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**HANDBOOK  
OF HOUSEHOLD SURVEYS  
(REVISED EDITION)**



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**NOTE**

**Symbols of United Nations documents are composed of capital letters combined with figures. Mention of such a symbol indicates a reference to a United Nations document.**

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## PREFACE

The revised United Nations *Handbook of Household Surveys* has been prepared to meet the evolving needs of national statistical services in this rapidly growing and developing field, drawing on experiences in survey work since the first *Handbook* was issued, in 1964 (57).<sup>\*</sup> The revised *Handbook* is the basic document in a series of technical studies prepared by the United Nations Statistical Office and in the context of the National Household Survey Capability Programme (NHSCP) designed to assist countries in planning and implementing household surveys and in making effective use of the data collected. In addition to the *Handbook*, a number of studies are being undertaken to provide reviews of issues and procedures in specific areas of household survey methodology, operations and topics. Two of these have been issued in draft form (80, 82), and several others are in preparation.

The revised *Handbook* has also been prepared in the context of other publications dealing with statistical methods and subjects issued by the United Nations and its specialized agencies. In particular, the *Handbook* can be seen as a further detailing and extension of the material presented in chapter IX of the United Nations *Handbook of Statistical Organization* (68).

In the last decade, the central and strategic importance of household surveys in the organization of national statistical services has come to be universally recognized. There has been an unprecedented expansion of household survey work in developed and developing countries in response to rapidly expanding demands for current and detailed socio-economic data on population. As NHSCP has noted, "Household surveys can provide extensive and up-to-date information on the conditions under which people live, the activities in which they engage, their level of income and patterns of spending, demographic characteristics and cultural factors which influence behaviour and response to social and economic changes" (81). Such data are indispensable in economic and social policy analysis, planning, programme management and decision-making at all levels of government.

The revised *Handbook* provides overall technical information and guidance of a relatively general nature to

middle- and senior-level personnel who are producers or users of survey statistics. On the producer side, this includes personnel in national statistical services charged with planning, organizing and implementing household survey activities. Among these are survey and sampling experts, data processing specialists, general statisticians, statistical managers and their staffs. On the user side are statisticians, planners, analysts, programme managers and policy-makers who will utilize the survey results for various purposes. The full range of activities involved in survey work is covered in order to promote overall co-ordination. Among the activities are planning, strategy and technical design; selection of topics and their translation into survey instruments and preparation of the accompanying manuals, instructions and training activities; organization and implementation of field work; processing, compilation, tabulation and dissemination of data; evaluation of the data and the procedures used to collect and process them; and analyses and arrangements for active storage and retrieval of the survey results. As in any complex undertaking consisting of many interrelated aspects, a failure in any one part can cause the breakdown or seriously compromise the success of the entire enterprise. Therefore, careful and realistic selection of objectives and strategy and meticulous advance planning of all aspects of the work are the best safeguard against such breakdowns and the serious waste of scarce human and financial resources which may result.

Many organizations and offices of the United Nations system assisted in the preparation of the present *Handbook*. In particular, Mr. R. B. Pearl drafted part one, as consultant to the United Nations Secretariat; the Population Division of the United Nations Secretariat drafted portions of chapter IX; the International Labour Office, the Food and Agriculture Organization of the United Nations, the United Nations Educational, Scientific and Cultural Organization and the World Health Organization drafted the chapters of part two in their respective fields of competence; and each of the regional commissions of the United Nations drafted the chapter of part three concerned with experience in its region.

Comments and inquiries concerning the *Handbook* are welcome. They may be addressed to the Director of the Statistical Office, United Nations, New York 10017, or to the concerned international statistical office as listed at the end of the bibliography.

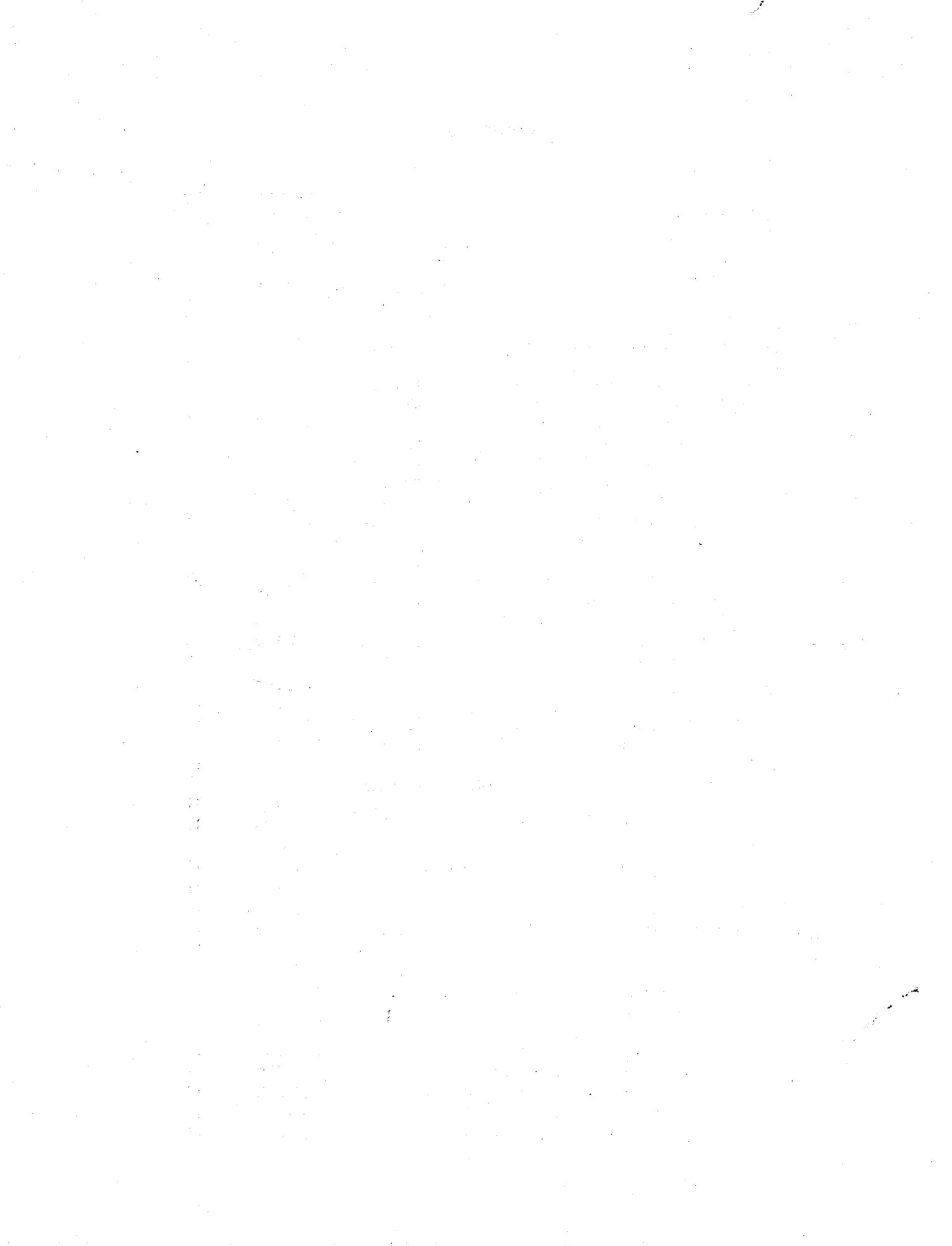
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<sup>\*</sup> Numbers in parentheses refer to numbered entries in the references listed at the end of the present document.



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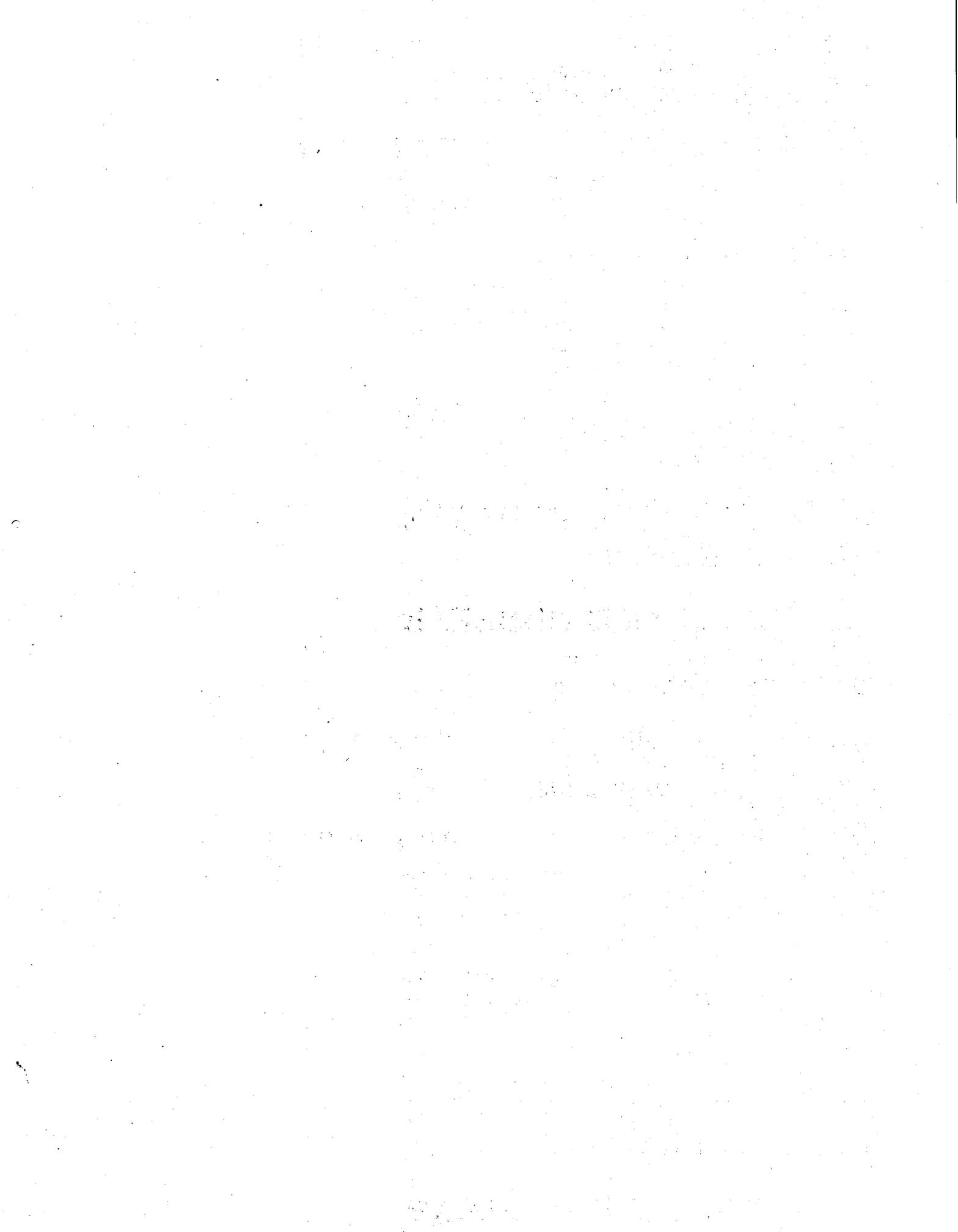
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## INTRODUCTION

### A. OBJECTIVES

1. The revised United Nations *Handbook of Household Surveys* has been prepared with two primary objectives. The first objective is to assist countries considering the development or improvement of a survey programme, however small or large in scope and coverage, in undertaking a careful review and analysis of their options in survey programme development to meet their priority data requirements in considering the implications of these in terms of inputs of human and financial and other resources and outputs of usable statistics. The second objective is to provide practical guidance to agency and programme managers and technical personnel on the organization and administration of survey operations and on the compilation, tabulation and interpretation of the data collected.

2. The first objective is concerned with the early stages of survey planning, when overall objectives and costs have to be considered and major potential constraints and pitfalls taken into account. For this purpose, particular emphasis is placed in the *Handbook* on consideration of trade-offs involved in various aspects of survey design and management and organizational arrangements, including intragovernmental co-ordination.

3. In this connection, the *Handbook* has also been designed to serve as a basis for developing communication and dialogue between producers and potential users of survey statistics. In this dialogue, it is essential to understand both the limitations and advantages of survey work and the many factors which affect the timeliness, reliability, accuracy and relevance of the results. The more precisely users can identify their requirements, the more effectively will users and producers together be able to design a survey programme to meet them.

4. Secondly, the revised *Handbook* is designed to provide practical guidance on each step of survey work. This work comprises a wide range of interrelated activities, including planning broad technical strategy and survey design, selection of detailed topics and their translation into survey instruments and preparation of the accompanying manuals, instructions and training activities, organization and implementation of field work, processing, compilation, tabulation and dissemination of the data, data analysis and evaluation and arrangements for active storage and retrieval of the survey results. In the *Handbook*, emphasis is placed on examining examples of results and applications from actual surveys, with special reference to the experience and needs of developing countries, and on problems of planning and carrying out an integrated survey programme to meet a variety of data needs and develop broad statistical capabilities in each country.

5. It is particularly hoped that the revised *Handbook* will be useful to national governments and international organizations participating in NHSCP. By Economic and Social Council resolution 2055 (LXII) of 5 May 1977, the United Nations has launched NHSCP as a major develop-

ment activity aimed at building enduring capabilities in developing countries to conduct their own integrated survey programmes.

6. The National Household Survey Capability Programme is addressed to the development of indigenous institutions and capabilities within developing countries in accordance with their own needs and development objectives. Within this primary objective, NHSCP stresses the advantages of household survey programmes, including the opportunities for wide choice of subjects, flexibility, an integrated approach to statistical activities, benefits of continuity, cost effectiveness, generation of internationally comparable data and practical application of technical co-operation among developing countries.

7. While the needs of developing countries where statistical resources and experience are scarcest have been given highest priority, the United Nations expert group on revision of the *Handbook* stressed that the *Handbook* would also be of great interest to statistical services in developed countries. In many of these countries, survey programmes regularly undergo substantial review and revision to keep pace with evolving statistical needs, to develop and improve concepts and methods, and to implement new processing, dissemination and retrieval technologies. Hence the present *Handbook* is also addressed to survey planners and practitioners in developed countries interested in reviewing their survey programmes in the light of experience in other countries.

### B. ORGANIZATION AND SCOPE

8. The revised *Handbook* is divided into three parts. Part one is devoted to general survey planning and operations. Although part one will be of particular interest to countries organizing new survey programmes, it also provides guidance to countries interested in reorganizing or improving existing survey operations, including in both cases countries participating in the National Household Survey Capability Programme. Parts two and three are devoted to essays prepared in collaboration with the interested United Nations specialized agencies and regional commissions on special issues related to survey content, design and operations of particular relevance to each subject-matter or region, within the context of an integrated survey or survey programme. These essays include illustrations and commentary on national work. They highlight some of the special problems facing survey planners in different parts of the world and in various subject-matter fields and show some of the approaches that may be considered to deal with these problems.

9. The primary guide in preparing the revised *Handbook* has been national experiences in household survey work, particularly in the last 20 years, since the first *Handbook* was issued (57). This experience has highlighted the advantages of household surveys for tackling a wide range of requirements for social, economic and dem-

ographic data on the population and has underlined the importance of careful and intensive survey planning and organization in the context of overall statistical planning and development to achieve survey objectives in an effective and efficient manner. A detailed review of the hundreds if not thousands of sample surveys of households that have been conducted by Governments in the last 20 years on a regular or *ad hoc* basis does not exist, but there is considerable documentation available from developing and developed countries describing survey operations and results. Along with experience in survey operations, much has been learned about how to use survey results more effectively in various subject-matter fields and about the uses to which they may be put and ways of fostering these applications.

10. It should be stressed that the revised *Handbook* is not intended to be either an academic text on survey sampling or a set of recommendations dealing with the subject-matter content of the survey or survey programmes. In the former case, textbooks covering sampling theory and practice are widely available and extensively used in university and other statistical training programmes. A list of such texts is included in section C of the bibliography at the end of the present document. In its treatment of sampling, the revised *Handbook* aims only at helping the non-specialist to grasp some of the main issues and ways in which these should be taken into account in survey planning and organization. Appropriate sampling expertise should be called on in actually designing and selecting the probability samples to be used in any survey.

11. With respect to recommendations dealing with the subject-matter content of surveys, no single document can provide guidance on this complex and diverse aspect of survey methodology. On the one hand, the needs and circumstances of countries vary markedly, so that no single set of recommended survey topics can be compiled. Indeed, one of the greatest advantages of the household survey is its great potential flexibility to meet diverse needs in different social and economic contexts. One of the primary purposes of the *Handbook* is to show how surveys or preferably a continuing survey programme based on a sound survey capability can meet these varying situations.

12. On the other hand, recommendations dealing with the subject-matter content of surveys, including definitions, concepts and classifications, cannot be divorced from the general international statistical recommendations dealing with each subject-matter. Survey organizers will want to draw as much as possible on the experience of other countries in the development of concepts, classifications and definitions and, with appropriate adaptation, of international recommendations. These recommendations, it must be stressed, are not limited to household surveys but provide substantive guidance on the definitions, concepts and classifications appropriate to one or another field of statistics. As these international recommendations are extensive and are widely available they are not repro-

duced in the revised *Handbook*, but many are discussed in parts two and three, and complete references are included in section A of the bibliography.

13. Some of the major subject-matter fields which have not been treated in part two are housing, human settlements and environment; tourism, travel and transport; time-use and non-economic activities generally; and public safety and criminal justice. In some cases, other international publications and studies are available to partially fill these gaps (on housing and human settlements, see (77); on tourism and travel, see (151), (152); and on time-use, see (110)), while in others, new studies are in preparation. In addition, there are other "cross-sectoral" fields which have assumed major importance in household survey work, which are not dealt with here. These include the role of women in development, rural development and agrarian reform, poverty and access to public services, including social protection. Particularly in the early stages of survey planning, the survey statistician and manager should be alert to the wide range of possible users and uses of the data, to ensure maximum use of the survey results and support for the survey programme.

14. Given the extremely wide-ranging and flexible nature of household surveys and the variety of national circumstances throughout the world, these essays by no means exhaust the topical and organizational issues that survey planners must face, but it is hoped that the planner will find in the essays assistance in dealing with some of the more important of these issues.

15. At the end of the *Handbook*, a bibliography and set of references is provided, followed by an index. The bibliography is divided into five sections. Section A contains references to international standards, recommendations and guidelines on statistical concepts, classifications and definitions which should be consulted in the preparation of any survey programme and to other international publications. Section B contains a listing of national studies and reports concerned with household surveys. Sections C and D provide listings of survey and sampling textbooks and technical articles and monographs, respectively, while section E provides a list of technical articles in French from the journal *Stateco* (Paris). The references are followed in section F by a list of addresses from which further technical information and assistance can be obtained, particularly by those working in developing countries who have limited access to bibliographic resources.

16. The present volume will be complemented by a second volume now in preparation consisting of a collection of actual questionnaires from national household surveys. These questionnaires will illustrate national programmes that have actually been implemented. They will be for illustrative purposes only, to highlight the diversity of national experience and approaches and the importance of each country thoroughly considering the organization, coverage, scope and methods of a survey programme in the light of its own experience, priorities and circumstances.

**Part One**

**GENERAL SURVEY PLANNING AND OPERATIONS 24**



# I. ROLE OF HOUSEHOLD SURVEYS IN NATIONAL STATISTICAL SERVICES

## A. OVERALL STATISTICAL PLANNING AND SETTING OF PRIORITIES

1.1. Although the present *Handbook* is devoted principally to household surveys, these must not be considered in isolation. Household surveys are an essential part of national statistical services, but they do not represent the entire statistical picture. Several United Nations publications discuss statistical planning, the organization and management of national statistical services and the development of social and related statistics in developing countries (62, 66, 68). Statistical planning must take into account the overall data needs of the country. Only in such an overall context is it possible to determine the appropriate role of household surveys in meeting data requirements and how such surveys can tie into periodic censuses and other data sources such as administrative records.

1.2. Statistics have a large and varied clientele but the Government is customarily the largest user. At the same time, the Government is the major producer of statistical data. Therefore, the final responsibility for overall planning in statistics is vested in some governmental authority. This final responsibility is often assigned to a central authority in a position to make broad-scale assessments, rather than decentralized to units with limited and specialized perspectives. The United Nations review of major issues in statistical organization states that a visible overall planning function is vitally important in the national statistical service "to ensure that appropriate planning takes place in the various sections and divisions as well as at the centre. . . . Efficient and effective utilization of new resources for strengthening capabilities . . . and changes in the allocation of available resources between programmes and activities involve comprehensive and sustained planning." (62, paras. 103 and 105)

1.3. This statistical planning must not be concerned with statistics as an end in themselves. Statistical objectives should reflect the concerns of the society, including those expressed at local levels. In many countries, particularly developing countries, these concerns are identified in the national development plans. The national plan provides a basis for determining the kinds of information necessary for planning and implementing programmes and assessing their effectiveness. It therefore provides a framework for developing a national statistical plan, keeping in mind, however, the fact that statistics are used for a large variety of purposes, not just planning (62, paras. 108-109). An appropriate balance among the different subjects covered is more likely to be useful in identifying various problems and meeting diverse needs than an unbalanced coverage would be.

1.4. Data priorities for household surveys must, therefore, be established in the context of an overall statistical plan, but many other considerations also affect determination of the most useful potential role of household surveys in a national statistical service. In particular, first,

there is an acute shortage of human skills and other resources for statistics, especially, though not exclusively, in developing countries. Secondly, the costs of statistical collection programmes vary according to the type of programme, the frequency of collection and the level of geographical and subject detail and accuracy. Finally, the methodology for data collection may be more advanced in certain subject fields than in others, which could determine the order in which various topics are investigated.

1.5. The United Nations review of major issues in national statistical organization stresses the continuing review and analysis of costs and alternatives in setting statistical priorities. "Ideally, priorities should be determined on the basis of analysis of costs and benefits of various alternative ways of using the scarce resources." However, even though "priority setting and allocation of resources among competing possibilities in statistics on the basis of precise cost-benefit calculations are practically impossible, . . . this does not detract from the importance and usefulness for efficient and effective management of analysing benefits in relation to costs on the basis of judgements and insights based on past experience and the fullest information, particularly of user needs, in order to render priorities and related resource allocations as rational and balanced as possible" (62, paras. 110 and 113).

1.6. The projected costs of a household survey programme can only be determined after a detailed plan has been drawn up. Assistance in preparing such a detailed plan is one of the major objectives of the present *Handbook* as a whole, and no attempt will be made to summarize this information here. However, the relationship of household surveys to other data sources should be assessed at an early stage of the planning process, once general subject priorities have been determined. These relationships are discussed further in section B below, while some of the different types of household surveys are described in section C. This is not a comprehensive review of the advantages and disadvantages of each type of survey, as these can only be assessed in the light of detailed examination of the circumstances and priorities in each country. Rather, this description is intended to provide a broad outline of the main options available for household surveys for the first stages of overall statistical planning.

## B. RELATIONSHIP OF HOUSEHOLD SURVEYS TO OTHER DATA SOURCES

### 1. *Population and housing censuses and household surveys*

1.7. A population and housing census is part of the fundamental statistical base of a country. It provides an inventory of the nation's human resources in great geographical and demographic detail (77, paras. 1.1-1.21). However, population censuses cannot be repeated frequently and the information can soon become outdated.

Sample household surveys provide a basis for updating census information at least for the nation as a whole or for broad geographical areas. The relationship is essentially a complementary one, between an infrequent but geographically detailed cross-section represented by the census and much more frequent time-series provided by surveys, which reflect continuous changes in a society (77, paras. 1.26-1.27).

1.8. Population and housing censuses and household surveys also complement each other in terms of the level of subject detail generally obtainable and in the kinds of subject-matter that may be explored. Usually a broad range of topics is included in a census but because of typical budgetary, manpower and timing constraints, most subjects can be covered only in a brief fashion in a complete canvass. With much smaller workloads and the opportunity to train fewer personnel more intensively, these subjects can be examined in much greater detail in a sample survey. For example, a census may obtain information on the number of persons in the labour force classified according to occupation. A sample survey, on the other hand, can explore such additional matters as skills, hours worked, earnings and earnings rates, secondary occupations and the like.

1.9. Censuses are also poor mechanisms for gathering data in complex fields requiring extensive interviewing, such as health, nutrition or household expenditures. It is frequently necessary to turn to sample household surveys to obtain information of these kinds.

1.10. Finally, it is not possible to anticipate all the data needs of a country far into the future at the time a census is being planned. Sample household surveys provide a mechanism for meeting emerging data needs on a continuing basis. For example, most countries faced a largely unanticipated energy crisis in the early 1970s but usually had little information on what kinds of fuel or energy were being used by various segments of the population for various purposes. Where the appropriate survey capability existed, there was the opportunity to fill this data gap by adding questions in an ongoing survey operation or through a special survey.

1.11. The various advantages of sample surveys are such that the idea has sometimes been advanced that surveys might, at some point, entirely replace censuses. A gradual transfer of subject-matter from censuses to surveys is possible to simplify the census, where extensive geographical or demographic detail is unnecessary. However, an adequate sample survey design is usually possible only with the detailed population and household counts, maps and other geographical materials, the various control figures and other inputs which can be obtained only from a census. In this sense, the census is the major source for preparing a survey sample design (77, paras. 1.213-1.216).

## 2. Household surveys and other continuous data sources

1.12. Household surveys are among the most flexible of all data gathering mechanisms. In principle, almost any subject can be explored, and the concepts and level of detail can be adapted to the requirements of the investigation. At the same time, household surveys are relatively costly. As is also (or even more) true in population cen-

suses, the information is subject to many kinds of non-sampling errors arising from the interviewing process. Survey information is also subject to sampling error, which increases quickly with the level of geographical detail sought.

1.13. Another potential data source is administrative records, and these should be considered from the standpoints of costs and accuracy for certain data when they are available. However, these sources are often limited in content and their use restricted for legal or administrative reasons. Similarly, they do not usually have the adaptability of household surveys from the standpoint of concepts or subject detail. Sources of these kinds are often incomplete, inconsistent or limited in their coverage, and in many fields, such as health conditions, nutrition or household expenditures, appropriate administrative records are not available. Moreover, administrative records often focus on the individual and do not provide any information on his household or family, limiting the analytical usefulness of the data.

1.14. As administrative and other alternative data systems emerge and improve, however, they may sometimes be used to reduce the demands on censuses or household surveys. For example, where civil registration systems are properly developed, it is possible to discontinue the collection of data on births and deaths through surveys. Most frequently, however, administrative sources and household surveys should be seen as complementary, and survey planning should ensure the application of integrating mechanisms, such as the use, in so far as possible, of common concepts and subject detail in the different systems (65, 66, 67). Where this is done, it is important to check administrative procedures periodically to ensure the proper application of these common concepts and classifications.

## 3. Conclusions

1.15. From the foregoing, certain principles may be summarized whereby household surveys are the indicated mechanism for carrying out various aspects of the statistical plan:

(a) When census information is out of date or in insufficient detail for planning or other purposes or does not cover the topics needed;

(b) When other continuous sources, such as administrative records, are incomplete or non-existent or are not conceptually compatible with the data requirements;

(c) When certain analytically important relationships (such as household and family relationships or determination of household income) which are not normally revealed in other data systems, even when they exist, must be explored;

(d) When the level of detail in geographical or subject-matter terms is such that statistically reliable information can be obtained using the sample size that can be funded and given available manpower and other necessary resources;

(e) When the subject-matter can reasonably be obtained from a household survey respondent.

1.16. Many subjects for which household surveys can be effective are discussed in detail in parts two and three of the present *Handbook*, in two United Nations publica-

tions on social statistics and social indicators (66 and 70), and in the prospectus of the United Nations National Household Survey Capability Programme (81). Among them are the following:

- Demographic characteristics, including sex, age, marital status, national or ethnic origin
- Vital events (births, deaths, marriages) and fertility
- Employment activity, status, occupation and kind of economic activity
- Agricultural and livestock enterprises
- Household industries
- Housing characteristics and facilities
- Population mobility and migration
- School enrolment, educational attainment and literacy
- Health status and access to and use of health facilities
- Nutritional status and food consumption
- Consumption expenditures
- Income
- Household assets
- Energy consumption
- Cultural and recreational activities, including tourism
- Use of time
- Personal transportation
- Opinions and attitudes.

### C. TYPES OF HOUSEHOLD SURVEYS

1.17. Once a household survey appears to be the appropriate mechanism for data collection, the question arises as to the type of survey to be instituted. There are many types of household surveys which can be considered and each type has advantages and disadvantages for specific purposes. Some of the principal elements of survey types, which are not mutually exclusive, are discussed below.

#### 1. Continuing survey programmes and unintegrated ad hoc surveys

1.18. The distinction between a continuing survey programme and a collection of improvised and unrelated *ad hoc* surveys is a fundamental one. Often there are demands to meet specific immediate statistical needs by taking *ad hoc* surveys. Although some of these may satisfy immediate purposes, they do not ordinarily provide a framework for a sound, continuing data base and time-series. Since start-up costs are usually large, unrelated *ad hoc* surveys tend to be costly. There is generally no opportunity to develop an adequate technical and field staff since the intermittent nature of such survey undertakings provides little continuity of employment. With irregular operations, it is difficult to accumulate and absorb the knowledge and experience necessary to achieve efficient and reliable survey endeavours.

1.19. A continuing survey programme based on a sound survey capability can embrace a wide range of undertakings of various kinds, including multi-subject surveys, specialized surveys, panel operations, and others, which are discussed further below. The specific mechanism or combination of mechanisms chosen in any partic-

ular case will depend on subject-matter requirements as well as resource considerations. One feature of an ongoing survey programme is that an ongoing capability is created by assuring technical and field staff of employment. The justification and opportunity are also thereby established for development of advanced technical capabilities in such fields as sampling, cartography, computer usage and the like. The experience gained in continuing operations provides the basis for gradual but steady gains in efficiency and quality.

#### 2. Multi-subject surveys

1.20. In multi-subject surveys a variety of different subjects is covered in the course of a single survey cycle or round. Such surveys are usually termed "integrated" or fully integrated if all of the subjects are covered with all of the households. There are options whereby some of the subjects are covered for all households but others are alternated among different subsamples of households. Still another option entails using different subsamples for each subject but covering all topics in this manner in each geographical area, such as a village or city block, in the sample. These are often called "nested" designs. One purpose of partially integrated or "nested" designs is to limit the sample sizes to those specifically needed for particular subjects, rather than covering all topics with the full sample.

1.21. An example of a fully integrated multi-subject survey is the large-scale omnibus undertaking in Brazil in 1974.<sup>1</sup> Using a large subsample of the then quarterly labour force survey (55,000 households out of a total of 100,000), information was collected for all households on a wide range of socio-economic characteristics, labour force participation, family budgets and expenditure and nutrition.

1.22. An example of a partially integrated multi-subject endeavour is the National Integrated Sample Survey Programme in Kenya.<sup>2</sup> All of the 30,000 or so households in the overall sample are covered in the demographic inquiry to measure births, deaths and population changes. A subsample of 12,000 is included in the inquiry on labour force participation and related aspects of economic activity. A different subsample of about 1,700 is canvassed for the purposes of the Integrated Rural Survey, which examines the household and enterprise characteristics of rural residents.

1.23. An example of a "nested" multi-subject undertaking is the long-standing annual National Sample Survey of India.<sup>3</sup> The survey is based on a large sample of urban blocks and rural villages. All inquiries in a given survey round take place in the same designated areas. However, different subsamples of households are usually selected for purposes of the various subject inquiries.

1.24. Multi-subject surveys generally provide much greater economy than a series of surveys covering the same range of subjects. More efficient use is made of the

<sup>1</sup> Further information on this survey will be provided in volume II of the present *Handbook*. See also (131) and (153).

<sup>2</sup> Further information on this survey programme will be provided in volume II of the *Handbook*.

<sup>3</sup> Further information on this survey programme will be provided in volume II of the present *Handbook*. See also (165).

survey samples and field staff, and travel time and costs are much less. These considerations are especially important in developing countries with limited resources for statistics and where travel conditions are often difficult.

1.25. Where the surveys are "integrated", there is also the opportunity to cross-classify different subjects for the same households and individuals and thereby enrich the analysis. Even where they are not fully integrated, some such data co-ordination is possible at the area level or for comparable demographic or socio-economic groups.

1.26. A principal disadvantage of multi-subject surveys is the potential length and complexity of interviews, especially when there is full or partial integration of the subject-matter. More training and supervision of the interviewers is generally necessary to avoid serious non-sampling errors and to conduct relatively lengthy interviews efficiently. Even in "nested" designs, the interviewers must usually be trained in and familiarized with the whole range of subjects. Careful consideration of these complexities is essential in planning the scope of a multi-subject survey.

1.27. Another possible limitation is the compromises that may be necessary in the sample design. Certain types of designs may be more efficient than others for certain kinds of inquiries. When different subjects are combined, some compromises will generally be needed which may not be optimal for any one subject. This problem, however, is not likely to be a major issue in overall accuracy in most instances.

1.28. Potentially more important are the complexities and delays in data processing that may arise from ambitious coverage of a range of subjects. Since data processing is often one of the principal bottlenecks in survey operation, close attention to this problem is essential. Complex multi-subject surveys could also overload the capacity of the analytical staff and delay the issuance of the results.

### 3. Specialized surveys

1.29. Specialized surveys are those concerned with a single subject or issue. Specialized surveys may be *ad hoc* or they may be implemented as part of an ongoing national survey programme but conducted with separate samples because of subject-matter or other considerations. They may be conducted periodically, irregularly or only once. The same technical and field staffs might be employed for purposes of planned specialized surveys as for other parts of a continuing programme.

1.30. Specialized surveys may be inefficient if a series of such surveys is used to obtain a range of information which could equally be sought in a single multi-subject inquiry. Analytically, they do not permit the range of cross-classifications possible in an integrated multi-subject survey.

1.31. On the other hand, specialized surveys permit concentration on a single subject in the course of data collection. This could be important where a great deal of detail is needed or where the subject-matter is highly complex, as in the case of expenditure. In some instances, when technical knowledge is essential, it may even be necessary to use specialized personnel, such as nurses or medical students, in a detailed health survey. Respondents are less likely to become confused in a specialized survey

with a highly trained interviewer than in an operation where the questioning deals with a wide range of subjects. Specialized surveys also permit the optimization of sample designs from the standpoint of a single subject, unlike multi-subject surveys.

1.32. Examples of specialized surveys are numerous. Most household budget or consumer expenditure surveys are of this kind. Many labour force surveys are also specialized undertakings. There are numerous examples in other fields, such as demography, nutrition, housing and health.

### 4. Multi-phase surveys

1.33. In some surveys information is collected in succeeding phases, with one phase serving as the forerunner to the next. These represent a special kind of multi-subject survey. They may be partially integrated to the extent that all of the information is collected for at least some of the sample units. However, the survey questioning at any one phase is less complex than if all of the information is obtained at one time. The same general subject can be covered in the various phases but with differing amounts of detail in each. An example of a multi-phase survey would be a survey of population and housing conducted in the urban areas of a country. Based on income information collected in the first phase, appropriate-sized sub-samples can be selected from each income class for purposes of a second-phase household budget survey.

1.34. Where the initial phase uses a larger sample, which is usually the case, the information may be used to improve the statistical reliability of the data for the subsequent phases. Ratio estimation procedures can be employed for this purpose, using the more reliable population parameters obtainable from the first-phase data. This is discussed in chapter IV.

1.35. A multi-phase approach of a somewhat different kind is the use of the same sampling source for different survey purposes. For example, as shown in chapter IV, listings of households may be prepared for various areas in the country as one of the initial phases of the sample selection process. Different samples may be drawn from these same listings for different surveys, which would make the most use of the often costly and laborious listing phase.

### 5. Panel surveys

1.36. In the customary multi-phase survey, the follow-up phases generally occur shortly after the first phase, in order to reduce the problem of household mobility. Panel surveys, on the other hand, entail successive surveys of the same sample units, which are deliberately spaced over time (say, monthly, quarterly or annually), because one of the objectives is to measure changes in the units. In the typical panel survey, certain major topics are repeated periodically because of this interest in measuring changes over a period. Other subjects can be alternated. This achieves results similar to those of an integrated multi-subject survey but with less complex interviews at any one time.

1.37. Panel surveys can interview the same specific households or even individuals each time, but this requires tracing those who move, which is costly and time-con-

suming. An alternative is to use the same sample addresses or housing units each time and interview whoever is living there. This procedure is less costly and almost as effective as the first, provided mobility is not excessive.

1.38. One problem with panel surveys is possible attrition in the sample as respondents become fatigued with or lose interest in the survey. Some systematic rotation of the sample, such as replacing a systematically selected proportion of the units each time, can reduce this problem. Another possible drawback is that the responses of individuals may be affected by repeated interviews, especially if the same subjects are covered. For example, if a person who does not read very much is asked on repeated occasions whether he reads newspapers or magazines, he may eventually say that he does to oblige the interviewer, or actually be induced to do so.

1.39. An example of a long-standing panel operation is the Current Population Survey of the United States of America, which has been conducted on a monthly basis for about 40 years. A complex rotation system is employed whereby each sub-sample is interviewed eight dif-

ferent times, once a month for four months one year and over the same period of four months a year later. The sample overlap is about 75 per cent from month to month and 50 per cent from year to year. This enhances the principal objective of the survey, which is the measurement of trends in employment and unemployment (208).

1.40. A unique feature of panel operations is the possibility of developing so-called "longitudinal" measures, that is, analyses of the changing status or behaviour over time of specific individuals or households. For example, studies can be made of the changing composition of households, of changes in the employment activity and status or occupation of individuals and of increasing or decreasing incomes or expenditures as a consequence of altered circumstances. For such analyses, various special procedures are needed. These include procedures (a) to link data on individuals and households from survey to survey, (b) to deal with those households or individuals which move between successive surveys and (c) to deal with those which are not interviewed because they have moved and cannot be found or for other reasons.

## II. ORGANIZATION OF SURVEY ACTIVITIES

2.1. The organization of survey work must take into account the desired scope, coverage and frequency of the survey or surveys and the existing structure and capabilities of the national statistical service. While no general rules can be given on the best form of national statistical organization, the United Nations review of issues in the organization of national statistical services does state that "There is wide agreement that it is beneficial to a country to have a strong central statistical office which is administratively autonomous and whose head serves as the country's chief statistician." As concerns household surveys this report further states that "There appears to be a consensus that the central statistical office should be responsible" for these (62, para. 33).

2.2. This report on statistical organization goes on to discuss the advantages and disadvantages of various degrees of centralization of statistical services and of various approaches to this issue. Despite wide variation in organizational approaches and priorities among countries, the development and implementation of any survey or surveys do require provision of certain administrative, functional and subject-matter capabilities. Regardless of how the national statistical service is organized, these capabilities are essential for the conduct of survey activities. They may be provided within a central survey unit or in some cases through co-operation between the nuclear survey staff and other elements of the national statistical service. These essential capabilities are summarized in the following sections and most are discussed in detail in the following chapters.

### A. NUCLEAR STAFF

2.3. Every survey programme, no matter how limited in size and scope, requires at least a nuclear staff of professional personnel for administrative and operational purposes. There is no absolute criterion of size for this purpose but the nuclear staff must, in one way or another, cover all of the necessary aspects of survey administration. As an example, a minimum staff might consist of an overall survey director or planner, a subject-matter specialist for each field to be covered, a sampling specialist, one or more assistants versed in survey design and field work and a computer or data processing specialist. Some capacity to handle normal administrative and service requirements is also important. On any nuclear survey team the various members must be flexible and capable of assisting one another as the need arises. It should be evident that the initial scope of a survey programme must be tailored to the capacities of the available staff.

2.4. Since many survey programmes are planned to commence shortly after the conclusion of a population census, the staff developed for the conduct of the census might serve as the source of a nucleus for survey work. The census staff may, of necessity, be compressed into a

smaller nucleus as the census funding expires, and that nucleus can serve as the basis for launching a survey programme. In addition, certain capabilities developed for census purposes, for example, for mapping or other geographical work, data processing and computer services and the like, may continue after the census, most probably on a smaller scale, to serve the overall needs of the national statistical service. In that situation, the survey organization can call upon such existing services rather than developing its own capabilities in those sectors.

2.5. As survey programmes evolve and expand, it is necessary to augment the staff accordingly. It should eventually be possible for the staff to specialize in the various survey activities, such as survey management, subject-matter development and analysis, sampling and survey design, field administration and data processing. With the increase in specialization, a suitable balance between subject-matter and functional organization is needed. As one example, development of data requirements and related analytical duties may be assigned to separate organizational units, according to the subject-matter, whereas the technical activities, especially survey design, cartography, field work and data processing, may be organized on a functional basis.

2.6. The kinds of capabilities required in the various functional areas in a more advanced organizational structure are discussed in the following section. In actual practice, there is not necessarily a one-to-one correspondence between organizational units and functional capabilities. Even in a more complex organization, some of the different functions could be carried out by the same individuals, either simultaneously or at different times.

### B. REQUIRED FUNCTIONAL CAPABILITIES

#### 1. *Planning and management*

2.7. The overall planning and direction of a survey programme should be carried out in close collaboration with users and require a broad-based group, co-ordinated at a high level, with representation from subject-matter and technical interests as well as from administrative services, such as budget and personnel offices and field administration. The main responsibilities include:

(a) Planning of the overall survey programme in terms of the broad content and basic approaches to be used;

(b) Allocation of resources and personnel among programmes and functions;

(c) Establishment of priorities and setting of timetables for implementation of programmes in accordance with the basic overall statistical plan;

(d) Charting of progress and adherence to timetables;

(e) Resolution of major problems and bottlenecks;

(f) Preparation of cost estimates and survey budgets.

## 2. Subject-matter specialists

2.8. The nuclear survey staff should have access on a day-to-day basis to subject-matter specialists, including users, with quantitative skills and interests. Organizational arrangements must be made among these to carry out the following responsibilities in each subject field:

- (a) Planning of detailed survey content;
- (b) Determination of concepts and definitions;
- (c) Planning of tabulations;
- (d) Analysis of results and preparation of publications;
- (e) Maximum consistency of the data with related data from other sources;
- (f) Conduct of more detailed analyses, such as development of social or economic models, social indicators and population projections.

## 3. Survey preparation and development of procedures

2.9. Technically trained professional personnel, proficient in statistical and mathematical sciences but preferably with some exposure to and interest in subject-matter, are needed on the nuclear staff for this function. The responsibilities should include:

- (a) Translation of the specified content and designated concepts into usable survey questionnaires, in co-operation with subject-matter specialists;
- (b) Conduct of pre-tests and pilot studies;
- (c) Design of samples and estimation procedures;
- (d) Determination of data collection procedures;
- (e) Preparation of training programmes and training materials for field personnel;
- (f) Design of quality control procedures and evaluation studies;
- (g) Conduct of essential methodological research.

## 4. Cartography (mapping)

2.10. Access to geographers, cartographers and supporting personnel is needed for cartographic work. They must develop the necessary mapping materials for purposes of sample selection and field administration and enumeration. The preparation of illustrative maps for inclusion in publications may also be desired.

2.11. Comprehensive mapping materials are usually prepared in the course of population and housing censuses (77, paras. 1.70-1.81). If such is the case, these can serve as the starting point for meeting cartographic needs for survey purposes. As the United Nations population and housing census recommendations state, "Maps and prior census information concerning small areas are very important for devising a good sample plan. Maps are particularly valuable if they unambiguously indicate boundaries of very small areas and the number of living quarters, households or inhabitants living within the boundaries. This prior information need not necessarily be very accurate or up to date if it is used for grouping or stratification." (77, para. 1.215)

## 5. Organization of data collection

2.12. A capability to undertake field work is an essential element in any survey programme. This requires full-time or part-time interviewers and field supervisors. The field work can be directed from a central office in smaller countries but may require a regional office structure in larger ones. The responsibilities of those in charge of field work include:

- (a) Recruitment and training of field staff;
- (b) Conduct of any advance listings of households or field counts needed for sampling purposes;
- (c) Maintenance of control over the flow of field materials;
- (d) Conduct and monitoring of the data collection phase, including observation of interviews, field review of questionnaires, conduct of reinterviews and other quality control procedures;
- (e) Conduct of specified evaluation studies.

## 6. Data processing and dissemination outputs

2.13. A variety of personnel is required to carry out data processing, including computer systems and programming personnel, supervisory and clerical personnel for coding, editing, and other clerical operations and computer and other machine operators and maintenance staff. Major equipment requirements include not only computer hardware but auxiliary equipment such as that needed to convert survey information to a machine-readable form and to print computer output. The responsibilities of those in charge of data processing include:

- (a) Determination of the basic processing approach, such as the extent to which clerical and other manual operations will be used in conjunction with computer operations;
- (b) Development of computer programs and related specifications, if necessary, after considering use of available computer software packages;
- (c) Development of specifications for any indicated manual processing of questionnaires;
- (d) Manual and/or computer editing and coding of survey data;
- (e) Transference of survey data from questionnaires to machine-readable form;
- (f) Preparation of the specified tabulations and other required output, such as sampling variances;
- (g) Provision for permanent storage in usable machine-readable form of the survey micro-data (the original data after editing);
- (h) Provision for alternative means of data dissemination in addition to publications, such as issuing data tapes to users or preparing special tabulations.

## 7. Co-ordination of functions

2.14. Needless to say, it is essential that the various functional areas be closely co-ordinated in order to assure an efficient and consistent system. For example, it is crucial that subject-matter and data processing specialists be in close touch with respect to coding and editing specifications, programming requirements and the like.

### C. LEGAL AUTHORITY

2.15. An important element in survey administration is appropriate legal authority for collection of statistics. This authority usually exists for government statistics in general, but additional authority should be obtained if needed for survey programmes. The legal authority sometimes specifies the obligation of all persons to provide the requested information. This provision is rarely invoked

except in extreme circumstances. Dependence is placed mainly on voluntary co-operation.

2.16. Legal restrictions against the disclosure of information provided by individuals or prohibiting adverse use of such information are an additional essential provision which should be ensured. Such restrictions also protect the statistical authorities against demands from other agencies for the release of individual data.

### III. SURVEY PLANNING

#### A. STAGES OF PLANNING

3.1. The success of a survey programme depends on a number of factors. Even an outstanding plan will not guarantee success in the undertaking. However, inadequate planning will almost certainly result in failure. It is important to recognize that development of an adequate survey plan requires time as well as staff and money, and that a planning cycle of as much as two or three years is not uncommon for an undertaking of any complexity. Pressures will frequently be present for compressing the timetable for development of urgently needed data. However, although some shortcuts may be possible on occasion, undue haste can be wasteful and self-defeating in the long run and can result in unusable or seriously deficient information. Once a continuing survey organization and the necessary mechanisms are in being, subsequent data-gathering endeavours can be accomplished much more expeditiously. The sample design and technical and operational materials prepared for one survey undertaking can often be adapted and used for subsequent aspects of a continuing programme.

3.2. The principal stages of planning and preparation may be summarized as follows. They are not necessarily in chronological order (for example, budget estimates must be prepared at an early stage), and some may be carried out simultaneously or continuously:

- (a) Survey planning:
  - (i) General planning of the survey programme;
  - (ii) Selection and specification of subject-matter and preparation of tabulation plans;
  - (iii) Development of the survey design:
    - a. Decisions on type of survey framework;
    - b. Scheduling and timing considerations;
    - c. Decisions on population coverage;
  - (iv) Development of budget estimates and a calendar of operations.
- (b) Survey preparation:
  - (i) Design of survey samples;
  - (ii) Development of cartographic materials;
  - (iii) Development of survey procedures:
    - a. Determination of data collection procedures;
    - b. Design of survey questionnaires;
    - c. Pre-testing of questionnaires and survey procedures;
    - d. Preparation of instructional and training materials for field use;
    - e. Decisions on selection of survey respondent;
    - f. Decisions on compensation of respondents;
    - g. Development of a quality control system for survey operations;

- h. Decisions on data processing methodology, such as the appropriate mixture of clerical and computer operations and extent of manual editing and coding;
- i. Institution of an appropriate publicity and public relations programme.

Each of these stages is discussed in the remainder of this chapter and in chapter IV.

#### B. GENERAL PLANNING

3.3. Once the essential elements of a survey programme have been decided upon in broad terms (see chap. I), the statisticians, in co-operation with users, can begin more detailed planning. This planning is usually carried out by a relatively small group of senior staff members representing subject-matter, technical and administrative (budget, personnel and the like) backgrounds, and users. The interaction and co-ordinated review of these specialists are important in achieving consistency among the various elements and compatibility with the overall survey objectives and user needs. Many factors have to be taken into account.

3.4. One of the first issues the planning group must deal with is the detailed selection of the subject-matter of the programme and any priorities that have to be decided. The establishment of a general timetable for accomplishing the various objectives is a logical corollary.

3.5. A second issue is survey design. This is a highly technical matter, requiring detailed study. However, the planning group should review some of the major design alternatives and decide on those it especially wishes the technical staff to consider, taking into account the country's physical features, distribution of population and ease and availability of transportation and the subject-matter to be investigated.

3.6. Staffing requirements for the various aspects of the programme are a third crucial planning consideration. The possible means of meeting staff needs through recruitment, reassignment, retraining of personnel or other ways must be dealt with at an early point.

3.7. Other resource requirements are a fourth major concern of the planning group. Attention must be given to requirements for space, major kinds of equipment and other basic facilities.

3.8. The availability of budgetary resources is a fifth matter of concern. The means for developing reliable and detailed estimates of cost for various activities and alternatives requires close attention.

3.9. A related group of issues is the assignment of responsibilities for various aspects of planning and implementation of the programme, target dates for completion of various detailed plans, and mechanics for charting and monitoring progress.

## C. SUBJECT-MATTER

## 2. Organization of subjects

### 1. Selection and specification of data requirements

3.10. Determination of the subject-matter requirements for a survey programme should be made in the context of an overall government statistical plan, as discussed in chapter I. Once the general requirements and priorities have been determined, subject-matter specialists in the statistical agency must translate the needs of users into detailed specifications for survey use. This responsibility is especially significant when the data requirements are expressed in only general terms, as may often be the case in the first stages of a programme. In fact, it may sometimes be necessary to anticipate the specific needs of policy officials.

3.11. For example, the Government may have a population planning programme which requires a detailed knowledge of the rate of natural increase in the population. Concern may be especially great with regard to population growth in the capital city area, where immigration of rural residents has accentuated the problem. The subject-matter specialists would have to decide which data elements were needed to shed light on these issues. In the absence of a reliable registration system for vital events, information would clearly be needed on births and deaths in some geographical detail. The extent and sources of migration into the capital city area would be another necessary topic. Consideration would also be given to the kinds of demographic and other characteristics which would be important in analysing the findings.

3.12. At the same time, the subject-matter specialists might observe that the required inquiry presented opportunities for filling other data gaps. For example, in identifying births, information could be obtained on the circumstances and place of delivery (in hospitals, with midwives etc.) and the extent of infant mortality. For deaths in general, the cause of death and the extent to which the person had received medical attention could be ascertained. In the case of population migration, the degree of mobility among regions, as well as to and from the capital city, might readily be obtained as an aid in improving regional population estimates. Some of these additional matters might be explored at relatively little cost; others could require increased budgeting. In any event, it would be the obligation of the subject-matter specialists to point out these opportunities to survey planners and users and to seek their views.

3.13. Another immediate issue the subject-matter specialist must address himself to, in co-operation with survey specialists, is whether the proposed data can reasonably be obtained from household survey respondents. Regardless of the importance of or need for the information, there is little point in attempting to cover it in a household survey if there is small likelihood that it can be supplied with acceptable accuracy by the respondents. Sometimes, prior experience or the experience of other countries can provide evidence on this point. At other times, pre-testing may be the best or only means of securing such evidence. Where the feasibility of certain important topics is seriously in question, subject-matter specialists should suggest and investigate other possible sources or means of developing the information.

3.14. An issue which is extremely important in survey planning but one for which there are few guidelines is the manner in which subjects should be organized or distributed over various survey rounds in multi-round surveys. In the context of the overall data requirements, early decisions are needed on which topics may suitably be combined for survey purposes and which should be undertaken as separate inquiries. Technical as well as subject-matter considerations must be taken into account.

3.15. One approach in a continuing programme which has received much attention and consideration is the notion of a "core" of items to be included in each successive survey. The core usually includes certain basic demographic characteristics, such as sex, age, marital status, national or ethnic group, educational attainment and the like, which are almost invariably needed for cross-tabulation with other subjects. It can also include certain changeable subjects for which frequent measurements are deemed desirable (for example, employment activity and status) or which are the continuing focus of government policy (as may be the case for elements of population growth, namely, birth and death rates and the like). The core is ordinarily supplemented by various "modules", or standardized groups of questions on particular topics, which can be rotated from survey to survey. There may be separate modules, for example, on migration, school enrolment, housing conditions, health matters, nutrition and income or some combination of these. In addition to providing a continuously updated body of basic statistics, the "core" approach permits the use of a standard set of classifiers across the various subject fields. On the other hand, the continuing inclusion of a set of "core" items obviously occupies a sizable part of the capacity of a given survey round and thereby limits the range of other topics that can be covered.

3.16. In deciding on the possible combination of subjects in a given survey, a predominant consideration is likely to be budgetary and administrative constraints. Where resources are extremely tight, the only way to achieve programme objectives may be to combine as many subjects as can reasonably be accommodated in a given survey undertaking. On the other hand, there may be subjects of so complex a nature that there is no viable way of combining them with other inquiries.

3.17. In cases where options exist, an important consideration is to combine topics in a manner that will produce the greatest dividends from an analytical standpoint, that is, those which would be most meaningful in terms of cross-tabulation. For example, there is usually a close relation between education and occupation, between time worked and earnings, between health and nutrition and the like, so that such combinations of topics are useful analytically. Of course, good analysts will often proclaim that there is no limit to the variables that are useful for analytical purposes. However, when pressed on this matter, they are usually able to designate the combinations that make the most sense for their purposes.

3.18. Compatibility of subjects, that is, combinations that would appear reasonable or logical to respondents, can be another basis for judgement. It might not be wise, for example, to combine questions on receipt of income with those on payment of taxes, since this could arouse

suspicions regarding the motives of the inquiry. Entirely unrelated subject combinations, for example, fertility, crime and crop irrigation, can result in rather abrupt questioning unless special care is taken in making the transition from one subject to another.

3.19. Another aspect of compatibility relates to the optimal sample designs or data collection procedures for different subjects. Where the requirements are similar, there can be a strong case for combination. If substantially different approaches are needed, a combination might result in compromises that do not satisfy any of the component parts. For example, an optimum design for studying relatively rare events such as births and deaths might call for canvassing large groups of adjacent households. However, such a design would be highly inefficient for studying housing conditions, since neighbouring dwellings are often much alike. These two subjects, therefore, would not constitute a desirable survey combination.

3.20. One ultimate limiting factor is the extent of questioning sustainable in an interview without overloading the operation to the breaking point. Even well-trained and experienced interviewers can be over-strained by the inclusion of too many different topics. The effect on respondents, in terms of creating confusion and arousing antagonism, can be even greater. Survey respondents can also be annoyed not only by unduly lengthy and complex interviews but by being contacted frequently by survey organizations for different purposes. Therefore, it is important in designing samples to avoid unnecessary overlapping of surveys for the same respondents.

3.21. Another constraint in combining survey topics is the danger of overburdening the data processing and analysis phases. As previously indicated, this could result in serious delays in compiling the survey findings, and the analytical staff can be overwhelmed when too many different kinds of data are produced at the same time.

### 3. Comparability of data with other sources

3.22. One of the issues the subject-matter staff must consider in developing the survey content is the degree of comparability with other sources. For example, a frequent requirement in a statistical plan is to update certain information collected in the most recent census. At the same time, more detail may be needed on these subjects than could be obtained in the census. Since the level of detail requested can sometimes influence the kinds of responses received, care is needed to avoid incomparabilities with the census. One approach is, first, to repeat the relevant census questions for everyone in the household (thus providing continuity with the census series) and then ask for the more detailed information needed currently for each person.

3.23. Comparability with prior surveys may also be an issue. A question which always arises is whether it is preferable to introduce new and improved concepts or questions in a current survey or to lean in the direction of comparability with the past. One solution often offered is to proceed with the improvements but also attempt some linkage with the past (perhaps in the manner indicated above). Where it is not feasible to use both the new and old approaches in all cases in a survey for budgetary or other reasons, there is the option of repeating the old concepts or questions for only a subsample, but one of suffi-

cient size to provide for reasonably reliable estimates of the differences between the two procedures. Where the linkage data are sufficiently reliable, they can sometimes be used to revise the data from previous surveys in order to create a continuous series.

3.24. There may also be considerations of comparability with international recommendations or at least with the standards commonly used in similar countries in the same region. Where a country's data needs deviate a good deal from such standards, one useful approach is to obtain sufficient additional information—at least for a subsample or at some point in time in a continuing programme—so that valid comparisons can be made at some level of detail.

3.25. Comparability can also be affected by questionnaire design, such as the set of pre-coded answer boxes provided for a given question. It is important that these be consistent from survey to survey, or at least that comparable categories can be achieved through appropriate combinations of the various answer boxes in different surveys.

### 4. Determination of concepts and definitions

3.26. The selection of subject-matter means little without the specification of the concepts and definitions to be used. This specification is essential for purposes of framing the survey questions. For example, an inquiry on employment depends on what is meant by that term—paid work only or home enterprise or unpaid work in a family business as well—and what period of time (for example a week or a month) the questioning refers to. A survey on income depends on how that concept is defined—whether money income only, or also the monetary equivalent of free rent or other income in kind and the value of home-produced goods and the like.

3.27. The delineation of concepts is no simple matter. Some guide-posts are available from international or regional recommendations and guidelines which are provided for most kinds of subjects. Previous experience in censuses and surveys will usually be helpful. Whatever the case, the operational definitions should be as simple and unambiguous as possible and meaningful and understandable to the population being surveyed. For example, there would be little point in using a strictly monetary definition of expenditure as an indicator of the level of living in a country (or part of a country) where home production may be the main source of consumption. Instead, measurement of the quantities of goods (or frequency of services) obtained in some manner might be the only viable approach. Discussion of conceptual issues affecting different kinds of subject-matter may be found in parts two and three of the present *Handbook*.

### 5. Other considerations

3.28. There are various other issues to consider in planning the subject-matter content. Some of the more important ones are discussed below.

#### (a) Level of detail

3.29. Several factors have to be taken into account in determining the level of detail that will be provided on a given subject. Perhaps the most important consideration is

the minimum detail needed for meaningful analytical purposes. As an example, let us assume that a study is being made of the socio-economic characteristics of various national or ethnic groups in a country in which there are five clearly identifiable major groups and several dozen numerically minor ones or tribal affiliations within each major one. Since it is difficult and time-consuming to distinguish among many of the minor groups, it would be important to limit the inquiry to those for which distinctions are most essential. Upon careful study, it may be decided that sociological differences within two of the major groups would make it important to attempt to subdivide one of them into two subclasses and the other into three subclasses. Insufficient differences within the three other major groups, however, may indicate that it would not be worth the considerable effort required to attempt further subdivisions.

3.30. A second factor is to specify a level of detail for which reliable estimates can be obtained with the survey size and design that is contemplated or which can be supported. There is little point in specifying a level of detail which cannot be reliably measured within the survey limits. Possible non-sampling as well as sampling errors also have to be taken into account. For example, income reporting is always difficult and may be a particular problem under certain conditions. In such cases, it is of little value to specify very fine income categories.

3.31. Sometimes, analytical needs dictate obtaining certain data in greater detail than can be reported for a given sample in order to provide a greater degree of flexibility in the tabulations. For example, age is almost invariably needed in analysing various subjects, but the age detail required will vary from subject to subject. In most cases, it is as easy to collect data on actual age or date of birth as it is to obtain the information in some grouped form, such as 5-year or 10-year groups. (This does not mean that the reporting is necessarily accurate.) Although the survey data could not reliably be tabulated by single years of age, the availability of the age information in this detail permits creation of different age groupings for different purposes.

#### (b) *Frequency and periodicity of data*

3.32. The frequency with which certain data are needed may be stipulated in an overall statistical plan but may often be left to the judgement of subject-matter specialists. Budgetary restraints, human resource limitations, data processing requirements, and other resource problems could be a principal factor in deciding on the frequency of providing various kinds of statistics. Certain specialized data (for example, food consumption data) are much more costly and time-consuming to gather than others, so that they could not readily be collected very often. Planning and policy considerations could also be a factor. For example, if population policy is a priority issue, continuous or at least annual collection of data on vital events may be indicated.

3.33. The rate at which certain types of data are subject to change would likely be another factor. For example, employment is a relatively fast-changing measure, so that many countries provide for frequent observations (some as often as monthly). On the other hand, such subjects as housing, health, educational level and the like tend to change rather slowly (unless there are "crash"

programmes in these fields) so that less frequent measurements may be indicated (perhaps only once every several years).

#### (c) *Requirements of precision*

3.34. It is difficult for planning officials or even subject-matter specialists to specify the level of precision required for various kinds of data. Judgements may sometimes be based on previous studies or prior experience. For example, it might be determined that a difference of two points in the birth rate per 1,000 population or 3 percentage points in the unemployment rate could have a significant effect on government policy or on the general condition of the country. The reliability requirements might then specify that the survey should be able to measure such differences with confidence (for example, within 1.6 or 2 standard errors). Of course, it might not be possible to ascertain until the entire survey design is completed whether the standards are attainable or whether compromises will be needed.

### 6. *Preparation of tabulation plans*

3.35. The development of tabulation plans is listed as a preparatory activity because it is important that it be accomplished at the earliest possible stage, well before the start of data collection. When this planning is completed, it is possible to initiate the preparation of computer and other tabulation specifications, clerical coding and editing instructions, and other materials essential in compiling the final data. Delays in preparation of the tabulation plans beyond the initiation of data collection will almost inevitably result in delays at the processing stage.

3.36. The early preparation of the tabulation programme can also provide valuable opportunities to demonstrate to potential users the value of the survey and to make a final assessment with them of the compatibility between the data requirements and the final survey design. Some modifications in one aspect or another may be needed where clear disparities, not previously evident, emerge. A comparison may also be made at that point between the questions that are asked and the tabulations that are planned to ensure that no unnecessary questions are included and no essential analyses are omitted.

3.37. Illustrations are given in part two of the present *Handbook* of the types of tabulations that might be specified for different kinds of subject-matter. At this point, it will only be reiterated that the principal data objectives, the level of detail needed for analytical purposes, and the limits imposed by sampling variability and non-sampling errors would be among the principal guide-posts in planning the tabulations.

3.38. Tabulation plans would ordinarily be prepared in the form of table outlines, that is, designation of the level of subject detail desired, cross-classified by various demographic and other characteristics needed for analytical purposes. The table outlines would not necessarily be synonymous with the detail planned for publication. The usual practice is to tabulate in greater detail than intended for publication, in order to provide for the possibility of more intensive analysis. Also, publication may depend on the success in collecting the specified information, which cannot be determined in advance. As indicated in a later

chapter, certain tabulated data which are not published may be made available to users for their own purposes.

3.39. Planning should also proceed in advance for various types of analyses beyond those related to the standard publications. Examples might be data needed for population and other projections, for social and economic indicators and for studying multivariate relationships and the like.

#### D. SURVEY DESIGN AND STRUCTURE

3.40. The term "survey design" encompasses several of the most important planning elements, apart from determination of the subject-matter. First among these are decisions on the type of survey organization to be established for gathering the data. For reasons discussed earlier, some continuing kind of survey mechanism is important in developing the needed staff continuity and the basic time-series for a sound data base. Beyond this, there are choices in terms of multi-subject or specialized approaches, multi-phase operations, panel systems and the like, or some combination of these. Considerations of scheduling and timing of the various elements and of population coverage should also be inherent parts of the design.

##### 1. *Decisions on the type of survey framework*

3.41. In chapter I, section C, some of the advantages and disadvantages of the various types of household surveys were noted. In the present chapter, paragraphs 3.14 to 3.21 above, considerations affecting the combination of topics for survey purposes were discussed. The decisions on the type of survey framework to be established will depend on both technical and subject-matter considerations. Where the statistical plan calls for a considerable variety of data, the natural tendency is to consider the multi-subject approach. This is often the case, especially when available resources and skills for statistical work are limited. Among the options within this framework are "integrated" systems, where the same households or individuals are queried on the various subjects, or "nested" systems, where different subjects are treated in different subsamples. The trade-off is between the less complex interviews in the "nested" approach (although interviewers usually have to be trained in all subjects) and the greater analytical opportunities of the "integrated" type.

3.42. The specialized survey approach is probably most applicable in the case of complex subjects, such as nutrition or expenditure studies, which are not readily integrated with other surveys. They could also be appropriate in countries where data collection by telephone or mail is feasible.

3.43. Some of the economies and other advantages of multi-subject surveys, but without some of the interviewing complexities, may be achieved by a multi-phase approach, that is, carrying out the data collection in more than one step. The economies arise mainly from the use of the same samples (or subsamples thereof) in the various phases, although the separate phases also increase the number of field visits required. Interviewers have to be trained only on a limited number of subjects for any one phase, and the interviews themselves are less complex than in a single, integrated survey. A more developed type

of multi-phase survey is the panel approach, where the same units are interviewed periodically over a period of time. An outstanding feature of panel operations, where certain subjects are repeated on some cyclical basis, is the ability to measure changes with much greater reliability than where different samples are used. Emphasis in the statistical plan on the measurement of trends, therefore, would favour this approach. Rotating different kinds of subject-matter is also much more feasible in this kind of system, with the resultant simplifications in interviewing which have already been discussed.

3.44. In a continuous programme, some combination of these various approaches can be considered. For example, a compatible group of topics, none of which is especially complex or detailed, can be combined in a multi-subject survey. Depending on the sample sizes needed, some of the subjects can be covered in all households, whereas others can be limited to various subsamples. At the same time, those subjects requiring separate, detailed treatment can be attempted using the specialized survey. In scheduling these various endeavours, the objective should be to make optimum use of the same technical staff, field personnel, processing facilities and other resources, in a manner which does not overload the system at any one time.

3.45. In establishing the survey framework, it is also important to provide for some capacity to meet unforeseen data needs. In other words, the survey resources should not be so fully committed that the agency is not able to collect the information needed for an emergency request. Alternatively, priorities should be established in such a manner that planned topics of lesser importance can be dropped on short notice in order to meet emergency needs.

##### 2. *Scheduling and timing considerations*

3.46. Reference was made in chapter I, paragraphs 1.7 to 1.16, to factors that affect the frequency with which various kinds of data should be collected. Based on these considerations, decisions can be made regarding the scheduling of various topics in the course of a continuing survey programme. For example, if an annual multi-subject survey is being conducted, questions on vital events might be included every year but inquiries on housing characteristics might be made only every second year and questions on income every third year.

3.47. Another important timing consideration in designing a survey is the scheduled timing of the enumeration, particularly whether the interviewing should be concentrated in short periods or spread over longer periods. Sometimes, the availability of personnel, such as teachers and senior students during school vacation periods, determines the timing of enumeration. Extreme weather conditions such as heavy rains or extreme heat or cold can also determine when it is feasible to conduct interviewing. The seasonal pattern in agriculture, the migration of nomads and similar factors affecting the accessibility of survey respondents can have a bearing on timing as well.

3.48. Aside from these special circumstances, there are advantages and drawbacks in concentrating or spreading the enumeration period. A concentrated survey will be concluded more rapidly and will be less ambiguous with respect to the reference date of the information. However, it will require a larger field staff and could possibly result

in less reliable data if adequate staffing and training cannot be achieved. Also, there is the problem of finding a "typical" period for changeable subjects.

3.49. Spreading the enumeration over a period permits the use of a smaller, possibly full-time staff, provided such personnel are available. Also, if the subject-matter is affected by sharp seasonal or other influences, the results are more representative. The advantages of spreading the sample can be increased if the workload in any subperiod (such as a week or month) is a representative cross-section of the entire sample. In that way, the data for various subperiods can be combined into estimates for analytically meaningful but irregular periods, such as the dry season, the harvest period or periods during which there were unusual economic developments. In one example of this kind of system the sample of a continuous quarterly household survey is spread systematically over the 13 weeks of each quarter, so that estimates can be derived for any combination of weeks containing a sufficient number of sample cases during the year.

### 3. Decisions on population coverage

3.50. Various judgements are needed on the scope of population coverage in the survey. For example, a decision may be required on whether to include some rather isolated populations, such as nomadic tribes or persons living in remote areas, where sampling and interviewing costs are unusually high. Similar judgements are in order regarding the coverage of persons in various special situations, such as those living in institutions, homeless persons, military personnel and the like. These determinations largely depend on whether the survey objectives are such that the additional costs and difficulty of covering various special segments are warranted. In an employment survey, for example, there may be little point in including inmates of institutions such as prisons and long-term sanitariums. However, they might well be included in a health survey.

3.51. Another consideration is whether data for special groups can be obtained from other sources, such as from military records for members of the armed forces or establishment records for institutional inmates. In general, since certain of these special groups may differ a great deal from the population as a whole and may represent

major social and economic problems, some means of reflecting them in the survey coverage, if only occasionally or on a reduced scale, merits consideration.

3.52. Another fundamental issue is the general approach to be used in covering the population, primarily whether a *de jure* or *de facto* approach will be used. Under a *de jure* approach, persons are counted in accordance with their usual place of residence. Permanent residents in a household are included in that household whether they are present at the time of enumeration or temporarily away for some reason. Temporary visitors are excluded unless they have no usual residence elsewhere. The *de facto* approach, in contrast, counts persons at the place they are staying at the time of enumeration. Permanent residents of a household who are temporarily away are not included as members of their usual households but at the place where they are temporarily staying. Temporary visitors in a household are counted there.

3.53. The *de jure* procedure is generally considered preferable in a continuing survey programme, especially where the enumeration is spread over a considerable period of time. Temporary movements of the population in such situations are less likely to result in omissions or duplications than they would under a *de facto* approach. In addition, certain kinds of household information, such as household size and composition and household income and expenditures, are more meaningful analytically under a *de jure* procedure, since the data reflect the more permanent or usual situation. The *de facto* approach is considered most suitable when the enumeration is compressed into a very short period or for highly transient groups such as homeless persons or nomads.

3.54. Country conditions could affect these decisions. Where, for example, the population is extremely mobile or unsettled, the *de facto* approach may be the only viable choice.

3.55. In determining coverage, especially under the *de jure* approach, the matter of dual residence—that is, having more than one permanent residence—may sometimes arise. One example is persons who customarily spend half the year in one place and half in another. Another example may be persons who work and live in one area during the week and return to a family home on weekends. Although there may be no absolutely "correct" rule on where to enumerate such persons, it is necessary to establish consistent rules on how to proceed in such situations.

## IV. SURVEY PREPARATION

### A. SAMPLE DESIGN

4.1. Aside from the major censuses, nearly all data collection from households in most countries is carried out on a sample basis. Sampling is widely used as a method of rendering data collection more efficient. In addition, sampling theory and practice have advanced to the point where it may actually be preferable to use sampling as opposed to a complete canvass from the standpoint of overall accuracy for many types of data, taking into account both sampling and non-sampling errors. This is because the control of non-sampling errors, which is often a more serious problem than sampling variability, may be more readily achieved in a smaller, more easily monitored operation. Moreover, sampling is a means of producing data much more rapidly, given sound and effective organization and administration of the survey programme.

4.2. The practical application of sampling principles is a highly technical matter requiring well-trained professional staff, and it is not feasible to review the subject in great detail in the present *Handbook*. Many technical manuals and textbooks are available for this purpose, including the United Nations publication *A Short Manual on Sampling* (56), and a selection is given in the bibliography, section C.

4.3. The discussion here is largely confined to the major issues which have to be dealt with, the choices that have to be made, and some practical means for reaching decisions. The intention is to provide a basis for better communication between general survey planners and sampling specialists.

#### 1. Explanation of terms

4.4. Some basic terms which will be used frequently in this section are explained below to facilitate the discussion. There are many other concepts and terms in sampling theory and applications which are discussed in the following subsections, 2 through 11.

##### (a) Population or universe

4.5. The population or universe represents the entire group of units which is the focus of the study. Thus, the population could consist of all persons in the country, or those in a particular geographical location, or a special ethnic or economic group, depending on the purpose and coverage of the study. A population could also consist of non-human units such as farms, houses or business establishments.

##### (b) Domain of study

4.6. A domain of study is a major segment of the population for which separate statistics are needed. In the course of tabulation, data may actually be provided for

many population segments; however, a domain of study would be a segment identified in the overall statistical plan as one for which a certain level of detail and certain data reliability were required. The domains of study chosen may coincide with the strata adopted for stratified sampling or may cut across them (see paras. 4.26–4.32 and 4.59–4.61 below).

4.7. A domain could consist of a geographical area such as a region or major metropolitan centre. It could also comprise a specified population category, such as a major national or ethnic group. The number of domains has an important bearing on the size and distribution of the sample. Because of the well-known principle that the reliability of a sample is primarily dependent on its absolute size, the sample must be as large for a small domain as for a large one if the reliability requirements are the same.

##### (c) Sampling frame

4.8. A sampling frame is a body of information about the population being investigated which is used as the basis for selecting samples and in subsequent estimation procedures (see paras. 4.48–4.92 below). An example of a sampling frame is an up-to-date listing of every unit in the population, with identification information. Such a list is rarely available, however, except perhaps immediately after completion of a census or in those few countries which maintain up-to-date population registers.

4.9. A list of areas covering all of the geographical areas in the country and including information about each which can be used for sampling purposes represents another and more commonly available type of frame, and is usually termed an area frame. For example, there could be a list of all political subdivisions, large and small, including information on the size of population, type of industry or agriculture which is prevalent, and the like. One of the most useful types of area frames is the list of area units created for purposes of census taking, which are usually called "enumeration districts" or "enumeration areas" and which typically represent the territory assigned to a given census enumerator. Enumeration areas are especially useful because maps are usually available delineating their boundaries and because population and other data are often available or can be compiled for each. Another advantage for sampling purposes is that enumeration areas are usually of approximately equal size.

4.10. There are various other types of possible sampling frames as well. In the Union of Soviet Socialist Republics and various Eastern European countries, for example, lists of economic enterprises, together with information on number of employees, constitute the frame for many of the surveys. Municipal taxpayer lists are used for this purpose in Israel. In the urban areas of Cyprus, lists of domestic consumers of electricity represent the sampling source. For highly specialized surveys, more

direct and efficient frames may be used. For example, in a survey of family planning in the Philippines, samples were drawn from lists of "acceptors" in family planning clinics.

4.11. A common procedure in a continuing survey programme is to develop what is often termed a "master sample". This is a compilation of units which may be used to select successive samples for various survey rounds or separate survey undertakings. The use of a master frame will often promote greater efficiency in sample selection and also provides a means for avoiding selection of some of the same units for different surveys.

(d) *Ultimate sampling unit*

4.12. The ultimate sampling unit may be defined as the smallest unit which is the subject of sample selection. In a household survey, the natural ultimate sampling unit might be the household. Using the definition recommended by the United Nations for population censuses, a household would comprise either an individual who makes provision for his or her own food or other essentials for living or a group of two or more persons living together who make common provision for food or other essentials for living (77, para. 1.223).

4.13. One problem with using households as the ultimate sample units is that they lack permanence and may change between the time of sample selection and the start of data collection, as a result of the mobility of some or all of the members. Moreover, households are not readily identifiable from external features but will usually require inquiries to establish their identity. A more permanent type of unit, which can usually or often be identified by external observation, is the housing unit or, more broadly, living quarters. According to the United Nations housing census recommendations, living quarters are separate and independent places of abode intended for habitation or not intended for habitation but occupied as living quarters at the time of the census (77, para. 3.41). Where living quarters is specified as the ultimate sampling unit, all of the households living in a selected unit—and there could be more than one—are covered by the sample.

4.14. In some countries where extended families living in compounds are common, neither of the above concepts (household or living quarters) may be feasible. It may often be necessary, in these situations, to consider the entire compound as the ultimate sampling unit. Deviations are also often necessary in the case of collective living quarters, such as hotels, institutions, barracks and camps. In such cases, one option is to consider individuals as the ultimate sampling units. Special sampling problems pertaining to homeless persons, collective living quarters and nomadic tribes are discussed in paragraphs 4.78 to 4.83 below.

4.15. It should be noted that even where the household or living quarters constitutes the ultimate sampling unit, this is not necessarily the smallest statistical unit of record used. Any physical unit which is to be observed or measured in a survey and is indivisible for a given observation is called an elementary unit. Different elementary units may be defined in the same survey. The ultimate sampling unit, such as the household or living quarters, may be used as an elementary unit for some items of information, and individuals comprising the household or

residing in the living quarters sampled may also be designated as elementary units for other items of information.

4.16. Neither is the ultimate sampling unit necessarily, or even usually, the elementary unit selected or needed for a given item in data compilation and tabulation. The individual may be used, or other elementary units may be defined. For example, the ultimate sampling unit may be the living quarters but, depending on the statistical objectives, the data compilation and tabulation may be in terms of households; families; economic units such as establishments, agricultural holdings or nutritional units; or various of these. It is essential, however, that the ultimate sampling unit be such that the desired elementary units can be identified within it and the information necessary for such identification be collected.

(e) *Stages of sampling*

4.17. If a complete list of all ultimate sample units exists, the sample can be selected in one step or stage. In the 1969 survey of the economically active population in Luxembourg, for example, it was possible to select the sample directly from the census lists prepared a year earlier. However, this situation does not usually exist, and several stages of sampling are required. Even if a complete list of ultimate sample units exists, multi-stage sampling is generally used, as it is usually more economical than direct sampling.

4.18. In the great majority of household surveys, sampling is accomplished in either two or three stages. In a three-stage design, the first stage usually consists of selecting a set of sizable geographical areas, such as urban places or political or administrative subdivisions of regions or provinces, to represent all such areas in the country. These may be termed "primary sampling units". The next stage entails selection of a set of smaller geographical areas within each designated primary sampling unit. These second-stage units, or "secondary sampling units", can consist of such areas as city blocks in urban areas or villages or hamlets in rural areas. Preferably, for reasons cited earlier in discussing sampling frames, they would be census enumeration areas. The final stage is the selection of a sample of ultimate sample units within each designated "secondary sampling unit". For some types of samples, all of the ultimate units in a secondary sampling unit might be included.

4.19. In a two-stage design, the kinds of areas described above as secondary sampling units are designated as the primary sampling units. The second stage then consists of choosing the ultimate sample units within each selected primary unit. For convenience in the discussion, the area units preceding the final stage, that is, the second-stage units in three-stage designs and the first-stage units in two-stage designs, will be referred to as "penultimate" units. As the term is used here, the penultimate units are always area units.

## 2. *Sampling procedures*

4.20. With these general concepts in mind, it will now be useful to review briefly the types of sampling procedures that can be considered in planning surveys and some of the features that are relevant in reaching decisions on the procedures to be adopted. Various of the sampling

procedures can be applied at various stages of sampling or in a single stage, if only one is used.

(a) *Simple random sampling*

4.21. The theory of sampling is largely built around random selection, that is, instances where sample units are drawn purely by chance from among an entire population or universe of ultimate sample units. For example, if slips of paper representing each living quarters in a given country were thoroughly mixed together in a huge hat, and the appropriate number of cases was drawn successively from that hat, that would constitute a simple random sample. Since it is not feasible from the standpoint of time and cost to canvass sample units spread throughout the length and breadth of a country, there are hardly any sample household surveys based on simple random sampling. (Certain kinds of telephone or mail surveys may be exceptions.) However, simple random sampling is a convenient standard against which to judge the reliability of other types of designs.

4.22. When the selection of a sample is based on a random process and each sampling unit has a known non-zero probability of being selected, the sample is called a probability sample. For such samples, it is possible to use statistical inference based on the theory of mathematical probability, since subjective elements do not play a role in the selection of the sample. This means that the reliability of the estimates can be calculated in terms of probability.

4.23. When different procedures are used, such as deliberately selecting particular ultimate sample units or areas for the sample, in the belief that they may be typical of the population, the result is called a "purposive" sample. It is not possible in such instances to estimate the degree to which the sample actually represents the universe. The same kind of defect exists for the technique known as "quota" sampling. In this case, the interviewer is instructed to find a certain number or quota of cases of various kinds, presumably corresponding to the proportion of such cases in the population. He then proceeds to canvass large groups of households and individuals until the stated quotas are filled. Although still used in some commercial circles and elsewhere, non-probability sampling methods are not usually regarded as acceptable for a sound survey operation.

(b) *Cluster sampling*

4.24. Because of budgetary and timing considerations, most household surveys are based on what are termed "cluster samples", that is, cases where the ultimate sample units are chosen in groups of various sizes within only selected parts of the country. In this type of design, the units are closer together and the costs of interviewer travel are thereby reduced. However, because units in closer proximity are likely to resemble each other to some extent (that is, in technical terms, they may have appreciable "intra-class correlation"), the reliability of estimates from such a sample is generally lower than that of a random sample of similar size. All multi-stage samples are cluster samples of one kind or another.

4.25. An extremely important consideration is the size of cluster to be selected at various stages, particularly the final cluster size. Generally, the smaller the final cluster, the more reliable the sample but the higher the unit cost.

There is, therefore, a trade-off between cost and reliability, whereby the "optimum" cluster size would be the one which results in the greatest precision for a given cost. There are formulae in statistical texts for computing these values when the necessary information on costs and variances can be obtained or estimated.

(c) *Stratified sampling and probability proportional to size*

4.26. A powerful standard technique which is used in almost all surveys is stratification. Before a selection occurs at any stage of sampling, the units are divided into "strata", or groups of similar units, and the selection is made within each stratum. For example, the larger geographical units, cited as "primary sampling units" in three-stage designs, might first be divided into regional groups and then into urban and rural subgroups within each region. A selection of one or more units can then be made within each final group. The selected units would represent the strata from which they were chosen. This procedure provides greater assurance that each type of area is adequately represented in the final sample and thus generally results in an increase in sampling reliability. In order for any significant improvement to occur, however, the characteristics used in stratification must have some relationship to the data objectives in the survey. Thus, it is important to be aware of these objectives in deciding on the type of stratification.

4.27. Stratification can be used at any stage of a multi-stage design with some potentially beneficial results. However, it is usually applied at one or more of the earlier stages, since relevant information may be available for such areas from a previous census or other source. Not enough is usually known in advance about the ultimate sample units to use stratification at that stage. However, where listing of households in each first-stage unit is done prior to selection of sample households and some auxiliary information about the households is collected in the process of listing, stratification of households (substrata) within the selected first-stage units in addition to stratification at the earlier stage may be useful.

4.28. Stratification is still almost as much an art as a science, and a good deal of judgement usually enters into the determination of the characteristics or variables to be used for this purpose. Geographical location in terms of regions, urban-rural character within regions, size of area, features such as arid or tropical climate, major type of industry or agriculture and the like are examples of the kinds of variables often used in assigning areas to different classes or strata. Whatever characteristics are used, there is little value in carrying out stratification in excessive detail, since the gains that might be achieved beyond a certain point are likely to be small.

4.29. In creating the strata one should make each stratum as homogeneous as possible with respect to the characteristics used for stratification, and as heterogeneous as possible among strata. Considerations such as the organization of the field work, equal distribution of workload for each enumerator and the like may lead to creation of strata of equal size in respect of population, households or dwelling units etc. Situations may also arise where a stratum may contain only one unit because of stratification criteria, and, therefore, for representing the stratum this particular unit is selected with certainty in the sample.

4.30. Among the matters that have to be decided are the number of strata to be composed and the number of primary sampling units to be selected from each stratum. Turning first to the second issue, a common practice is to select two primary sampling units from a stratum. This procedure provides a simple means of estimating sampling variances in each stratum.<sup>1</sup> The computation of variances is more precise if three or more primary sampling units are drawn from a stratum.

4.31. Determination of the number of strata is again largely a matter of the trade-off between reliability and cost. Generally, the larger the number of strata (assuming a fixed overall sample size), the smaller will be the sampling variability, since there will be less clustering. However, unit costs increase as the sample is spread over more strata. Mathematical formulae are available for computing the optimum sample spread, assuming information is available or can be estimated on various elements of cost and components of variance. Interviewer workloads can be another factor in deciding on the number of strata. A possible guideline is to determine the number of strata so that at least two units are selected from each stratum.

4.32. The selection of primary or secondary sampling units from each stratum, or, in fact, the selection of such units even if they are not initially stratified, can be based on equal probabilities, that is, for example, putting a slip of paper for each unit in a hat<sup>2</sup> and drawing out the required number at random. If the units are of considerably different sizes, however, a better and commonly used procedure is to make the selection on the basis of "probability proportional to size". This means that the probability of selection of any one unit will be proportionate to some measure of its size, usually its population. Thus, if one unit is twice as large as another, its chances of selection are twice as great (two slips of paper in the hat, compared with one slip for the smaller one). Under this procedure, each ultimate sample unit in the population has the same chance, initially, of being selected, provided that an appropriate subsampling fraction is chosen.

(d) *List sampling and systematic sampling*

4.33. Any of the previously described types of samples can use list sampling provided the necessary materials are available. Although complete lists are rarely available for household sample purposes, sometimes partial lists are obtainable. These can be used provided that the missing elements are covered through other means, such as by area sampling, described below. A combined procedure is used in the example cited earlier from Cyprus. Lists of consumers of electricity are used in sampling urban residents, whereas samples of villages are used as "first-stage" units for the rural areas. Listing of all the ultimate units has another advantage. Information on certain characteristics related to the subject of inquiry can be collected from all the ultimate units during listing. The information can be fruitfully utilized to stratify the ultimate units, and ultimate

sample units can be selected separately from each stratum. This will substantially improve on the overall efficiency of the estimates.

4.34. The procedure usually followed in using lists for sampling purposes is called systematic sampling. If a 1 per cent sample is being chosen, for example, the procedure is to select every hundredth unit on the list after a random starting point. Systematic sampling is, in effect, a form of random sampling. If the units are arranged in some meaningful order (such as geographically) there is, moreover, some element of stratification in the process. In using systematic sampling, it is important that there be no periodicity in the ordering of units on the list. For example, if a particular list always consisted of a male followed by a female, it is possible that only one sex group or the other would be chosen for the sample.

(e) *Area sampling*

4.35. In the case of multi-stage designs, as previously described, the first-stage and perhaps the second-stage units nearly always involve a selection of geographical areas. The term "area sampling" relates to selecting the areas as sample units. For example, the designated penultimate units (villages, city blocks, or census enumeration areas, in the usual case) can be subdivided by field agents into small geographical parts containing perhaps 5, 10 or 20 housing units, depending on the final cluster size, on the average. One of these parts can then be selected at random and all of the ultimate sample units within its boundaries may be included in the survey. An alternative is to prepare special field listings of all the ultimate sample units in the penultimate units and to select the required final number through systematic sampling from the lists.

(f) *Point and line sampling*

4.36. These are processes for selecting penultimate units from maps. In "point" sampling, two random numbers are selected to serve as the co-ordinates of a point on the map. The area unit in which the point falls is then selected for the sample. "Line" sampling may be employed where larger clusters are appropriate, and can be carried out in various ways. One approach is to draw equally spaced parallel lines on the map and then select one of these at random. All area units through which the line passes are chosen for the sample. Alternatively—and this amounts to a two-stage design—equally spaced points can be plotted on the selected line, and those area units in which the points are located constitute the sample. One problem with these approaches is that the probability of selection of areas is dependent on their physical size rather than on such measures as population, which may be more closely related to survey objectives. However, where such matters as crop acreage or production are the focus of investigation, physical size may be the better selection criterion.

(g) *Multi-phase surveys and double sampling*

4.37. Mention has already been made of multi-phase surveys, whereby certain households or individuals identified in a survey are returned to in a second phase. This approach is sometimes used to locate samples of relatively rare types of elementary units (such as specific occupation groups, persons with certain health conditions or new mi-

<sup>1</sup> As indicated earlier, some strata may consist of only a single large area, which would be automatically selected for the sample.

<sup>2</sup> The use of the proverbial "hat" in making random selections is of course purely an illustration of a traditional, simplified process. Much more practical and sophisticated procedures exist, such as the use of random number tables.

grants into an area) about whom more information is wanted. For this purpose, an efficient procedure is to use large compact clusters (such as entire city blocks or census enumeration areas) for the first phase. This system is sometimes called double sampling.

4.38. Actually, the same objective can be met in a one-phase operation, although the procedure is more difficult to control, if only a certain number of cases is wanted. Introductory or "screening" questions can be asked in each household in a large cluster in order to locate specific classes of individuals. Where such cases are found, the interview continues in order to obtain the additional information which is the subject of the inquiry.

### 3. Decisions on sampling procedures

4.39. The decisions on the sampling procedures to be used from among the various alternatives just discussed depend on a number of factors, including the size and nature of the country, the data requirements in the survey, and the types of field personnel that can be recruited. The kinds of sampling frames that are available are important in choosing between list and area sampling.

#### (a) Country size and conditions

4.40. In a relatively large country, especially when travel conditions are difficult, a considerable degree of clustering is indicated. In fact, it is likely that several stages of sampling will be required. In smaller countries or where travel is relatively easy, the clustering can be reduced. In such instances, there would probably be only two stages of sampling. Exceptions to the usual situation may be found. For example, only two stages of sampling are used in the National Sample Survey of India, in spite of the country's size. The cost-variance relations previously described are one basis for decision.

#### (b) Data requirements

4.41. Where the statistical plan calls for certain data for specific geographical areas or sample domains, this has an influence on the necessary spread of the sample and thus on the degree of clustering that is feasible. A sufficient number of first-stage and subsequent units must be selected within each designated sample domain so as to produce statistics for that sector with sufficient reliability.

4.42. The type of data to be collected can also have a bearing on the design. For example, the characteristics most effectively used in stratification are those related to the subject-matter, such as the type of industry where employment is a major topic. Also, the permissible degree of clustering depends on the extent to which the subject-matter is associated with the specific location of the ultimate sample units. For example, where persons of similar national or ethnic origin tend to live in the same general neighbourhoods, it is inefficient to select large clusters of adjacent households if an important objective of the survey is to obtain data on the social characteristics of different groups. On the other hand, if births are a fairly random occurrence in terms of a given area, much larger clusters can be used in a study of vital events. Computations of "intra-class correlations" for various subjects from census or prior survey data are extremely useful in making these judgements.

#### (c) Available field personnel

4.43. The types of field interviewers available can also influence the decisions. For example, if capable locally based interviewers can be found who are willing to work part-time, it is possible to reduce the clustering and spread the sample over more extended parts of the country. If it is necessary or deemed advisable to use full-time, travelling interviewers, more clustering is indicated to reduce time and travel costs. Different choices can be made for different parts of the country, depending on personnel availability.

#### (d) Compromises

4.44. Since some of the factors discussed above could lead to conflicting decisions, compromises will often be necessary. For example, if country conditions absolutely preclude any choices other than a relatively concentrated sample in geographical terms, the level of geographical detail in the statistics may have to be moderated.

### 4. Determination of sample size

4.45. In determining the required sample size, two principal approaches are generally used: (a) given a fixed budget for the programme, determine the largest and most efficient sample that can be supported; or (b) given a required level of reliability in the statistics, determine the sample size needed to satisfy the criterion. Generally speaking, it is better to start with the second approach. Naturally, if the resultant sample size is greater than can be supported, compromises will be necessary in the survey specifications.

4.46. Where a considerable range of subjects is involved in the survey programme, the statistical reliability can differ a good deal from one topic to another. Items that occur with considerable frequency in the population, for example, usually have greater sampling precision than those that are rare occurrences. In complex programmes, one approach is to select a few of the most critical measures for purposes of computing the required sample size. The largest sample determined for these selected measures is the one chosen.

4.47. The determination of sample size has to be made not only for the country as a whole but for each domain of study for which separate statistics are needed. In fact, where there are separate domains the usual procedure is to calculate the requirements for each domain. The total sample is then the sum of those separate requirements. Where no separate domains are specified, the calculation is made directly for the nation as a whole. The process of computation is similar in either instance.

#### Illustration 1

4.48. In determining sample size, a common procedure is to make computations using assumptions of random sampling, but then to adjust the required size upward to allow for a clustered design. Certain kinds of information or even some rough estimates for the population as a whole are needed for this purpose.

4.49. In the illustration which follows, the computations relate to a single measure, the proportion of the population living in substandard housing. For this illustration, it is assumed that this proportion is roughly estimated at

between 30 and 40 per cent from previous studies, pre-test results or other sources. Considerable deviations from this "guesstimate" would not affect the computations very much. It is also assumed that the object is to be able to measure this proportion in the current survey within three percentage points with "confidence", which is defined here as at the 90 per cent confidence level, or within 1.6 standard errors.

4.50. The formula to be used in this case is:

$$\sigma_p^2 = D \frac{pq}{n} (1-f)$$

where:

$\sigma_p^2$  = the sampling variance (square of the standard error) of  $p$ , the proportion living in substandard housing. Since it is desired here to measure  $p$  within three percentage points at 1.6 standard errors,  $\sigma_p$  (standard error of  $p$ ) is .03/1.6 or .0188, and  $\sigma_p^2$  is, thus, .000353;

$p$  = proportion in substandard housing, or about .35 (average of our assumed range of 30–40 per cent);

$$q = 1 - p = .65;$$

$D$  = the design effect, that is, an allowance for the difference in sampling variance between a clustered sample of the type contemplated and a random sample. The value of  $D$  depends upon the heterogeneity (i.e., variability) of the population within the cluster with respect to the characteristic(s) being studied; the heterogeneity, in turn, usually depends upon the cluster size used. This design effect, which is based on the computed extent of "intra-class correlation", may be large for a characteristic such as housing, where there may be a good deal of similarity for units in the same vicinity. A value of 3 can be allowed for  $D$  in this case, based on some census computations for clusters of the size contemplated (for example, choosing six ultimate sample units in each selected census enumeration area). It will be necessary to calculate the actual sampling variance by formulae appropriate for stratified multi-stage designs for a few items in order to arrive at the value of  $D$ , the design effect. This may be done on the basis of census data and surveys on similar topics conducted in the recent past. More precise estimates may be made from subsequent survey data for refinement of the calculations;

$f$  = the sampling ratio, that is, the proportion of all households that are sampled. When the sampling ratio is small, as for most household surveys, the expression  $1-f$  may usually be disregarded, and will be in this case;

$n$  = the number of households needed in the sample. This is the unknown quantity at the beginning.

Substituting these various values in the equation and solving for  $n$ , about 1,900 households is obtained as the indicated sample size needed to meet the reliability standard.

#### Illustration 2

4.51. In this illustration, the principal item to be measured is a numerical value rather than a proportion, as above. Assume that income is the principal topic and that it is desired to be able to measure average household income within 5 per cent with 90 per cent confidence (1.6 standard errors). Also, assume that prior surveys, pilot studies and the like indicate that average income in the

population as a whole may be in the neighbourhood of 8,000 units with a likely standard deviation of 7,000 units. A 5 per cent margin then amounts to 400 units (5 per cent of the 8,000-unit average), and the standard error limit is 400 divided by 1.6 standard errors, or 250 units.

4.52. The formula, in this case, would be:

$$\sigma_x^2 = D \frac{\sigma_x^2}{n} (1-f)$$

where:

$\sigma_x^2$  = the variance (or square of the standard error) of the average income figure, or 250 squared, which equals 62,500;

$\sigma_x^2$  = unit variance (or square of the standard deviation) of income in the population (the standard deviation was estimated at 7,000 units and its square is 49,000,000);

$D$  = the design effect, as defined above. This would still be large for income (although not as high as for housing), say 2;

$f$  = sampling ratio as defined above; again, the expression  $1-f$  may be disregarded;

$n$  = the unknown value or the required sample size.

4.53. Substituting in the formula and solving for  $n$ , an estimate of close to 1,550 households is obtained as the required sample size. Note that if both the proportion in substandard housing and average income are the items to be tested, the larger sample size as computed in the first illustration should be used. The formulae are somewhat more complex if the precision requirements relate to the ratios of one element to another or changes from one period to the next. However, the basic procedures are similar to those just described.

#### 5. Allocation of sample among strata and domains

4.54. A common procedure in allocating the sample among strata, assuming that stratification is used in the design, is to use the same sampling rate in each stratum. For example, if the overall sample ratio is 1 per cent of all households in the population, the number of cases allotted to each stratum amounts to 1 per cent of the stratum total. In this case, each ultimate sample unit regardless of stratum has the same weight (the reciprocal of the sampling fraction, or 100 in the above example), and data processing is simplified.

4.55. A uniform weight may also be achieved by adopting a "self-weighting" design in which the number of ultimate sample units to be selected in each penultimate unit is suitably controlled so as to equalize the weights. The households are selected from each selected primary unit systematically, with probability proportional to the probability of selection of the primary unit. This technique is very useful when manual or mechanical tabulation is adopted, since tabulation work becomes much easier, quicker, more economical and more accurate compared to a design requiring a large number of weights. This design, however, involves unequal workloads in different primary units.

4.56. An alternative is to vary the sampling ratios by stratum so as to optimize the overall sampling reliability. In this case, the allocation takes into account not only the stratum size but the standard deviation for some character-

istic question among units within each stratum. Where there are wide differences in these standard deviations by stratum, this procedure can be beneficial. For example, for an inquiry on use of irrigation, allocation to different strata may be made in proportion to irrigated area or number of households using irrigation. One problem is that the sample weights will now vary by stratum, which introduces complexities at the data processing stage. These, however, are manageable, especially where computers are used. Another difficulty is that information on standard deviations by stratum is not always obtainable. The consequence is that uniform allocation is often used unless there is clear evidence of substantial gains via the optimization procedure.

4.57. Note, in any case, that the sample allotted to a given stratum is divided among the primary sampling units selected from that stratum. If, for example, a sample of 100 ultimate units is assigned to a stratum, and two primary sampling units are selected from that stratum, each primary sampling unit is allotted 50 ultimate sample units as a target. Since samples are usually selected on the basis of a proportion of the ultimate sample units in a primary sampling unit, the actual number selected could vary somewhat from the target if the area actually contained somewhat more or fewer units than initially expected.

4.58. Another aspect of sample allocation is allocation among the domains of study for which separate statistics are required. As indicated in the previous section, one approach is to compute the needed sample size separately for each domain depending on reliability requirements and to make the allocations accordingly. The result is likely to be differences in the sampling ratios among domains. Where the differences are large, the consequence can be appreciably lower sampling reliability for the overall country estimates than could be obtained through uniform sampling ratios.

## 6. Allocation of sample within primary sampling units

4.59. Once the primary sampling units are selected and the sample is allocated among them, the next step is to distribute the sample cases within each designated primary area. In two-stage designs, the primary sampling units usually consist of such areas as city blocks, rural villages, or census enumeration areas. In such instances, the sample allotted to the primary sampling unit can be distributed uniformly throughout the unit. For example, if the allotted sample is 10 ultimate units, and the primary sampling unit was expected to contain a total of 100, every tenth ultimate unit would be chosen systematically from a field listing of all such units (more or fewer than 10 would be selected if the actual number of listed units exceeded or was less than 100).

4.60. In three-stage designs, it is first necessary to select a sample of secondary sampling units, or penultimate units, within each primary sampling unit. The number depends on the sample allotted to the primary sampling unit and on the final cluster size which is chosen. A common procedure in such designs is to assign only one final cluster to a given penultimate unit.<sup>3</sup> For example, assume that a target of 50 ultimate sample units is allotted to a certain

primary sampling unit and that a final cluster of five ultimate units has been determined to be the optimal cluster size. This means that 10 penultimate units should be chosen and assigned one cluster of five ultimate units each. The selection of the penultimate units is generally accomplished through systematic sampling of all such areas in the primary sampling unit, most likely on the basis of probability proportional to size. The methods of selecting the final cluster of ultimate sample units within each chosen penultimate unit are described in paragraphs 4.66 to 4.70.

4.61. Ultimate sample units may be stratified and differing sampling fractions may be chosen from stratum to stratum to increase efficiency. For example, in India about 15 per cent of households own more than 50 per cent of the land under cultivation. In a land-holding inquiry in such a situation, households with larger holdings could be completely enumerated or the sampling fraction for such a group could be much larger than for others.

## 7. Development or completion of sampling frames

4.62. Except in those rare situations where complete lists exist, one of the necessary preparatory activities is development of certain elements of the sampling frame. Some of the needed steps are described below.

### (a) Creation of primary sampling units

4.63. In multi-stage designs, one of the requirements is a frame or set of primary sampling units that can be used at the first stage of selection. For this purpose, it is necessary that the entire territory of the country be divided into primary sampling units.

4.64. In two-stage designs, units such as urban blocks, rural villages or hamlets, or census enumeration areas usually exist that can serve as primary sampling units. There may be no need, therefore, to create primary units in that situation.

4.65. In three-stage designs, the primary sampling units generally consist of larger geographical areas. Sometimes, existing political or administrative subdivisions can serve as the primary units. These can be individual urban places or the basic administrative subdivisions of principal geographical units such as provinces or states. If some of the urban places or subdivisions are exceptionally large, they could be made separate strata and, thus, be automatically selected for the sample. Where certain subdivisions are exceptionally small in terms of population, adjacent ones can be combined to constitute primary sampling units. It is advantageous to have units of sufficient size so that there is a reasonable amount of heterogeneity in the population, which offsets some of the negative effects of clustering. On the other hand, they should not be so large as to be difficult to administer or canvass in a survey operation. One advantage of using political subdivisions or combinations thereof is that it is more likely that population data and other information needed for sample selection and stratification will be available. The availability of comprehensive and detailed cartographic materials is essential in the creation of primary sampling units (see paras. 4.104-4.114 below).

### (b) Field listings and counts

4.66. When the sample design consists of area units at the first and second stages, it is likely that some prelimi-

<sup>3</sup> For the purposes of certain "interpenetrated" samples, more than one cluster might be assigned to a given penultimate unit (see chap. VIII).

nary field work will be required to develop a frame for selection of the ultimate sample units, such as living quarters or households. This work is generally scheduled when the penultimate units, such as villages, blocks or census enumeration areas, have been chosen. The types of field operations that are usually needed are described below.

(i) *Subdivision or segmenting of areas*

4.67. In some types of surveys where large compact clusters are acceptable, as might be the case in surveys of vital events, the entire penultimate unit might be included in the final sample. In most instances, however, only a subsample of the ultimate sample units is chosen. In such instances, one approach is for field agents supplied with the necessary mapping materials to visit the selected penultimate units and subdivide or segment them into subunits of the required size. For example, if the desired final cluster size is 10 housing units and the penultimate unit contains approximately 100, it should be divided into 10 segments of roughly 10 housing units each.

4.68. This subdivision need not be precise but should be reasonably close to the desired target size. A crucial consideration where subdivision is done is to delineate clear-cut boundaries for each segment, such as roads and streets or physical features such as streams or walls. In fact, the field agent might sketch in the boundaries for the various segments on the map for the penultimate unit, also indicating the approximate number of ultimate units in each part. If the map does not lend itself to this use, a rough sketch showing the segments can be prepared and be attached to the map. Following this subdivision, the sampling staff selects one segment for the sample, usually at random (with equal probability). The interviewer canvasses all ultimate units within the boundaries of the segment for purposes of the survey.

(ii) *Listing of ultimate sample units*

4.69. Where subdivision is not feasible, another option is for field agents to prepare advance listings of all of the ultimate sample units within the boundaries of the selected penultimate units. The required number of ultimate sample units can then be selected through systematic sampling from the lists. For example, if the desired final cluster size is eight, and 56 units are listed in the area unit, every seventh one after a random start can be picked. If the interval is fractional, for example, if the total number of units happens to be 55 instead of 56 ( $55/8 = 6.9$ ), the fractional interval is successively added. If the random start is 3, this gives 9.9, 16.8, 23.7 etc. The units selected would be third, ninth, sixteenth, twenty-third etc. Even where subdivision is possible, this alternative listing procedure is sometimes used as a means of achieving closer control over the sampling. A variation of this method is known as circular systematic sampling. For instance, in the first example the random start is chosen from 1 to 56. While selecting the required number of units, if the number of a unit to be selected exceeds 56 one comes back to the first unit in a circular fashion.

(iii) *Combined procedure*

4.70. Still another common procedure involves a combination of segmenting and listing. The first step is to subdivide a unit into a number of fairly large segments, each of which might contain several times the number of units

specified for the final cluster size. These larger segments are sometimes called "chunks". An estimate of the approximate number of ultimate sample units in each "chunk" is obtained at the time of segmenting. One of these chunks is then selected either via probability proportional to size or, if they are of roughly equal size, with equal probability. The ultimate sample units in the chunk are then listed in the usual manner and the final cluster is chosen by systematic sampling from the list. This procedure entails less overall cost than listing the entire penultimate unit, but there is a higher degree of clustering. As compared to the "small-segment" approach, there are less clustering and fewer problems in determining segment boundaries. However, as will be noted in the next section, the "small-segment" approach provides an automatic means of updating the sample for future surveys.

8. *Rotation and updating of the sample*

4.71. If the same ultimate sample units are to be used in repeated surveys, such as in a panel-type operation as described earlier, consideration should be given to some systematic rotation of the sample in order to avoid an undue burden on any respondent or an increasing resistance to the survey. It is also necessary in a continuing operation of this kind to update the sample to reflect population changes which have occurred since the time it was initially selected.

(a) *Rotation of the sample*

4.72. A procedure often followed to avoid excessive use of samples but without serious disruptions at any one point is to replace a certain proportion of the units each time. For example, assume that it is deemed desirable to interview the same households no more than four times. In that case, it is necessary to change one fourth of the units each time. To achieve this, all of the final clusters in the original sample can be systematically assigned "rotation" numbers of from 1 to 4. It is usually more economical to rotate entire clusters at one time, rather than to rotate within individual clusters. Those clusters with rotation number 1 are replaced in the second survey with an equal number of new final clusters also assigned rotation number 1. In the third survey, those with rotation number 2 would be replaced, and so on.

4.73. If conditions permit more extended interviewing of the same units, the rotation can be achieved more slowly. For example, in the monthly labour force survey in Japan, households are interviewed eight different times. The interviewing is accomplished in two different periods of four months each, separated by an eight-month interval.

4.74. The replacement clusters can be selected within the same penultimate units as the original sample. Where subdivisions of the penultimate units have been made, the procedure can be to select another segment, at random. Where the entire penultimate unit has been listed in advance, another systematic selection of a subsample can be done. If, for example, the first subsample was the third, tenth, seventeenth etc. units, the replacements can be the fourth, eleventh, eighteenth and so on. Sometimes, primary sampling units as well as ultimate sample units may be rotated at various points in a continuing programme. This might occur when it is felt that there has already been

too much use or exposure of particular primary sampling units.

#### (b) *Updating of samples*

4.75. Certain kinds of area samples provide for automatic updating in successive surveys. For example, where the final cluster consists of a segment or subdivision of a penultimate unit, the procedure calls for interviewing all ultimate units within the boundaries of the segment. If any units are added by the time of a succeeding survey, they should, therefore, be picked up as a matter of course.

4.76. The updating is not so automatic in cases where the procedure calls for a pre-listing of all the ultimate units in a penultimate unit and selection of a subsample for the survey. A reasonable approach in this instance is to provide for an updating of the entire list, adding any new units at the end, at the time the sample cluster is interviewed. The new systematic selection of a replacement cluster then accords the newly added units the proper chance of being selected.

4.77. These updating procedures can result in some added sampling variance, especially in cases where large numbers of new units are added in penultimate units which previously included relatively small numbers. Another procedure, which will not be described in detail here, is to develop lists of newly constructed housing units from building permits or other such sources and to use these in the course of updating samples.

### 9. *Special sampling problems*

4.78. Where decisions are made to cover in the survey certain special populations, such as homeless persons, nomads or those living in collective living quarters, special sampling procedures are generally needed. One common approach is to deal with these situations as if they represented separate sampling universes.

#### (a) *Homeless population*

4.79. Because of the transient nature of this population, a common procedure, as in a census, is to conduct a rapid enumeration at a single point in time, perhaps on a single night. The areas in which such persons customarily sleep are determined. At the specified survey time, the field staff proceed to the designated areas and make a quick count of those present. Using the appropriate sampling ratios, a random or systematic sample is chosen and the required interviews are conducted immediately.

#### (b) *Persons in collective living quarters*

4.80. According to the United Nations census recommendations, the concept of collective living quarters includes hotels, rooming houses and other lodging houses in which the number of boarders or lodgers exceeds five, institutions and camps (77, para. 3.49). Some other types of collective living quarters may also be found in certain cases (para. 3.76).

4.81. A common procedure for covering collective living quarters is closer to the normal survey approach. An advance list of places of these kinds is compiled. Information from the prior census can be a starting point. Often, these places require special licences from the government and licensing agencies are a useful source. Local officials

and other informants as well as some field inspection can aid in the compilation. In addition to identifying these living quarters, it is important to obtain at least an approximation of the number of residents.

4.82. Based on the overall sampling ratio, a sample of these living quarters is drawn from the list, usually on the basis of probability proportional to size (number of residents). Depending on the final cluster size which has been decided, a sample of residents is then selected within each designated unit.

#### (c) *Nomads*

4.83. There are many possibilities for handling this population and they are discussed in detail in a United Nations paper on the subject (87). One approach is to identify the areas in which nomads reside in the off-season, that is, when they have returned from grazing areas, and sample their tents or other living quarters in the usual manner. Another is to locate the watering holes to which nomads must bring their herds to secure water. The sampling in this case might consist of all those who appeared at the watering places on specified days. Other approaches, such as sampling those who pass certain points on migrating routes, have also been considered or used. A useful method may be developed on the basis of the tribal (hierarchical) system when it exists.

### 10. *Estimation procedures*

4.84. The derivation of estimates from sample survey results may be achieved in a fairly straightforward manner, but more reliable estimates can be developed through more advanced mathematical techniques. The determination of estimation procedures is again a rather technical matter which cannot be adequately covered here, but is described in many statistical texts. Some of the alternatives are cited below.

#### (a) *Unbiased estimates*

4.85. The simplest types of estimates may be obtained by multiplying the basic survey results by the reciprocal of the sampling fraction. For example, if the sampling fraction is one half of 1 per cent, the data for each sample case can be multiplied by 200 in developing the final estimates. If different sampling fractions are used for different areas or population groups, the appropriate "weights" would be used in each case. The results of this rather simple procedure are often called unbiased estimates, in that there is no statistical bias. Biases can occur for other reasons, however, such as non-response (discussed below) and errors of response.

#### (b) *Adjustment for non-response*

4.86. The procedure just described disregards an almost inevitable survey result, that is, that some of the households will not be interviewed for some reason. This can occur because the household cannot be found at home despite repeated attempts, because of serious illness which makes interviewing impracticable, because of refusal to provide information or for other reasons. If only the households that were successfully interviewed are included in the estimation, the results, in terms of absolute numbers, will be understated.

4.87. Various options exist for adjusting for non-response. One is to increase all of the weights uniformly to allow for non-response. Thus, if the uniform household weight is 200, and 5 per cent are not interviewed, the weight for the interviewed households is increased by 5 per cent to 210.

4.88. A somewhat more reliable adjustment can be made within individual clusters, since there should be more similarity among households in proximity. If, for example, there are 10 households in a cluster and one is not interviewed, one of the interviewed households can be selected at random and counted twice, that is, assigned a double weight, in the estimation. Alternatively, especially if computers are available, the adjustment can be spread over all of the interviewed units in the cluster instead of using only one such unit, for example by increasing the weights of each of the nine interviewed units in the above illustration by around 11 per cent. More sophisticated adjustments can be made by taking into account certain known characteristics, such as national or ethnic group or size of household.

4.89. Care should be exercised to make these adjustments only for non-respondent units occupied by persons within the scope of the survey. Unoccupied units or those occupied by persons outside of the scope of the survey should be excluded from the estimation. Non-response can also give rise to biased estimates if non-response units have different characteristics from responding units. This possibility is discussed in paragraphs 5.70–5.82 and 7.5–7.14.

(c) *Ratio and regression estimates*

4.90. In many instances, the reliability of the estimates can be improved by using so-called ratio or regression estimates, which take into account the relationship between two or more variables. These types of estimates are “biased” in the statistical sense that the average over all possible samples do not equal the population value. The bias, however, may be relatively small in relation to the gains in sampling precision.

4.91. A simple but useful type of ratio estimate may be applied where independent estimates are available for the population and where certain of the survey statistics are highly correlated with population size. For example, a statistic such as employment, which represents a large proportion of the population, usually varies in accordance with population size. Considerable sampling error may be associated with this statistic, however, because the population size in sample surveys is subject to a good deal of variation. If a reliable, independent estimate is available for the population, that can be used to improve the statistical reliability of estimates such as employment.

4.92. For example, if a reasonably valid, independent estimate of a population is 10,000,000, whereas the weighted survey population estimate is only 9,200,000, a ratio estimate effect can be achieved by multiplying the weights for each sample case by 1.087 (10,000,000 divided by 9,200,000).<sup>4</sup> The weighted sample population estimate will now total the independent estimate.

<sup>4</sup> The actual statistical form of this kind of ratio estimate is  $x' = (x/y)Y$ , where  $x'$  is the ratio estimate of a statistic (such as employment),  $x$  is the unbiased sample estimate of employment,  $y$  is the unbiased sample estimate of the population and  $Y$  is the independent population estimate.

4.93. One of the important advantages of probability sampling is the ability to estimate sampling variances, that is, the probability that an estimate from a given sample differs by a given amount from the average of those from all possible samples of the same kind or, in effect, from the corresponding value for the population as a whole. The standard error (the square root of the sampling variance) is the form in which sampling error is usually expressed. It is common to allow for an interval of either two standard errors or 1.6 standard errors in either direction around an estimate from a given sample as the possible range of sampling error. Under the two standard error criterion, the population value as estimated from the sample falls within the indicated range in 95 cases out of 100. Under the 1.6 standard error criterion, this probability drops to 9 cases out of 10 but this is still a reasonable basis for judgement for many analytical purposes.

4.94. Most variance formulae in textbooks assume either that there is some knowledge of the distribution of given variables in the population or that those distributions can be estimated from the sample results. However, depending on the type of sample, there are some simple means of calculating estimates of sampling variances from the sample data without the need for determining or estimating the population distributions. Some common illustrations are given below.

(a) *Random group method*

4.95. This procedure can be used in many situations. It is frequently employed for samples which were not designed on a stratified basis or for those parts of a stratified sample selected with certainty, that is, where an area was automatically included in the sample because of its size or unique character. It may also be used for very complicated designs where it is otherwise difficult to allow for all of the elements affecting the variances.

4.96. The procedure requires the subdivision of the sample into a number of random or systematic groups. The “rotation” groups described earlier in discussing sample rotation are examples of such groups, but any random process for subdividing the sample is acceptable. Usually, all of the units in a given final cluster are assigned to the same random group. An important element is that the same steps in weighting and estimation have to be applied to each group. Generally, the larger the number of groups, the more reliable are the variance estimates, but practical considerations in data processing generally preclude an excessive number. Usually, somewhere between 6 and 10 groups suffices.

4.97. The formula for calculating the variances of a weighted total such as the total number of births based on random groups is:

$$S_x^2 = \frac{k^2 \sum (x_i - \bar{x})^2}{k(k-1)} = \frac{k \sum (x_i - \bar{x})^2}{k-1}$$

where:

$S_x^2$  = sampling variance (square of the standard error) of a weighted total  $x$ ;

$k$  = number of random groups;

$x_i$  = the weighted total for a given random group;

$\bar{x}$  = the average (mean) of the weighted sample totals for the various random groups.

(b) *Stratified cluster method*

4.98. Where the first-stage area units are subdivided into strata and two are selected for the sample from each stratum, there is also a simple way of calculating the variances from the sample data.<sup>5</sup> The formula is:

$$S_x^2 = \Sigma(x_{g_1} - x_{g_2})^2$$

where:

$S_x^2$  = sampling variance (square of the standard error) for an estimated sample total (such as the total number of births);

$\Sigma$  = the sum overall strata;

$x_{g_1}$  = the weighted sample total for the first first-stage unit drawn from a stratum;

$x_{g_2}$  = the weighted sample total for the second first-stage unit drawn from a stratum.

4.99. In some designs, the variances for those primary sampling units selected for the sample with certainty, because of their size and importance, can be computed by the random group method, whereas the variances for those selected in pairs from strata can be based on the above formula. The variances for the entire sample are then obtained by summing the two components.

(c) *Ratio estimates*

4.100. The computations are more complicated in the case of ratio estimates or other more sophisticated estimation procedures, but the variance measures can often be directly derived from the sample data as well. The specific formulae are presented in many statistical texts.

(d) *Computer software*

4.101. For more elaborate or precise variance calculations, other alternatives are possible. There are computer software packages on the market for the specific purpose of deriving sampling variances.

(e) *Components of variance*

4.102. One complex but useful type of computation which can be done on occasion is the derivation of "components" of variance, such as that part of the total variance which arises from the fact that only a sample of areas has been selected and that part resulting from the selection of only a sample of ultimate sample units within a given area. These measures are helpful in determining the distribution of sample units which would minimize the overall sampling variance.

(f) *Frequency and extent of calculations*

4.103. In a continuing survey, it will not usually be necessary to calculate sampling variances in each round. There will usually be sufficient stability in the variances in

these situations so that they need be calculated only periodically. In addition, it is almost never possible to calculate estimates of sampling variances for each individual survey estimate (that is, for each cell of each table produced). For this reason, a decision has to be made, involving user and subject-matter considerations, as to which variance estimates are to be calculated. User input helps in focusing on which survey estimates and comparisons are of greatest immediate importance and subject-matter specialists can advise on likely interrelationships among the variables investigated in the survey and on the longer-term analysis of the data. An expert in survey sampling methods, using this information, is then in a position to advise on the selection of variance estimates to be calculated, based on the resources available for this task. Variances may be presented in tabular form in publications for the guidance of users. Another method is to present graphs of variances, whereby the sampling error can be read from the graph, depending on the type and size of the sample estimate.

## B. CARTOGRAPHY

4.104. A fundamental requirement for area sample selection and later for enumeration purposes is adequate maps and other cartographic materials. Many statistical agencies will have a considerable store of cartographic materials on hand as a result of a prior population census. A capability may also be present for updating or otherwise adapting the materials for current use. If such resources and capacities do not exist, it is imperative to take the necessary steps to remedy the situation. The development of cartographic materials is a complex technical process which cannot be discussed here in detail. Some of the principal requirements and general approaches that might be used are discussed below.

### 1. *Personnel and equipment requirements*

4.105. The staffing for this function should include geographers, cartographers and supporting personnel. For this purpose, geographers can be defined as individuals who through education and/or experience have an intimate familiarity with the physical and climatic features of the country, its economic resources, and its population and demographic characteristics. Cartographers are individuals trained in the design and drafting of maps. Persons who possess both capacities are ideal for this purpose but may be difficult to find. With the aid of geographers, some of whom might be borrowed from universities, it is usually possible to train secondary school graduates with the requisite aptitudes to fulfil many of the cartographic and supporting requirements.

4.106. Aside from mapping materials themselves, many specialized types of equipment and supplies are needed for this function. Drafting materials such as drafting paper and cloth and drafting instruments are an obvious necessity in drawing maps. Photographic equipment and supplies such as cameras, printers, enlargers and development chemicals, as well as film and printing paper, are needed for purposes of adapting previous maps and reproducing new ones. Other forms of reproduction, such as photocopying or similar processes and blueprinting, may also be involved. Some of these services may be obtained on a contractual basis.

<sup>5</sup> In designs where only one primary sampling unit is selected for the sample from a stratum, an approach called the "collapsed stratum method" may be used. The various strata are first grouped into pairs of similar strata. The data for the two primary sampling units drawn from each pair of strata are then used in the formula cited here. This method usually provides an overstatement of the sampling variance.

## 2. *Types of maps needed*

4.107. Maps are needed at all geographical levels. For overall planning, national maps are required showing major administrative divisions, principal physical features such as mountains and rivers, and the location of significant cities and towns. For each administrative division separate detailed maps are necessary, identifying subdivisions and all recognized urban places. For each city or town, detailed town plans showing streets and roads are important. The greatest level of detail, and a most important type of map if obtainable, is that showing the boundaries of census enumeration areas (the area assigned to a single enumerator) in the previous census. At the greater levels of detail, including cities, towns and enumeration areas, maps are needed—from the standpoint of sample selection—only for those areas to be included in the sample.

4.108. Specialized maps of various kinds can aid significantly in planning a survey. Topographic maps showing elevations and climatic maps showing such features as deserts, savannah and swamp can be important guides in organizing the operation. Demographic maps showing population density and ethnic concentration can play a similar role. There is also a need for transportation maps showing highways, roads, railways and other channels of communication. It could be useful if transportation maps also displayed the availability of public transport on different roads, even including information on seasonal limitations where these exist.

4.109. In addition to maps needed for operational purposes, the cartographic staff may eventually prepare illustrative maps for inclusion in survey publications. These may include maps of regions or other administrative divisions, topographic maps and maps showing distributions of demographic or other subject-matter characteristics. The presentation of geographical data in this form can add significantly to the interest and comprehensibility of a publication.

### 3. *Acquisition of mapping materials*

4.110. Where maps have been developed in conjunction with the most recent census, this represents the most obvious immediate cartographic source. However, census maps may be incomplete or inadequate or substantially out of date. In any case, it is important for the cartographic staff to accumulate mapping materials from other sources as well. Such materials may be obtained from other governmental agencies, civilian or military. Provincial or regional governments or local entities may have various maps for their respective territories. Private sources such as geography departments of universities and commercial firms may have developed or acquired maps for their own purposes.

### 4. *Appraisal of available mapping materials*

4.111. Once mapping materials are assembled from the census and other sources, the next essential step is to appraise them from the standpoint of completeness, accuracy and currency. Comparisons of different maps for the same areas can lead to judgements as to the validity and usefulness of the various alternatives, or to improvements

possible from composite use. Appraisals can also be made on the basis of the knowledge and experience of geographers or of regional or local officials. Often, however, some on-the-spot field checks are necessary to determine the validity of the maps. For survey purposes, field checks of localized maps can be limited to those areas of the country and their subdivisions in which the sample will be located.

## 5. *Revision or redrafting of maps*

4.112. Where possible, cartographic needs should be met by the revision of existing maps through photographic or other reproduction, together with the addition or removal of features as needed. This is much less costly and time-consuming than the preparation of new maps. Where complete redrafting is necessary, the usual approach is for cartographers to take features from various available maps and add other necessary elements based on information from various sources. A crucial matter in the revision or redrafting of maps is the determination of precise boundaries for the various administrative areas and especially for those areas representing primary or secondary sampling units in the survey design. The aid of local officials may be important in establishing boundaries, and field visits may be required in the case of uncertain boundaries for such geographical entities as census enumeration areas.

4.113. For household surveys in urban areas in many countries, frequent updating of maps of areal units to be used for sampling is necessary. Such maps need not be to scale, but they must show notional boundaries of each unit and should give some indications about the location of certain landmarks and the like for proper identification of the unit at the sampling stage. Members of the field staff may themselves assist in this activity, with additional manpower resources provided as necessary.

## 6. *Assignment of geographical codes*

4.114. An essential final step in the cartographic process is assignment of geographical codes to the various geographical units of the country. The use of a multi-digit code can be helpful for tabulation as well as control purposes. The most significant digit might identify the largest separable geographical unit, for example, region or province. The next digit might specify the principal subdivisions within the major unit. Various digit combinations thereafter can identify other specific areas needed for control and tabulation purposes. The geographical codes should not only appear on all of the survey materials but should become part of the computer record for each survey unit. In that way, tabulations can be made at various levels of geographical detail. Where a coding scheme has been developed in the prior census, it can be continued for purposes of the survey programme with such modifications as are needed to reflect changes.

## C. DEVELOPMENT OF SURVEY PROCEDURES

### 1. *Data collection*

4.115. There are various techniques and procedures that may be considered for data collection purposes. The type of subject-matter and the circumstances in a given

country are probably the most important considerations. The choices are more limited in developing countries as a result of lower literacy and the absence of communication facilities.

(a) *Face-to-face interviews*

4.116. Data collection through face-to-face interviews with survey respondents probably still represents the most common technique in household surveys and often the only viable approach in developing nations. Such interviews usually achieve higher co-operation and response rates and more complete and consistent data. In highly complex fields or involved multi-subject undertakings, there may be no feasible alternative, even where literacy is high. The disadvantages of face-to-face interviewing are the higher costs and manpower requirements and the need for extensive training of field staff and close supervision over the data collection.

4.117. Because face-to-face interviews remain the dominant procedure in household survey work, especially in developing nations, much of the discussion in the present *Handbook* on field organization and staffing, quality control procedures and the like is presented in this context.

(b) *Self-enumeration*

4.118. One alternative in more developed countries and in the more literate populations of developing nations is self-enumeration, that is, completion of survey questionnaires by the respondents themselves. The questionnaires can be distributed by mail or hand delivery and the completed forms can either be returned by mail or picked up by field agents. Generally, it is advisable to restrict the length of self-enumeration questionnaires in order to avoid confusion and reduce non-response. However, some rather burdensome tasks are sometimes attempted in this way, such as by asking persons to maintain diaries for days or even weeks on such topics as consumption expenditures and use of time. In these more complex applications, it is usually advisable to provide for personal pickup and on-the-spot review of the completed forms by field agents.

4.119. The advantages of self-enumeration generally include smaller field costs and lower personnel requirements. Also, in theory at least, there is the opportunity for the various family members to consult each other in providing the information. To the extent that this is done, the survey data can be more accurate than where a single respondent reports for the entire household, as is often the case in interview surveys.

4.120. Disadvantages include likely lower co-operation and completion rates and less consistent responses. Where these problems are great, a significant follow-up effort by personal visits or telephone may be required to salvage the information. Also, as indicated, the scope of the survey must usually be limited with self-enumeration, and the volume of editing and coding at the data processing stage is usually greater than for other data collection methods.

(c) *Telephone interviews*

4.121. In some highly developed countries where private telephones are prevalent, various kinds of data may readily be collected by this means. Many of the surveys in

Sweden, for example, including the continuing labour force survey, are conducted in this manner. Telephone interviews are generally inexpensive and can achieve some of the advantages of direct interviews, such as securing more consistent responses. Also, since no travel is involved, it is not necessary to select "clustered" samples. Therefore, more reliable estimates may be obtained with a given sample size, or fewer interviews would be needed to meet a specified reliability standard. Control and monitoring of interviews is considerably easier than in a field operation.

4.122. Experience has indicated that telephone interviews can be reasonably extensive, but they cannot be as prolonged as direct interviews. They present particular problems where observation is helpful in the inquiry, such as rating the adequacy of housing. Also, it is generally easier for a respondent to terminate a telephone than a direct interview if annoyed by some of the questions. Provision has to be made to cover segments of the population without telephones, generally those in less privileged groups. Also, there is a tendency in some countries for an increase in telephones not listed in telephone directories at the request of the subscriber. In such cases, the telephone directories cannot as readily be used for sampling, and recourse has to be made to less efficient techniques such as so-called "random digit dialing".

(d) *Direct observation and measurement*

4.123. Alternative techniques using direct observation and measurement are sometimes used in complicated surveys. An example of observation is a food consumption survey where the interviewer visits every day and records consumption on the basis of questioning the respondent and observing what food has been prepared. An even more intensive approach is where the interviewer actually measures or weighs the ingredients that go into food preparation. Another example of measurement is where survey respondents are examined by health practitioners in the course of a health-related survey.<sup>6</sup> Anthropometric measurement (as of height, weight and girth) is sometimes included as part of health or nutritional studies.

4.124. These intensive techniques are aimed at providing more reliable data than obtain through more conventional approaches. These kinds of efforts are usually exceptionally costly and often require highly trained personnel, so that sample sizes are likely to be small.<sup>7</sup> Also, close scrutiny of this kind can possibly influence the behaviour of respondents and result in atypical findings. In addition to direct expense, certain measurement techniques can have indirect cost implications, such as where persons subjected to health screening might expect treatment for any conditions which are found.

(e) *Combination of techniques*

4.125. Some combinations of the various data collection techniques are frequently found. For example, an expenditure survey may start with a face-to-face interview to

<sup>6</sup> The continuing Health Examination Survey in the United States of America entails arranging for persons selected through household sampling to go to central points to undergo complete physical examinations.

<sup>7</sup> However, the nutrition and family budget survey in Brazil in 1974/1975 used the food-weighing procedure in a large-scale and widespread sample. (See footnote 1 above.)

obtain background information and to inquire about certain large outlays, whereupon the household is asked to keep a diary or record of current expenditures for a period of time. As already suggested, a mail inquiry will nearly always require some follow-up by personal visits or telephone for those who do not mail back the completed questionnaires.

## 2. *Design of questionnaires*

4.126. The information collected in an interview survey ultimately depends on what questions are asked and how they are asked. One of the most difficult problems in survey preparation is the translation of complex ideas and concepts into usable questions for survey purposes. As is often the case in translating from one language to another, something is frequently lost in the process.

4.127. There is a great deal of experience in questionnaire design and most of the specific issues and problems are well known. Nevertheless, the preparation of questionnaires is still more of an art than a science and there is considerable disagreement about particular points. Examples of questionnaires used by others and specific experience in a given country provide some guidance. Often, however, adequate pre-testing may be the principal guidepost and even then uncertainties may remain. Some of the main issues to consider in questionnaire design are discussed below.

### (a) *Types of questions*

4.128. In developing a questionnaire, a prime objective is to consider the types of questions required to elicit the desired information. Various approaches needed for specific purposes are described below.

#### (i) *Direct questions*

4.129. These are questions aimed at acquiring the final information needed on a given topic (such as, "What was your age on your last birthday?").

#### (ii) *Probing questions*

4.130. These are questions directed at assuring that the information is complete. For example, in inquiring about employment a first question might be, "Did you work at any time last week for pay or profit?". To be sure the respondent understands what is meant by work, some additional questions could be asked (for those answering "No" to the first question) such as, "Did you help at all last week on a family farm or business?" or, "Did you take in any contract work to do in your own home?".

#### (iii) *Redundant questions*

4.131. These are questions to check on the accuracy or consistency of the respondent's answers. For example, the respondent might be asked both for date of birth and age. If the answers are inconsistent, a further inquiry would be made to clarify the matter.

### (b) *Length of questionnaire*

4.132. Other things being equal, it is usually preferable to keep questionnaires as brief as possible, in order to avoid antagonizing or tiring respondents. However, this

objective often has to be tempered in the light of other considerations, such as efficiency and overall data requirements. It is also obviously less costly to add items to a questionnaire than to return a second time for the additional information. A general rule, which is easily stated but difficult to apply, is to include as much information on the questionnaire as possible without overtaxing the respondent. Again, experience and pre-testing may be the only ways to establish the limits.

4.133. Where respondents are to be surveyed only once, it is usually feasible to prolong the interviews to a greater degree than where repeated co-operation may be needed. Also, respondents are much more likely to submit to longer interviews when they have a good understanding of and interest in the survey. Adequate publicity, introductory letters, and clear but not overbearing explanations by interviewers are crucial for this purpose. Restrictions in questionnaire length are usually more critical in mail surveys or even telephone interviews where there is no physical presence of an interviewer to sustain interest.

### (c) *Reference period of the questions*

4.134. An important type of timing consideration is the appropriate reference period for the questions. The particular subject-matter and experience in the collection of certain types of data are the principal factors in reaching decisions on this issue. For example, personal and demographic characteristics such as age, marital status and educational attainment will usually relate to the date of interview or some other specific date. Complex and difficult to remember items such as food consumption could relate to the previous day or, at most, a few previous days or a previous week. Employment activity and status usually relate to the previous week, although questions may also refer to usual activity during a much longer period such as a year. Sometimes more than one period may be covered (such as economic activity both in the previous week and over the prior year). For certain subjects such as income and especially entrepreneurial income, normal accounting periods may have to be observed, which may result in a yearly reference.

4.135. As a result of long experience, certain principles have evolved that can serve as a general guide. On the whole, less accurate information is obtained using long recall periods than shorter ones, for example expenditure last year as opposed to last week. For the same periods, major events or items are more likely to be recalled than minor ones, for example births of children as compared to minor illnesses, so one option is to use longer periods for important items or events than for less consequential ones. Thus, in the 1972-1973 Consumer Expenditure Survey in the United States of America, questions on clothing and similar items related to the previous three months, those on household furnishings to the previous six months, and those on major appliances and automobiles to 12 months. Food outlays and other small items of expenditure were recorded on a daily basis in diaries. In some food consumption surveys in Africa and elsewhere, daily visits are made to determine food consumption for the previous day. In some other cases, the visits are on a weekly basis to ascertain consumption in the previous week. The trade-off is between the likely greater reliability of daily visits versus the lower cost of weekly interviews.

4.136. Data for shorter periods also present some problems. One is that fewer events occur during shorter periods and the sampling errors will, therefore, be larger than where respondents are asked to recall events over longer periods. Also, short reference periods are more likely to be subject to "end effects" or "telescoping", particularly a tendency to report as having occurred during the reference period an event which actually took place earlier. Choices have to be made whether to accept these short-term inaccuracies as opposed to the likely omissions and other distortions resulting from long reference periods.

4.137. Panel operations often afford a basis for avoiding some of these reporting difficulties. If certain subjects such as births or expenditure are repeated in successive interviews, for example using the last interview date as the reference, observations for longer periods can be obtained by linking together the reports for successive surveys for the same households or individuals. Also, information from a previous interview can sometimes be used to control some of the telescoping problems in the current interview.

(d) *Verbatim questions versus general categories*

4.138. An issue concerning which there is some disagreement is whether it is necessary to provide verbatim questions to be asked as opposed to merely listing the types of information needed. For example, there might be a question, "Were you working at any time last week?", as opposed to a caption, "Employment last week".

4.139. The argument for verbatim questions is that they achieve consistency in obtaining information and present the ideas in an orderly fashion. It is argued, and has sometimes been found to be the case, that even moderate changes in wording can influence the replies. This is especially the case for opinion questions but can also occur in factual items. When sound, tested questions have been developed, a stronger case can be made for the verbatim approach. If particular respondents do not understand or misinterpret the questions, there is always the option for the interviewer to reword the items.

4.140. The argument for the more general approach is that interviewers who understand the objectives can size up the situation in a given interview and ask the questions in a form that is most understandable to the particular respondents. Verbatim questions, according to this contention, often sound artificial or are confusing. The need for flexibility may be especially great when translation into local dialects is necessary. A more mechanical argument is that general captions will require less space than verbatim questions.

4.141. One of the alleged dangers of the more general approach is that different interviewers may interpret a given item in different ways and thus obtain inconsistent information. In some cases, interviewers may believe they know the answers and ask questions in a biased or negative manner such as, "You didn't work last week, did you?". Of course, biased rewording can occur even if verbatim questions are provided. One conclusion is that neither approach need be used exclusively. In cases where experience indicates there is little difference between the approaches, the more general procedure could be used. In critical cases where precise wording seems important, verbatim questions can be specified.

(e) *Wording of questions*

4.142. Where verbatim questions are used, it is important that they should be clear and concise and avoid ambiguities. Again, this is easier said than done, and pre-testing, as always, is indicated. Complex questions containing more than one thought should generally be avoided, such as "Were you ill at any time last week and did you see a doctor?". In this case the respondent might answer "No" even if ill, because he did not see a doctor. The wording of questions should be as objective and unbiased as possible. More objectivity can sometimes be obtained by including alternatives in a question, such as, "Were you working last week or were you doing something else?". Leading questions, that is, those that induce a certain answer (such as the negative questions cited above), should be carefully avoided.

(f) *Translation of questionnaires*

4.143. A problem arises when the language spoken by an appreciable number of respondents is different from the language of the administration. In some countries and for some surveys, the best solution is to print the questionnaires in two or more languages. In other situations, it is sufficient to teach the interviewers to formulate the questions accurately in the vernacular, which may be an unwritten language. The goal should be to ensure that the field staff understands both the official language and the local dialect. Sometimes, this is difficult to achieve and local interpreters have to be used.

(g) *Order of questions*

4.144. The order in which questions are asked can be important from the standpoints of accuracy of information and of retaining the interest and co-operation of the respondent. Some general rules which have been found helpful are as follows:

(a) A general order in a household survey can be to start with questions which identify the sample unit such as address or name of head, then to follow with those which describe the household and the individuals, such as list of members and their demographic characteristics, and finally to ask the detailed questions which constitute the main subject of the inquiry. Questions which are applicable to all members of the household might be asked first followed by questions which are applicable to particular categories of persons;

(b) Questions on a given topic or which relate to the same event should generally be grouped together;

(c) General questions should precede specific ones. For example, a question on whether a person worked should precede questions on place of employment and number of hours worked;

(d) More sensitive questions, for example those on income or family planning, should not be placed near the beginning of the inquiry. There is some opinion that such questions should be asked near the end of the interview, but there is also a view that the middle of the interview is a rather neutral place;

(e) In cases where certain topics or questions are included in successive surveys, it is important not to insert new items ahead of the repeated ones if there is any possibility that the new items could affect or alter the answers

to the repeated questions. Otherwise, the comparability of the data from survey to survey can be affected adversely. Where some changes of this kind are necessary, it is important to conduct pre-tests to ascertain whether any such effects are likely;

(f) Where the sequence of questions depends on the answers given at various points, it is essential to have clear instructions on how to proceed. The instructions should appear in a different print or in italics, or in some other form which distinguishes them from the questions themselves. Judicious use of arrows pointing in the indicated direction can sometimes be helpful;

(g) Where different questionnaires are used in the same interview, consideration has to be given to the order in which they should be used. The range of subject-matter could be a basis for decision, with more general topics relating to the entire household first, more complex matters or those relating only to specific individuals later and sensitive subjects toward the end.

#### (h) *Recording of answers*

4.145. Answers can be recorded by various means, such as checking a box, encircling a code, underlining pre-printed alternatives, writing in a code or a number or entering verbatim or condensed information. It is usually more efficient to mark or enter codes, as this takes less space and reduces the amount of coding required at the data processing stage. However, pre-coding limits the amount of detail that is provided. Sometimes at early stages, when there is uncertainty about the scope of certain specific items, it may be advisable to provide for write-in entries. A set of pre-coded categories can then be developed for use in subsequent surveys. Write-in entries may always be required where great detail and flexibility in classification are wanted, as for detailed occupations.

4.146. The order of placement of pre-coded answer boxes in a particular item also merits attention. There is often a logical arrangement, such as lowest to highest (or highest to lowest) value or most common to least common answers. There is sometimes a concern that the answer boxes placed earliest will be answered most often, even if this is incorrect, although this is more likely to happen on self-enumeration forms or where the alternatives are read to the respondent. An alternative is to change the order on different sets of the questionnaire. This latter approach complicates the interviewing and data processing, however, and should be considered only if there is clear evidence that the order is affecting the replies.

4.147. Another potential problem with pre-coded answers, especially if there are several possible choices for a given item in the questionnaire, is that interviewers may sometimes have difficulty in deciding which codes to enter or which check-boxes to mark. In such instances, there may be inconsistencies among interviewers in making these decisions. Thus, it is usually advantageous to present the codes as part of the questionnaire as this facilitates reference and reduces the chances of wrong coding. The use of pre-coding requires careful training in order that interviewers thoroughly understand the classifications and perform in a consistent manner.

4.148. In so far as is possible, questionnaires should be designed to be efficient for data processing as well as for interviewing. Where check-boxes are provided, for ex-

ample, pre-printed codes should appear alongside. In the case of write-in entries, convenient coding space should be provided nearby. The arrangement should be efficient for transference of the information by card punching, key-to-disk procedures, or some other means to machine-readable form. Close co-ordination between survey design and data processing personnel is, therefore, a clear necessity. Sometimes the needs of data processing may conflict with the more effective arrangement for interviewing purposes. If this occurs and no reasonable compromise seems possible, the priority should probably be given to the interviewing needs, as that is the most critical phase. Later adjustments can be made for data processing purposes, if necessary, for example by clerical transcription from questionnaires to more convenient forms.

4.149. Certain other types of recording have been developed to expedite the transfer of data from questionnaires. One type, generally called an optical mark-reading process, entails making entries by filling in circles or boxes with a dark pencil or similar instrument. When such questionnaires are passed through a reader, the information is automatically transferred to computer tape. A more sophisticated process, but one that is more difficult to control, involves the optical reading of actual numbers or alphabetical characters by machine. These numbers or characters have to be written in a rather careful, standardized form on the questionnaire in order to be "read" accurately.

#### (i) *Physical size of questionnaires*

4.150. The size of the questionnaire is a different issue from the length of the questionnaire, which refers to interview time. It relates to the physical size of the forms, regardless of the number of questions. Generally, forms should be large enough so that the questions can be printed in type of sufficient size so as to be readable in less than ideal lighting conditions. Sufficient space must also be provided for recording answers, entering codes, and making notes and necessary arithmetical calculations. Taking these considerations into account, the questionnaires should be as small as possible and unwieldy forms that are difficult to carry or manipulate in an interview should be avoided. Data processing and storage difficulties should also be considered in deciding on questionnaire size.

4.151. One way of avoiding undue size in multi-subject surveys is to provide separate questionnaires for different subjects. This can also expedite data processing operations. However, care is needed to provide for the proper identification of the separate forms for the same households or individuals, so that they can later be correlated. The use of individual vs. household forms is another means of reducing size, but with similar control problems. The control of forms can be made easier by binding individual questionnaires into booklets, which can be disassembled, if necessary, at later stages.

#### (j) *Printing of questionnaires*

4.152. One issue that is sometimes overlooked is the need to provide for adequate supplies of questionnaires. The number of copies printed may be set too close to the sample size, without considering the needs for training and practice interviewing, the wastage in field use, unavoidable inefficiencies in distribution and the like. A sup-

ply as much as 50 to 100 per cent above the basic sample needs is usually not excessive. It is also essential to allow sufficient time for the printing and distribution of questionnaires and other survey forms. Printing facilities are often slow and inefficient, especially in less developed countries. Postal service or other means of distribution of the forms to field agents may also be unpredictable. Unless the printing is scheduled well in advance of the survey date, there can be serious delays in starting the data collection.

4.153. Quality control on the printing is another important element. It is not uncommon to find that certain batches of the printed forms may be too light, or smudged, or missing certain sections. A sufficient sample of each batch should be examined to be sure that these problems do not exist. Otherwise, it may be discovered too late that there is an inadequate supply of usable forms. It is also important that questionnaires be printed on good paper stock. They receive so much handling in the course of data collection and processing that they might not otherwise last through the entire operation.

#### (k) *Interviewing aids*

4.154. Various interviewing aids are frequently developed for use with the questionnaires. A calendar might be shown to the respondent when inquiring about dates. Certain cards (sometimes called "checklists" or "prompt" cards) containing a range of possible answers might be given to the respondent to review in answering a question. An example is a list of chronic health conditions for use in asking about a person's health or pictures of different sizes of containers or an actual set of measuring cups or spoons might be used in asking about quantities of food used.

#### (l) *Identification of questionnaires*

4.155. Different form numbers should be assigned to different questionnaires so that they can be readily identified and referred to in instructions and training. These numbers should be based on some logical sequence, such as successive forms used in the same survey round or successive versions in the same subject field.

4.156. An even more important type of identification, essential for control purposes, is that assigned to the questionnaires (and other forms) completed for a given household. Multi-digit codes might be needed for this purpose, including identification of the area (based on the geographical coding system discussed earlier) and some numerical sequence of the sample households within areas. These codes are usually determined at the time of sample selection.

### 3. *Pre-testing*

4.157. Emphasis has already been given to the need for pre-testing to refine questionnaires and procedures. Sometimes, a series of tests may be needed whereby improvements are made sequentially as more experience is gained. It is important to schedule pre-tests far enough in advance of the starting date of the survey for the experience to be adequately analysed and applied and for additional tests to be conducted if needed. Even under the best of circumstances, pre-testing has clear limitations because

of the small sample sizes usually involved and the tight timetable for completion of the work.

4.158. For pre-testing questionnaires and procedures, it is usually not necessary or even desirable to use strict probability samples. Instead, so-called "purposive" samples may be selected whereby a number of cases is deliberately chosen from different groups of the population. These may include different socio-economic, ethnic, geographical, and other groups, including some extreme situations, in order to test the adequacy of the materials under different circumstances. The size of a pre-test depends on the scope of the issues to be investigated. If various alternative questions or procedures are to be examined, a larger sample subdivided in a random manner among the different treatments is needed. There should normally be as many as 30 to 50 cases for each treatment and at least three interviewers to provide for some variety in the observations.

4.159. In assessing pre-tests, a useful procedure is to have planning personnel and supervisors accompany the interviewers in order to observe as many of the interviews as possible. More can be learned quickly in this way than by almost any other means. Tape recording of interviews which are not observed, using small portable recording devices with the permission of the respondents, is another approach. A review of the completed questionnaires and discussions with the interviewers after the pre-test has taken place represent still other useful means. The samples are usually too small and atypical for compiling actual statistics. However, where alternatives are being tested, some tabulations are generally needed.

4.160. Aside from testing alternatives, the issues that may be examined through pre-tests include:

(a) The adequacy and clarity of the training procedures, survey instructions and training materials;

(b) The interaction between the interviewer and the respondent, indications as to whether the latter was puzzled or frightened, extent of co-operation and response;

(c) The extent to which the questions moved smoothly and were easy to ask, evidence of embarrassment or uncertainty on the part of the interviewer in asking certain items;

(d) Indications that some questions were clearly misunderstood, were answered incorrectly because of ambiguities, or were not answered at all because of lack of information or resentment;

(e) Clarity of time reference;

(f) Adequacy of recording space;

(g) The most appropriate respondent for various kinds of information.

4.161. In addition to the refinement of questionnaires and procedures, pre-tests can serve various other purposes, such as developing estimates of sampling variances as an aid in determining sample size and distribution, obtaining estimates of cost for various operations, assessing interview and travel time for personnel planning and testing processing procedures. Even more fundamental matters may be explored, such as the feasibility of the survey itself. For some of these uses, it is more important to use probability samples of some size. One approach is to select a typical sample in one or more sample areas. At this point, a pre-test begins to evolve into a pilot study to

examine the whole range of operations under more typical circumstances.

#### 4. *Instruction and training manuals and other materials*

4.162. One of the most essential but sometimes neglected preparatory steps is the development of instructional and training materials for field personnel, supervisors and interviewers alike. There is a folklore, perhaps most common in commercial types of surveys, that capable interviewers can manage with very sketchy instructions provided that they have good questionnaires to work with. While some questionnaires may speak for themselves, more probably remain mute on at least some points. Also, there is of course a great deal more involved in survey taking than just asking questions. Some of the types of materials that are usually needed for field personnel are described below.

##### (a) *Supervisors' manual*

4.163. Field supervisors have to be trained both in the technical aspects of the survey and in their supervisory responsibilities. In the first instance, their training is similar to that accorded interviewers. For the second purpose, a supervisory manual is important, covering the following types of matters:

(a) Responsibilities with regard to the recruitment or training of interviewers and other preparatory activities;

(b) Procedures for organizing and controlling the flow of materials to and from the field;

(c) Means of monitoring field work, importance of adherence to timetables, procedures for field review of completed questionnaires, and application of quality control procedures;

(d) Steps to take when serious errors are discovered or special situations, such as refusals, are encountered.

##### (b) *Interviewers' manual*

4.164. A detailed written instructional manual for interviewers is probably the most essential of all of the preparatory materials. Supervisors also use this manual as part of their own training and later supervisory activities. The manual should cover all aspects of the survey, as illustrated below, in language the typical interviewer can understand:

(a) The general background and purposes of the survey, the scope of the information, the general type and coverage of the sample, and related items;

(b) The administrative responsibilities of interviewers in terms of managing materials, proper planning and organization of their workload, procedures for reporting progress and problems, preparation of necessary cost reports and other administrative forms;

(c) Basic interviewing rules in terms of proper behaviour and dress, the need for proper identification, courtesy in interviewing persons in all walks of life, appropriate ways of introducing the survey, determination of appropriate respondent, need to assure confidentiality, and the like;

(d) Detailed instructions and specifications for each informational item, proper ways of asking questions, per-

missible types of probing, tactful ways of dealing with inconsistencies, methods of recording information, types of notes and explanations needed;

(e) The importance of and need for minimizing non-response in the survey, including arranging for return visits, procedures for dealing with refusals, and the like;

(f) The instructions for listing and selection of ultimate sample units, where this is done by the same interviewers.

##### (c) *Training guide*

4.165. A useful additional manual is a training guide, which relates closely to the interviewers' manual and is used by supervisors and others in conducting training sessions for interviewers. The guide should indicate the order in which various topics are to be taken up and the material to be covered. The guide can be in outline form, in which case the trainer expresses the various ideas in his own words. An alternative is to have a verbatim guide from which the trainer reads when he is conducting the sessions, with the option of rewording or clarifying certain ideas. The advantage of a verbatim guide is that the training will be standardized if different trainers are involved, and it may also simplify the task of the trainer. On the other hand, it can reduce somewhat the flexibility of the trainer in adapting the material to the needs of a particular group.

##### (d) *Other materials*

4.166. Certain other kinds of materials that may be developed include:

(a) *Home study materials.* These may consist of certain instructional materials with appropriate references to the interviewers' manual, which prospective interviewers can study at home, before attending the training sessions. Certain test exercises can also be included, which the trainee can complete and submit in advance of the sessions;

(b) *Materials for group training sessions.* These may include test exercises, to be completed at various points in the session, illustrative or "mock" interviews etc. Where feasible, audio-visual training materials can be very helpful. For example, recordings can be played of illustrative interviews, ways of introducing the survey etc. Slides and other visual aids can be shown of mapping materials, questionnaire forms, and the like.

##### (e) *Language problems*

4.167. As in the case of the questionnaires, the language question may arise with respect to the instructional and training materials. If a country has important regional languages, it may be necessary to provide the materials in each of them. If, however, all field personnel understand one language, it might be sufficient to formulate only the survey questions in the local languages and to employ staff who speak those languages where needed.

#### 5. *Decisions on selection of survey respondent*

4.168. Certain basic rules must be formulated in advance on the appropriate household respondent for survey purposes, in particular whether a single respondent is asked to report for the entire household or whether each person (or adult) is asked to report for himself. This matter is discussed further in the next chapter on data collection.

## 6. Use of compensation for respondents

4.169. Another issue to be decided is whether respondents or households should be compensated in any way for participating in the survey. Most household inquiries are not so demanding of time and effort as to warrant compensation. Co-operation can usually be obtained by proper explanations of the survey purposes and appeals to the public spirit of respondents. There may be situations, however, where the reporting burden is such that some kind of compensation may be considered. One example is where households are asked to keep records of food consumption over extended periods of time.

4.170. The experience with compensation is somewhat mixed. In situations where co-operation is usually poor, there may be some gain. Where compliance is ordinarily good, there may be little further advantage. The benefit, where it occurs, is usually greater among low-income families than among middle- and upper-income groups.

4.171. Compensation does not have to be in the form of money but could entail a small gift or choice of gifts, free chances in a lottery, or similar options. It has often been found, where compensation is offered, that it is the offer itself and not the amount or kind of offer that achieves the purpose. Where compensation is being considered, pre-testing might be carried out to see if the costs incurred are worthwhile in terms of improvements in response rates, quality of the data obtained and more effective use of interviewers' time.

4.172. Some other factors which should be kept in mind in considering compensation are the following:

(a) The practice may become known and lead respondents to expect similar treatment in other surveys, including those that do not make inordinate demands on their time;

(b) In the case of a household expenditure survey, payments should be made only after completion of the recording period so that purchasing behaviour during the period is not affected;

(c) In reporting vital events, it is important not to pay per event;

(d) Compensation may contribute to a degree of differential response between low-income and more affluent families by being relatively more attractive to the former.

4.173. A related factor in some cases may be "implied compensation", in the sense that the respondent may come to believe that an inquiry on a subject such as health may lead immediately to steps to treat deficiencies such as illnesses which are reported. Care should be taken in questionnaire design and interviewer training to ensure that such expectations are not created.

## 7. Quality control

4.174. An essential ingredient of any survey plan is the development of quality control systems and procedures, that is, means of assuring that the survey specifications are being carried out satisfactorily. Without such provisions, even the best survey plan can go awry, perhaps beyond repair, before difficulties even become known to the survey managers.

4.175. Probably the most important aspect of quality

control is control over data collection. Such a system can include a number of elements such as review of questionnaires by field supervisors, observation of interviews by the supervisory staff, reinterviews or second interviews of a subsample of the field work, and similar steps. Quality control is also necessary in other phases of a survey programme, for example in checking on the accuracy of field listings or other steps in sample selection, in monitoring data processing operations such as coding and transference of data to a machine-readable form and even, as already indicated, in checking on the adequacy of printing of survey forms. The various elements of quality control, particularly as they relate to data collection and processing, are discussed in detail in chapters V and VI.

## 8. Data processing

4.176. Although data processing itself represents one of the final stages of the survey operation, much of the planning has to be accomplished far in advance. Otherwise, undue delays will occur at various stages which will be destructive of the survey timetable.

4.177. The principal aspects of planning for data processing include the following:

(a) Determination of the basic processing methodology: one aspect entails decisions on how various processing steps such as data editing and coding will be carried out, whether by a clerical staff, on computers, or through some combination of methods; another example is decisions on how errors detected in processing will be handled and whether imputations will be made for missing items;

(b) Preparation of necessary instructions and manuals for coding and editing and other clerical operations;

(c) Decisions on the means of transferring data from questionnaires to machine-readable form by card punching, key-to-tape or to-disk or some other procedure;

(d) Decisions on the manner of organizing computer programming functions and on the possible use of computer software packages;

(e) Decisions on the type of computer and auxiliary equipment to use for processing and for subsequent preservation and use of the data;

(f) Decisions on the extent of centralization or decentralization of data processing functions.

These various matters will be discussed in detail in chapter VI on data processing.

## 9. Cost estimates and scheduling

4.178. Money and time are obviously essential ingredients in a survey operation as in most human endeavours. As soon as an overall survey plan is formulated, the next steps are usually to develop some approximate budget estimates for implementing the proposals and a timetable for producing the results. Although these may be based on preliminary judgements which are highly tentative, they have an important bearing on programme decisions and priorities.

(a) *Cost estimates for survey operations*

4.179. When the planning reaches the level of specific survey programmes, the budgeting must be reviewed in

exhaustive detail. Decisions on the range of subject-matter, the size and dispersion of the sample, and the data collection procedures will be strongly influenced by alternate cost estimates for the various options.

4.180. In spite of the crucial importance of budgeting, cost estimation is one of the least developed aspects of survey planning. One of the problems is the often burdensome nature of maintaining detailed cost records. Another is the difficulty of separating costs in joint endeavours, especially administrative and other indirect expenses. Nevertheless, the development and maintenance of a comprehensive cost reporting system can pay important dividends with respect to future planning and the ability to attract the necessary support for data programmes. Often, unrealistic cost assumptions and consequent "overruns" may lead to disillusionment with statistics on the part of officials whose support is needed. This is especially the case if it is not even known where the money has gone. At the same time, exaggerated cost estimates to cover all possible contingencies may preclude any consideration whatever of certain programmes.

4.181. The development of an adequate cost-reporting system is crucial because most current budgetary estimates are based on previous experience. Even though no two operations are exactly alike and circumstances change even when the same surveys are repeated, there are usually enough similarities with prior operations to serve as a basis for reasonable current estimates. As indicated earlier,

pre-tests may be another means of developing certain cost elements.

4.182. Cost estimation must usually begin at the most detailed level of operation. For this purpose, it is obviously necessary to have a complete understanding of all of the detailed steps involved. Certain specific operations are more readily measured than others, such as field interviewing and travel costs, clerical coding and editing and computer runs. In addition to the records maintained by the personnel directly involved, it may be useful to assign cost analysts to keep detailed accounts for these kinds of operations for a reasonable period, with a view to developing the necessary components of cost. The most difficult aspect, and one that is often disregarded, is the allocation of indirect and overhead costs or the costs of personnel whose responsibilities extend over several projects. For this purpose, it is necessary for administrative, professional and supervisory personnel to attempt to make some realistic estimates of their time allocation among projects. Certain costs which cannot be reasonably allocated in this manner, such as for overhead personnel not otherwise budgeted, space rental, certain types of supplies, and the like, might be totalled and computed as a percentage of the overall agency budget. This percentage can then be added on as an overhead cost to the sum of the direct and allocable indirect costs of each separate project. Table 1 below illustrates a detailed worksheet for survey budgeting. The worksheet treats capital expenditures

TABLE 1. ILLUSTRATION OF A COST WORKSHEET FOR A HOUSEHOLD SURVEY PROGRAMME

Activity	Estimated units of work (person-months, except where otherwise indicated)	Unit cost (relevant unit of currency per person- month, except where otherwise indicated)	Estimated total cost (relevant unit of currency)
<b>I. PLANNING AND PREPARATORY ACTIVITIES</b>			
<b>A. Initial planning and subsequent monitoring (senior staff) .....</b>			
<b>B. Selection and specification of subject-matter</b>			
1. Subject-matter planning .....			
2. Preparation of tabulation plans .....			
3. Secretarial and other services .....			
<b>C. Development of survey design</b>			
1. Initial design planning: survey structure, population coverage, sampling procedures, data collection methods etc. (professional staff) .....			
2. Development of sampling materials:			
(a) Cartographic materials (assumes census materials available):			
Personnel costs .....			
Maps and supplies .....			
(b) Field household listings (2,000 enumeration areas):			
Personnel costs (mainly interviewers) .....			
Travel costs .....			
(c) Sample selection and preparation from field lists .....			
<b>D. Design and printing of questionnaires and other forms</b>			
1. Professional staff .....			
2. Secretarial and other services .....			
3. Printing costs (after pre-tests) .....			
<b>E. Pre-testing</b>			
1. Professional staff planning:			
(a) Initial preparations .....			
(b) Analysis of results and revision of materials .....			
2. Field supervisor:			
(a) Personnel costs .....			
(b) Travel costs .....			

TABLE I (continued)

Activity	Estimated units of work (person-months, except where otherwise indicated)	Unit cost (relevant unit of currency per person- month, except where otherwise indicated)	Estimated total cost (relevant unit of currency)
<b>I. PLANNING AND PREPARATORY ACTIVITIES (continued)</b>			
3. Interviewers:			
(a) Personnel costs .....			
(b) Travel costs .....			
F. Preparation of instructional and training materials for field use			
1. Professional staff .....			
2. Secretarial and other services .....			
3. Reproduction costs .....			
G. Miscellaneous planning activities (for example, pub- lic relations and publicity) .....			
H. Subtotal components			
1. Senior staff .....			
2. Professional staff .....			
3. Technical staff .....			
4. Service staff .....			
5. Travel .....			
6. Printing .....			
7. Cartography and miscellaneous .....			
			SUBTOTAL
<b>II. FIELD OPERATIONS</b>			
A. Training of field supervisors			
1. Personnel costs .....			
2. Lodging and meals .....			
3. Travel costs .....			
B. Training of interviewers			
1. Supervisor costs .....			
2. Interviewer costs:			
(a) Personnel costs .....			
(b) Travel costs .....			
C. Data collection (including quality control)			
1. Supervisor costs:			
(a) Personnel costs .....			
(b) Travel costs .....			
2. Interviewer costs .....			
D. Field administration			
1. Field direction .....			
2. Travel .....			
3. Other costs (for example, control and shipment of materials) .....			
E. Subtotal components			
1. Professional staff .....			
2. Technical staff .....			
3. Service staff .....			
4. Travel .....			
5. Travel subsistence .....			
6. Interviewing .....			
7. Miscellaneous .....			
			SUBTOTAL
<b>III. DATA PROCESSING</b>			
A. Systems planning .....			
B. Computer programming .....			
C. Clerical coding			
1. Initial coding .....			
2. Quality control .....			
3. Supervision .....			
D. Key-to-disk operations			
1. Initial keying .....			
2. Quality control .....			
3. Supervision .....			
E. Computer time (including operator and maintenance costs) .....			
F. Miscellaneous processing costs (supplies etc.) .....			
G. Subtotal components			
1. Professional staff .....			
2. Technical staff .....			
3. Quality control staff .....			
4. Service staff .....			
5. Computing .....			
6. Miscellaneous .....			
			SUBTOTAL
<b>IV. DATA REVIEW AND PUBLICATION</b>			
A. Professional time .....			
B. Publication costs .....			

TABLE I (continued)

Activity	Estimated units of work (person-months, except where otherwise indicated)	Unit cost (relevant unit of currency per person- month, except where otherwise indicated)	Estimated total cost (relevant unit of currency)
V. SURVEY DIRECTION AND CO-ORDINATION (continuing oversight over all activities) .....			
VI. SUBTOTAL .....			
VII. EVALUATION STUDIES AND METHODOLOGICAL RESEARCH (may be estimated at 10 per cent of cumulative total)			
VIII. GENERAL OVERHEAD (may be estimated at 15 per cent of cumulative total for administrative costs, space rental, general supplies and the like) .....			
IX. TOTAL .....			

for equipment as either an amortized current expense or an overhead.

4.183. A problem which is common in many countries is that certain permanent staff members are budgeted as part of overall agency costs and are not normally charged to a survey project even if assigned to it. It is important that the contribution of these members to the project be determined even if this means keeping a special set of cost records for this purpose. Otherwise, it will be impossible to ascertain the true costs of a project and planners could be misled in developing future budgets.

(b) *Preparation of a calendar of operations*

4.184 The failure to produce timely statistics in spite of advance commitments can discourage official support of statistical programmes to the same or an even greater degree than cost overruns. Most statistical plans specify an overall timetable for producing results. However, unless a detailed calendar of operations is developed specifying all of the steps that have to be accomplished, the chances for meeting the target may be rather slim.

4.185. Preparation of a calendar can actually go hand in hand with the budgeting stage. In both cases, a first step is to spell out all of the activities entailed in the various stages of the operation, planning the programme, completing the necessary preparations, collecting and processing the data, and analysing and disseminating the results. Tentative starting and ending dates have to be attached to each significant activity. The relationship of the calendar to the originally targeted completion date should be examined realistically to see whether the initial timetable can be achieved. If that target appears to be unrealistic, it is better to face that situation at the outset than to chance serious disappointments later.

4.186. Table 2 illustrates a timetable in bar chart form for a survey programme of relatively short duration. Where the interviewing is spread over a longer period (such as a year), the line for data collection would, of course, extend over the appropriate period of months and the data processing and analysis phases would be shifted to the right accordingly.

4.187. Once the calendar is established, it is necessary to chart progress on a continuing basis to observe whether the various intermediate target dates are being met. If delays or bottlenecks develop, there should be a mechanism for examining means of solving the problem. If certain delays become inevitable, it will be necessary to determine

their impact on interrelated activities and on the calendar as a whole. It is possible that modifications in the programme or additional resources will be needed to overcome the difficulties or make up time at a later stage. In short, planning a programme is not a one-time activity but entails continuous monitoring and likely reformulations at various stages.

10. *Publicity and public relations*

4.188. A survey programme requires the co-operation of the public, and it is only reasonable, as well as important, that an effort should be made to inform the public about it in advance. There is no guarantee that the word will reach all of those who may be involved, but the effort is nevertheless important. The programme should be reasonable in dimension and avoid excessive exposure.

4.189. Some approaches which may be helpful are the following:

(a) Interviewers should be supplied with materials which they can show or give respondents, as needed. These could include pamphlets or articles prepared by the agency in understandable language. Where there has been newspaper publicity about the survey, copies of newspaper articles might also be helpful. Interviewers could also make references to radio or television announcements where these had been made or were planned;

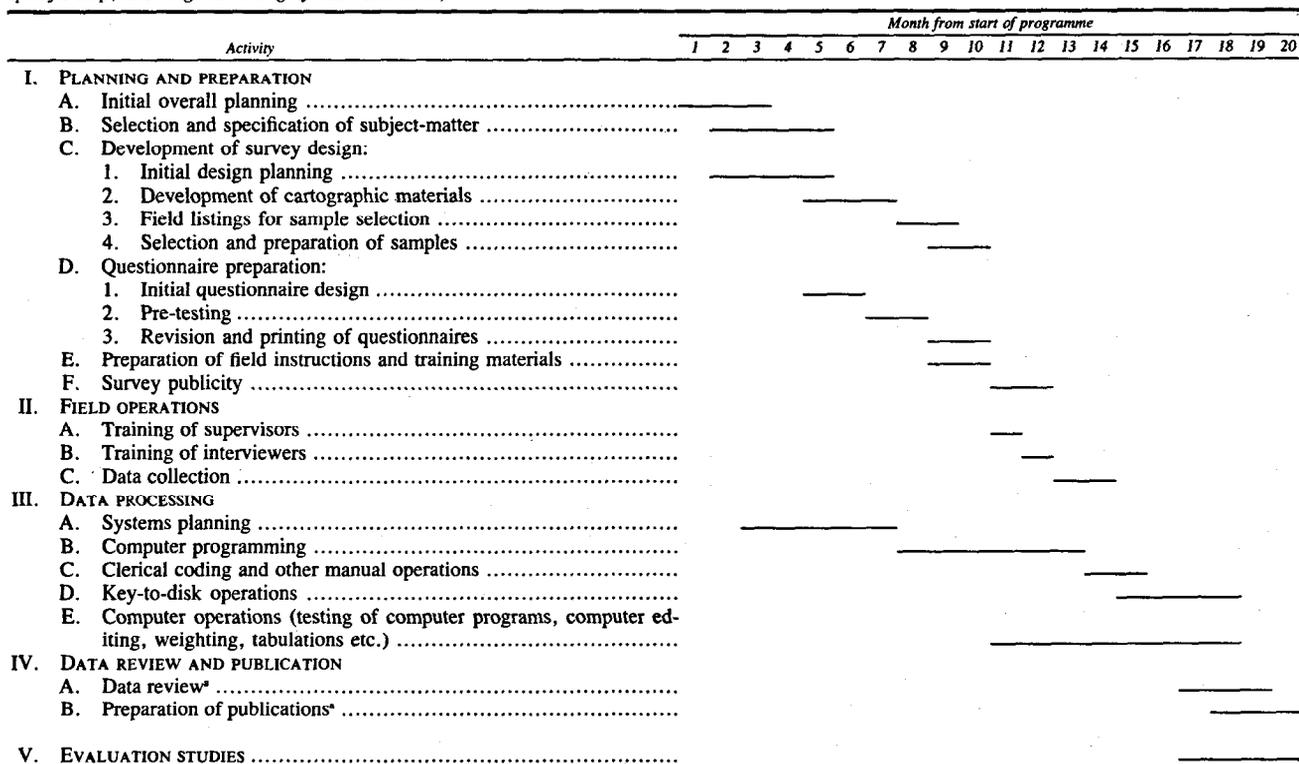
(b) Statistical officials can disseminate information about the programme through advisory committees or by speeches before various local government bodies, professional associations, and similar groups;

(c) Personal contacts can be made to explain the programme to key local officials and other important interests whose co-operation may be crucial in enlisting support. It could be particularly important to secure the approval of such rural officials as village heads, chieftains of nomadic tribes, and others without whose concurrence it would be difficult to gain the compliance of their constituencies. If the statistical agency has a regional office structure, these local contacts might more readily be made by the regional officials;

(d) Where literacy is reasonably high, advance letters may be sent to the selected households, describing the survey briefly and announcing the approximate time period for the data collection. This procedure is not always advisable, however, and local conditions and customs should

TABLE 2. ILLUSTRATION OF A TIME SCHEDULE FOR THE FIRST SURVEY ROUND OF A HOUSEHOLD SURVEY PROGRAMME

(This chart is purely an illustration of the kind of schedule that has to be developed. The actual schedule will depend on the specific kind of survey operation and circumstances in each country. In addition to an overall schedule such as that shown, a separate chart should be prepared for each specific step, showing the timing of each sub-task.)



\* These steps relate to the basic technical review and publication of the basic results. More detailed studies could extend over many months, even years.

be considered in deciding on this step. In some instances, such notices are believed to have created suspicion and advance hostility. Other experience indicates that advance notification can create a more favourable atmosphere for the interviewer, even if respondents have not thoroughly read or understood the material;

(e) For certain types of complex surveys, advance visits to sample households to explain the survey purposes and procedures may be considered. This kind of personal contact is more feasible when the survey sample is relatively small and confined to only certain parts of the country.

## V. DATA COLLECTION

5.1. At this point, survey plans and preparations should largely be completed. The subject-matter has been selected, questionnaires have been designed and pre-tested and a basic tabulation programme has been prepared. The sample design has been determined and the ultimate sample units have been chosen or are awaiting certain final field counts or listings for this purpose. The survey framework and the data collection and data processing procedures have been finalized. Instructional and training materials have been written. Budgets and timetables have been prepared and personnel requirements have been determined. All that remains to be done is to execute the survey, that is, to collect and process the data. In allegorical terms, all that remains to be seen is whether the splendid craft which has been created will actually fly and reach its destination.

5.2. It will not take very long to find out whether there is danger of a crash landing. The risks can be reduced, however, if there are enough control towers and monitors to watch every stage of the flight. The data collection phase is the crucial testing ground for the survey. If serious deficiencies arise which are not caught and rectified promptly, there is little that can be done after the fact to salvage the situation. To mix a few metaphors, sophisticated adjustment and estimation procedures after the data collection can help to heal the patient only if the wounds are not too great.

### A. FIELD ORGANIZATION AND RECRUITMENT

#### 1. Organization

5.3. No data collection is possible without some kind of field organization. Such an organization can be created on an *ad hoc* basis to accomplish a specific data collection purpose. Because of their vast size and intermittent nature, censuses are often carried out on such a basis. A special field structure can also be established for a given survey programme. However, it is extremely difficult to carry out a satisfactory one-time survey. It is only through gradual and careful development of field staff and continuing experience that an acceptable level of proficiency can be gained.

5.4. It is the objective of most statistical offices, therefore, to develop at least some elements of a permanent field organization. The need becomes almost overwhelming when a programme of multi-subject surveys, panel operations, or other continuing statistical projects is in existence or in various stages of planning. Even where statistical demands are less pressing, there are strong arguments for creating at least a small nuclear staff of field supervisors and establishing access to a pool of experienced interviewers who can be called upon as needed.

5.5. Mention has been made previously of some of the various possible forms of field administration. In larger

countries, especially where communications are difficult, there may be a need for a regional office structure, with senior supervisors and supporting staff posted in each region. In smaller nations, field activities might suitably be undertaken from a central point. An illustration of an especially extensive field organization may be found in Brazil, where there are some 22 regional offices, one in each state, and some 800 district sampling points where supervisors are posted. In contrast, it should not be surprising to learn that survey operations in Fiji are run directly from the Central Bureau of Statistics. Even where regional offices exist, there is usually need for a central group to provide overall administration, to handle communications to and from the field, and to control the flow of materials.

#### 2. Recruitment of field staff

5.6. Field supervisors are sometimes full-time statistical officers or other employees of a central statistical agency in smaller countries. In larger countries, they may represent a separate staff especially recruited for survey operations and assigned to regional posts. In such cases, some may have been selected from the ranks of those interviewers who had exhibited the ability and willingness to take on more responsibilities. The ratio of supervisors to interviewers depends to some extent on the geographical spread of the field work and the complexity of the survey operation. Where there is a wide dispersion, communications are difficult or there is much complexity in the procedures, the ratio should be low. In the National Sample Survey in Indonesia in 1967, for example, there were 170 field supervisors for 640 interviewers. In other situations, the ratio can be larger but probably should not exceed 6 or 8 to 1. Sometimes pre-tests may be necessary to establish the optimal ratios.

#### (a) Sources of field staff

5.7. The potential sources of field staff differ a good deal from country to country. In some instances, as in many African surveys, there may be no option other than to use teachers and older students. As indicated earlier, this can strongly influence the timing of surveys so as to coincide with school vacation periods. Agricultural extension agents, government nutritionists and other public employees can be used as interviewers in more specialized surveys, perhaps as part of their regular duties. Where recent censuses have been taken, the field staff employed in that operation can be a good source of both supervisors and interviewers for survey purposes. It is always advisable to keep records of competent field personnel used in censuses for possible future reference, even if there is no present need for such staff. In some countries where secondary education is fairly widespread, acceptable candidates can be found among housewives and others not customarily in the labour market.

5.8. Sometimes circumstances may dictate that full-time statistical officers of the central agency be used as data collectors as well as field supervisors. In the family budget surveys in the German Democratic Republic, where samples are selected from the rolls of industrial enterprises, a responsible employee on the establishment rolls is picked to collect the information for the sample individuals.

(b) *Desirable traits for interviewers*

5.9. Survey interviewers must have sufficient education for purposes of studying the often lengthy and complex instructions provided for survey work. The educational requirement could vary from country to country depending on the structure of the educational system. They should be able to pass qualifying tests which cover not only reading and writing ability but such job-related skills as map-reading and some arithmetical capability. Some other desirable traits are:

(a) A pleasant personality and the ability and willingness to relate to persons in all walks of life;

(b) The absence of highly opinionated views, especially with regard to the kinds of subjects likely to be included in the survey;

(c) Willingness to accept instruction and to adhere to rules;

(d) A knowledge of and facility in local languages and dialects in the areas where they are likely to be employed;

(e) Availability for night and weekend work and for travel, where necessary.

5.10. It is often difficult to judge the acceptability of prospective candidates purely from interviews or qualifying tests. It is useful, therefore, to have probationary periods so that those who do not later prove to be acceptable may be replaced without great difficulty.

(c) *Full-time versus part-time interviewers and other staffing options*

5.11. Although staff availability may often dictate the choices, there may be options with regard to the use of part-time or full-time interviewers. Where qualified part-time interviewers are available on a local basis, this can provide an opportunity to spread the survey sample over more areas and thus reduce the amount of necessary clustering. Travel costs can be minimized with locally based interviewers, and pay scales and fringe benefits can be lower on a localized basis. Since the survey assignments tend to be intermittent for local interviewers, however, they usually develop less proficiency in the work. Also, turnover is often substantial, with consequent additional training costs and losses in quality until the replacements gain the necessary experience.

5.12. In many situations, more qualified personnel can probably be recruited on a full-time basis, though this is not always the case if pay scales are low and other job opportunities exist. Since full-time interviewers may have to travel a good deal, interviewing costs are generally higher with that type of staff and there may be a greater necessity to concentrate the sample. Some offsets in cost can occur, however, because of likely lower turnover and probably greater productivity. The quality of work is likely to be

better because of the usually higher calibre of staff and more continuity in employment. Sometimes, where full-time interviewers are used, they can be organized and travel from place to place in teams rather than operating as individuals. The use of teams can result in easing transport problems and in creating opportunities for closer supervision. On the other hand, organization of the field work on an individual basis usually provides greater flexibility in making assignments. For example, travel time and costs can be reduced by taking account of the home base of individual interviewers in deciding where to assign them.

5.13. Another choice may be between permanent interviewers, that is, those who would work on various successive surveys, whether on a full-time or part-time basis, and temporary interviewers, who would be hired solely for a single survey round or undertaking. Whereas permanent interviewers have some obvious advantages in terms of training and experience, the ability to hire on a permanent basis depends on the existence of sufficient continuing work. Sometimes, temporary interviewers, although perhaps lacking in some technical skills, exhibit more interest and enthusiasm for their work than those who have been employed for a long time, especially where their pay scales are low. An option is to use permanent interviewers at the outset of a survey programme and to move to a more flexible arrangement as the system matures. However, if the programme is complex or there is need for consistency over time, the argument would be stronger for continued use of permanent or at least long-term staff.

5.14. One problem with permanent or even long-term interviewers is the matter of motivation. Human factors such as task fatigue, reluctance to travel continuously, growing concern about personal safety and the like have to be considered in this regard. One possible alternative is to institute a planned but gradual staff turnover, whereby no one works longer than a certain period of years as an interviewer. Opportunities for promotion or reassignment to other positions, however, should be made available, wherever possible, for the more capable personnel affected by such turnover policies.

5.15. The use of locally based staff, especially in small towns and rural areas, raises another issue, the possibility that the interviewers and respondents may be acquainted. This fact can sometimes be advantageous in terms of enlisting greater co-operation. On the other hand, the possibility exists that there could be some embarrassment in answering questions of a more private nature, which could adversely affect the survey results.

5.16. Another issue that often arises is whether it is necessary to match interviewers and respondents in terms of ethnicity, tribal affiliation, or other such characteristics. There may be situations where co-operation cannot be obtained unless the two parties are matched in this manner. The need for a familiarity with certain languages or dialects can also dictate the choice in some cases. Otherwise, the experience is somewhat mixed. Ethnic compatibility is sometimes regarded as useful in gaining compliance. On the other hand, too great a familiarity can occur in some instances, which can interfere with the independence of the interview.

5.17. Certain other customs and traditions may have to be taken into account in choosing and assigning interviewers. For example, some male respondents may not be

willing to talk with female interviewers. On the other hand, if it is necessary to interview female respondents, as in fertility studies, customs may preclude the use of male interviewers.

## B. PRELIMINARY FIELD WORK

5.18. Mention has already been made of some preliminary field work which is usually necessary in conjunction with the sample design. In effect, the required field work is a means of completing the sampling frame.

5.19. Two different approaches, already cited earlier, can be used for this purpose. On the one hand, an effort can be made to subdivide the penultimate unit into smaller segments (with well-defined boundaries), each of which contains approximately the number of ultimate sample units wanted as the final cluster. One of these segments is then selected at random for the sample. On the other hand, a listing can be made of all of the ultimate units in the penultimate unit and the final sample can be selected systematically from the list. Variations are possible.

5.20. This preliminary field work should be accomplished sufficiently in advance to provide time for sample selection and other preparations. It is possible, especially where complete listings are made, to carry out this operation simultaneously with the enumeration. In this case, certain lines on the listing sheets, such as every fifth, sixth or seventh etc., depending on the needed cluster size, are pre-designated and the ultimate sample units which fall on those lines are interviewed for the survey. Although this combined procedure may be less costly, it can result in some biases in the sample. For example, some units which interviewers have some reason to avoid, for example because of anticipated co-operation problems or apparent absence from home, may be deliberately listed out of order so that they do not fall in the sample. Control over the sample size is also more difficult in the combined approach. Where it is necessary for budgetary or other reasons to use a combined procedure, careful supervision and controls should be exercised in order to prevent biases in selection.

5.21. Special training is important for these preparatory phases. Some of the issues to be covered are:

- (a) Instruction in the use of maps;
- (b) Definition and kinds of ultimate sample units, and cases where special procedures are needed, for example, multi-unit structures or multiple households in living quarters;
- (c) Definitions of satisfactory boundaries for internal segmenting;
- (d) Order of listing units and amount of detail needed on listing sheets;
- (e) Specific instruction, where necessary, on updating of old listings from a previous survey as well as the preparation of new ones.

5.22. It is important to have sufficient descriptive information so that the interviewer can readily locate a listed unit which has been selected for the sample and does not enumerate the wrong unit. If it is not too costly and time-consuming, it is useful to have the name of the head and perhaps the number of residents as part of the description of a listed unit.

## C. TRAINING OF FIELD STAFF<sup>1</sup>

5.23. Questions always arise about the amount of training that should be devoted to field personnel, and there are no obvious answers. The background and experience of the personnel are evident factors. Experienced interviewers, for example, will not usually have to be trained on basic survey procedures but only on new subject-matter. The complexity of the survey would be another major factor in the amount of training needed. While it is possible to over-train staff, whereby the process becomes tedious and counterproductive, the opposite tendency is probably more common.

5.24. Training is usually most effective when the trainees have to participate actively, through such means as oral question-and-answer periods, test exercises, mock and practice interviews and the like. There is nothing so tedious, and probably so ineffective, as straight lecturing. Audio-visual aids such as recordings and slides or motion pictures not only can be useful as teaching devices but can serve to relieve the monotony. Careful preparation by the trainer is an absolute necessity or the whole process can degenerate into chaos.

### 1. Training of field supervisors

5.25. Field supervisors should be trained by the professional staff of the statistical agency. They are usually trained first on the technical aspects of the survey, using the manuals and other materials prepared for interviewers. Afterwards, they should be trained in their administrative and supervisory duties. It is essential for supervisors to conduct some practice interviews with actual households as part of their training. This gives them a better understanding of the procedures and the problems they are likely to encounter.

### 2. Training of interviewers

5.26. The training of interviewers is generally built around the basic instructional manual prepared for their use. The training can be conducted either by the professional staff of the agency or by field supervisors. The agency staff may be able to conduct more effective and consistent training. On the other hand, the task may become too burdensome and prolonged if the interviewer staff is large or widespread. Also, there may be advantages in having supervisors conduct the training in that they might gain more respect from the trainees in this manner and learn more about the personnel assigned to them. The use of training manuals or guides, where supervisors are involved, can achieve greater consistency and assure that standard training procedures are followed. Where field supervisors conduct the training, the professional staff of the agency should attempt to be present at various sessions to provide guidance and present an overview of the survey objectives. Another arrangement which is fairly common where the number of trainees is not exceptionally large is for the professional staff to serve as

<sup>1</sup> The discussion in this section is limited to the training of field supervisors and interviewers. There is obviously a need also for training of survey planners and other professional staff.

the principal trainers, while field supervisors serve as assistants at various stages. The types of training that can be used are discussed below.

(a) *Home study*

5.27. Where feasible, there is usually some advantage for interviewers to study some of the materials at home before attending assembled training sessions. In this way, they gain some familiarity with the basic forms and procedures and less time is wasted on very elemental points in the later sessions. Some special instructional materials, with appropriate references to the basic interviewers' manual, can be provided for home study. They may even be given test exercises to complete at home following their study.

(b) *Group sessions*

5.28. The most common type of training, especially where the interviewer staff is sizable, is by means of assembled or group sessions. Sometimes they last only a day or two but in complex programmes can extend over much longer periods. In some complex surveys a two-week training period is specified. The sessions entail lecturing, demonstrations, question-and-answer sessions, tests and mock interviews and the like. Prepared training guides, whether in outline or verbatim form, usually result in a more orderly process. As already noted, active participation by the trainees is essential. The training should cover all aspects of the survey, including the background and purposes, administrative requirements, and basic interviewing rules, as well as the specific survey content. It is advisable, especially in terms of achieving participation, to keep the sessions comparatively small, perhaps no more than 10 to 12 interviewers in a group.

(c) *Practice interviews*

5.29. It is only when a trainee starts interviewing that the survey instructions come to life. A highly useful aspect of training is to provide for some practice interviewing with actual households, but preferably not those in the survey sample. For this purpose, some extra clusters can be picked in the area in which the training occurs. Some of the interviews can be observed by the trainers to assess the degree of readiness of the interviewers. After the practice period, which may be only a day or two, the interviewers and trainers can reassemble, review the work, discuss the problems which arose and conclude the training. A similar device for surveys in which respondents are to maintain diaries, such as household budget inquiries, is to have the interviewers who are to distribute and collect the diaries maintain records themselves for a week or so. This gives them an appreciation of the process and of the kinds of entries needed.

(d) *Practice processing*

5.30. An additional technique that has sometimes been tried is to have the trainees review and edit, and perhaps assign simple codes, on completed questionnaires. This should give them an understanding of the processing requirements and the need for care in completing the forms. It is not necessary to use actual questionnaires for this pur-

pose, but various "mock" sets can be prepared to illustrate various points.

(e) *Refresher training*

5.31. In a continuing programme, there is a need for some so-called "refresher" training to cover the problems that are encountered in the programme, introduce new survey material and the like. This type of training can involve some combination of home study and group meetings.

(f) *Replacement training*

5.32. Some turnover is almost inevitable in a continuing programme and some replacements may also be needed for inadequate staff. For interviewer replacements in a continuing programme, the same basic material must be covered as for the original staff. However, since the numbers involved are small, the trainers usually do this on the basis of individual instruction. A technique known as "programmed" learning can be ideal for this situation. The procedure entails detailed verbatim home-study materials, with self-correcting tests and exercises built into the text. However, such materials are rather difficult and laborious to prepare. Whatever the method of training used, specific efforts are needed to ensure that replacements receive adequate training.

5.33. If there is any turnover in the course of an individual survey round, it is difficult to recruit and train adequate replacements in time. One choice is to spread the workload over the existing staff, which can result in some delays. Another possibility is to train at the beginning a modest reserve of interviewers who can be called upon if needed as replacements. This second approach adds to the survey cost unless some useful and necessary work such as data processing can be found for the reserves while they are waiting to be called upon.

## D. FIELD WORK

### 1. *Control over the flow of field materials*

5.34. Survey enumerations proceed rapidly and chaotic conditions can arise unless there is close control over the flow of materials to and from the field. Generally, there should be some central administrative unit in the statistical agency which is responsible for sending instructional and training materials, blank forms and questionnaires and other necessary supplies to field personnel. This same unit can be responsible for receiving completed questionnaires and other such materials from the field.

5.35. The central unit should be required to maintain careful records on what is sent and to whom. Of particular importance is a control record identifying each ultimate sample unit for which an interview is to be attempted. A convenient way of controlling survey materials is to prepare a folder for each final sample cluster (the group of ultimate units selected within a penultimate unit). The folder can include the map of the penultimate unit and/or the sketch of the segments or subdivisions within it, where applicable, the blank questionnaires and forms to be used and any special instructions. The folder can also contain a label identifying the geographical unit and indicating the supervisor and/or interviewer to whom it is assigned.

5.36. When the completed materials are received back by the administering unit, they should be checked against the control records. The most important matter is to account for every ultimate sample unit either as interviewed or as not interviewed for some specific reason. Where there are any discrepancies, the matter must be followed up with the appropriate field personnel.

5.37. The actual flow of materials can be accomplished in various ways, depending on circumstances. Where regional offices exist, the materials can flow back and forth through those offices, and thence be redistributed to supervisors or interviewers. Otherwise, materials can move through supervisors to interviewers or even directly to interviewers. The important matter is that each intermediate channel (regional office or supervisor) must maintain careful control records of its own.

5.38. The means of distribution can also vary depending on the situation. Where field personnel are located close to the central office or a regional office, pick-up and delivery can be made in person. Where dependable mail service exists, that can be used. Delivery by scheduled buses represents still another possibility. Even plane or helicopter distribution cannot be precluded in certain situations.

## 2. *Workload assignment and transport of personnel*

5.39. The estimated number of interviewers needed to complete the field work within the specified survey period is determined in the course of overall planning. A second planning effort is required to delineate specific workload assignments and to allocate the interviewers accordingly. Overall productivity assumptions can be only a general guide. Local variations are likely to occur for many reasons, among them differences in travel distances and time, differences in the likelihood of finding persons at home, weather and communication factors and the like. Sometimes the assignments will have to be re-examined after some experience.

5.40. Greater productivity is usually achieved where workload assignments are of sufficient size to occupy fully the working time of an interviewer during the survey period. There is usually a good deal of wasted time during the course of an enumeration because people are not found at home and have to be revisited at specific times, because transportation is available only at certain times, or for other reasons. This inevitable slack time can often be filled in by increasing the size of workloads. It is important not to provide excessive workloads, however, or interviewers may rush through them and obtain inaccurate information. After some experience, it should be possible to judge the optimum workload size for various kinds of situations and establish some reasonable production standards. Where localized part-time staffs with small workloads are used, production standards become especially important.

5.41. As previously indicated, specific assignments of interviewers may also be dictated by ethnic and language considerations and local customs. Another obvious element is the use of male interviewers in dangerous areas (especially where night visits may be required) or those entailing arduous travel conditions. A practice which is used in some difficult areas and situations is to employ guides to assist the interviewer in locating sample units

and obtaining co-operation. These guides are usually recruited locally and are often the chosen representatives of the local authorities.

5.42. Transport of personnel—supervisors as well as interviewers—is obviously a crucial matter in carrying out workload assignments. Since conditions vary enormously, it is not possible to provide specific guidance. In small areas and places with concentrated assignments, personnel would likely proceed on foot. The availability of dependable public transport both within and between areas could be a decisive factor. The use of private automobiles in survey work is common in highly developed countries but clearly less feasible elsewhere. Even in developing nations, government-owned vehicles might be supplied for some purposes. A careful study is needed to establish the optimum arrangements from the standpoint of time and cost, and some pre-testing may be entailed.

## 3. *Pay scales for interviewers*

5.43. There are various methods for payment of interviewers. In a large-scale, rapidly moving operation such as a census, payment on a piece-rate basis may be the only means of assuring that the field work is completed within reasonable budgetary bounds. Otherwise, the budget can be materially exceeded before this fact is even known.

5.44. In a survey operation, the options are somewhat greater. Piece rates can still be considered, since these presumably provide incentives for greater productivity. On the other hand, they may also induce less care in the completion of interviews, with adverse effects on quality. Experience is somewhat mixed on this issue. There have been findings that the more productive interviewers may also be the more accurate ones. Deficient work due to greater haste and even, in some cases, to the fabrication of information have also been experienced.

5.45. An alternative is to pay interviewers on an hourly or daily basis, but with some reasonable production standards to achieve greater cost control. A somewhat broader approach is to pay a flat rate adjusted for specific circumstances for completion of a given assignment. In any case, reimbursement may also be needed for travel costs or even living expenses, where interviewers are in travel status and have to remain overnight or longer away from home. It may also be necessary, in some instances, to provide accident or even life insurance for interviewers working in difficult areas.

5.46. It is often difficult to determine the best procedure for a given programme. Some careful judgements and even some pre-tests or trial runs may be necessary to establish which approach is most likely to:

- (a) Result in higher productivity;
- (b) Achieve the higher level of quality, including higher response rates and a smaller number of rejections at the time of data review;
- (c) Be easier and cheaper to administer;
- (d) Be more attractive to the interviewing staff.

There may be a conflict among these objectives, so that priorities must be established in making the final judgement. The procedure that achieves the higher quality is generally the one chosen unless it cannot be supported by the budget.

5.47. The level of compensation, however deter-

mined, should be competitive with the earnings that could be achieved by persons with the relevant qualifications in other fields of work. Otherwise, it is difficult to recruit and retain higher-calibre personnel. In a continuing programme, some basis for progression to higher pay scales or to supervisory positions should be possible, on the basis of demonstrated competence and performance.

5.48. Provision must be made for interviewers to maintain careful cost records, including reimbursable travel expenses, in order to receive payment for their work. These records are also useful in planning future survey work. An assured means of prompt payment to interviewers is essential if morale is to be maintained in the field.

#### 4. *Choice of survey respondent*

5.49. Selection of the respondent for purposes of a household interview is a matter that merits considerable attention. Uninformed respondents are a source of serious reporting errors. Various studies show that considerable differences in the data can result from the choice of respondent.

5.50. In some cases, the choice may be determined by custom. For example, custom may dictate that no one besides the head of the household is authorized to supply the information. There may also be situations where a village head will insist on being present and even participating in the interview. Where such restrictions are not present, one of the issues is whether to interview one person to obtain the information for an entire household or to interview each member, or at least each adult, for himself. Interview time and costs are usually much smaller if a single household respondent is used. In particular, it is not necessary to make return visits for persons not present or available for interview at the first contact. On the other hand, more accurate information may be obtainable if each person reports for himself. The decision, therefore, may often represent a trade-off between cost and accuracy. A compromise sometimes used is to interview individually each adult who is present at the first contact, but to obtain the information for absent adults and for children from a household informant.

5.51. Certain kinds of information that are generally common knowledge among household members may be obtained satisfactorily from a single household respondent. Examples might be personal characteristics of household members, food consumption at home, educational attainment and enrolment, housing conditions and the like. In contrast, opinion and attitude questions nearly always have to be addressed to each individual, and there are also factual questions that may require individual treatment, such as certain health conditions or personal expenditure. Pre-testing may be necessary to determine which kinds of inquiries warrant the considerable expense associated with individual interviews.

5.52. Actual experience in a given household can also affect the choice. For example, an interview may start with an appropriate household informant. However, if it becomes evident that the selected respondent cannot supply the information or answer for others, an effort is needed to find a better-informed person. In selecting a household respondent, the head or wife is usually the preferable choice. If they are not available, other responsible

adult members may be suitable. In some cases, where the adults are not literate or articulate, student members may be the better alternative, preferably in the presence of adults.

5.53. A problem which may occur in some situations is that a group of persons, including neighbours and others, may congregate when a survey is being taken and be present at or even intervene in an interview. It will require a good deal of tact on the part of the interviewer to operate in this kind of situation, especially if personal questions are involved. In some cases, there may be no alternative except to ask specifically to see the respondent alone.

#### 5. *Quality control over field work*

5.54. Training can be considered a form of preventive quality control. However, survey vigilance cannot stop at that point. It is important that there be open communication between field supervisors and interviewers and between field supervisors and central office personnel so that problems which arise during data collection can be speedily resolved. Equally essential is the existence of a quality control system for detection and minimization of non-sampling errors. Such errors may arise from various sources. Inadequate questionnaires and survey procedures can be one source, although it may be difficult to rectify these matters at the stage of field work. Improper interviewing techniques or misunderstandings on the part of interviewers can be another cause. Respondents contribute to the problem through misinterpretation of questions, lack of knowledge, faulty recollection or even deliberate misstatement. Some errors of these kinds are almost inevitable in a household survey, but the objective is to keep them within reasonable bounds.

5.55. Some of the approaches used for purposes of quality control are described below.

##### (a) *Field review or editing of questionnaires*

5.56. One of the most common approaches is the review and editing of completed questionnaires by field supervisors or other control personnel. The purpose is to identify obvious errors, such as omissions, inconsistencies from item to item, incomplete entries and the like at a point where preventive action can be taken. This type of review can be expedited if the reviewer is given a set of instructions on how to proceed systematically through the questionnaires and how to detect and record errors.

5.57. It is important to conduct field reviews of this kind at an early point, since more errors are likely to occur when interviewers are least experienced. Also, early detection and further instruction can prevent the repetition of the same kinds of errors. Where feasible, all work for the first day or two should be reviewed promptly, before the interviewer proceeds further. For those exhibiting satisfactory work on the basis of early review, subsequent work could be reviewed as submitted, without holding up additional interviewing, or reviewed only on a sample basis to assure that adequate work is continuing. Sample editing of experienced and qualified interviewers may be especially pertinent in a continuing survey programme.

5.58. Some of the errors may be corrected by referring to other information on the questionnaires. In other cases, return visits might be made by the interviewer to correct the information, if it is necessary to travel close to

the vicinity of a particular household for other purposes. Where a considerable volume of serious errors is involved, return visits may be necessary even if substantial additional travel is entailed. Where literacy is high, check-backs for deficiencies found in editing could be attempted by mail, if time permits. If telephones are available, that could be the most efficient way of checking back.

(b) *Preliminary hand tallies*

5.59. Either as part of the field review of questionnaires or as a separate operation it is useful to make some hand tallies or counts of certain crucial statistics such as the number of births or deaths, new migrants into an area, disabled persons and the like, depending on the kind of inquiry. These can provide some advance idea of the adequacy of the survey and the possibility of serious deficiencies. Of course, the specific levels to be expected will not usually be known in advance. However, some general idea can be gained from pre-tests, previous studies or independent sources. Also, wide disparities in the results for different interviewers, different areas of the same general nature and the like can raise some danger signals and call for further investigation, such as through spot reinterviews before the field work proceeds too far. A summary of advance hand tallies can also be useful to analysts as a first indication of what to expect from the survey.

(c) *Observation of interviewers*

5.60. A procedure that can be extremely useful for various purposes is the actual observation of interviewers by supervisory personnel. While it may be true that interviewers may not perform in typical fashion while being observed, experience has indicated that it is difficult for them to change ingrained habits, especially poor habits, which they have developed. Also, they cannot conceal inadequacies of which they are unaware. It may be useful for the observer to fill a rating sheet on which he judges various aspects of the interviewer's performance. Some of the matters that can be explored in this way are the following:

- (a) The efficiency with which the interviewer organizes and carries out the work assignment (travel efficiency, scheduling of revisits and the like);
- (b) The manner in which the interviewer identifies himself and explains the survey;
- (c) The interviewer's general demeanour in conducting the interview, the ability and willingness to deal courteously with all kinds of persons;
- (d) The way in which questions are asked and the interviewer's ability to probe further if required;
- (e) The extent to which the interviewer accurately interprets and records the replies;
- (f) The ability to deal with co-operation problems and provide assurances of confidentiality.

If deficiencies are exhibited in any of these respects, further training may be indicated. The scheduling of additional observations should depend on an individual's performance. In extreme cases, replacement of the interviewer may be required.

5.61. In addition to this systematic type of observation, it is important for the professional staff of the statistical agency to accompany interviewers and observe interviews from time to time. In this way, they obtain insights

into the adequacy of the programme and the procedures which can assist materially in formulating improvements.

(d) *Tape recording of interviews*

5.62. A procedure that has been used is the actual recording of a small sample of interviews on portable tape recorders in the possession of the interviewers. In these cases, the presence of an observer is not necessary, so that performance may be less affected on the part of both the interviewer and the respondent. The permission of the respondent is necessary for this purpose, but experience has indicated that this is not difficult to obtain in most situations.

5.63. Tape recordings can be used to explore many of the issues cited above, plus some of the problems raised by the respondents. One important matter that can be examined later is the correspondence between the respondent's reply and the entry made on the questionnaire. Tape recording and review of tapes can be costly and time-consuming, so that the scale will likely be small.

(e) *Reinterviews*

5.64. An increasingly common practice is to provide for reinterviews, or second interviews, by supervisory personnel for a subsample of the original sample cases. The reinterviews are generally scheduled as soon as possible following the initial interviews so that fewer changes would have occurred in the information solicited. Reinterviews may be used for various purposes, such as for data evaluation (discussed in a later chapter) as well as quality control. Certain highly complex or detailed subjects, such as expenditures and food consumption, may not be feasible as reinterview topics.

5.65. Sometimes the same questions are asked in the reinterviews as in the original interviews. Another option is to ask more detailed questions the second time, in which case the reinterviews resemble an evaluation study. The main purpose is to determine whether there are any evident errors in the original information, and especially whether certain interviewers are more prone to make errors than others. Some of the differences in the information can, however, result from errors in the reinterview. For this reason, the reinterviewer often has the original information available and checks with the respondent in the case of differences to attempt to establish which answer is correct.

5.66. A reinterview programme requires that the original interviewers be unaware of which particular households will be rechecked. Otherwise, they may take special care in such cases, beyond their normal practice. It is useful for interviewers to know that they are subject to such checks, as this could prompt more careful work in general, but not precisely where or when the reinterviews will take place. Even where errors can be attributed to the original interview, it is possible that the respondent and not the interviewer was responsible. However, the laws of probability suggest that individual interviewers should not always be plagued by poor respondents. If an unreasonable number of errors appears in the information collected by an interviewer, therefore, it is likely that he has contributed to that problem. Some allowances can be made, however, in areas which are beset with special interviewing difficulties.

5.67. Reinterview findings can be used to establish

the need for additional training or further checking of specific interviewers or in more extreme instances as a basis for replacement. An obvious case where replacement is indicated is when the reinterview establishes that the interviewer never even visited the household but fabricated the information.

(f) *Data processing in the field*

5.68. Because of staff limitations in the central office, transport difficulties and the like, some aspects of data processing may be carried out by interviewers or other staff in the field. For example, interviewers might be trained to make certain arithmetic calculations or summarizations (in addition to hand tallies, discussed earlier) during periods when they are not occupied with data collection, which can also provide them with greater continuity of employment. One possible advantage of field processing is that errors can be detected at a point where correction is more feasible. In that sense, field processing can represent another element of quality control. On the other hand, field processing is likely to be less efficient than a centralized operation and more subject to inconsistent treatment from place to place.

5.69. The matter of limited data processing by interviewers, as described above, should be distinguished from the possible establishment in regional offices of decentralized processing staffs. In this latter case, a whole range of processing functions could be carried out under controlled conditions.

## 6. *Controlling non-response*

5.70. A probability sample can soon lose its representative character if a significant proportion of the ultimate sample units are not successfully interviewed. This is because households that are not interviewed often represent special kinds of situations that differ from the average. For example, persons not easily found at home may represent smaller households or households without children or where both husband and wife work. Even though procedures exist for adjustment for non-response, the survey results are likely to be biased if more than a small percentage of cases is omitted.

5.71. The likelihood of bias in the case of a significant rate of non-response dictates a strong emphasis on minimizing non-response in the survey. Interviewers should be carefully instructed on the importance of completing their assignments and the means of so doing. Adequate time and resources should be provided for achieving this objective. In cases where high non-response persists, some special studies may be undertaken to try to find out to what extent non-responding units have characteristics different from the responding units. This information should be included in the technical review of the results of the survey, as discussed in paragraphs 7.5 and 7.6 below.

5.72. It should be noted that there will be situations where no interview is expected. These may include unoccupied sample living quarters or quarters occupied by persons outside the scope of the survey. In such situations, it is necessary only for the interviewer to record the circumstances. It may be desirable to schedule some reinterviews in such cases, however, to be sure they have been properly classified.

5.73. The main concern about non-response should be for sample units within the scope of the survey. Some of the approaches used in dealing with various kinds of non-response are discussed below.

(a) *Households not found at home*

5.74. One of the most frequent reasons for non-response is the inability to find anyone at home in certain households. This problem is usually greater in urban areas but may also occur at certain times of the year in rural areas. The usual approach in such instances is to arrange return visits at a time when it is likely the household will be present. Sometimes it may be possible to obtain information from neighbours, landlords, or others in the vicinity on when the household can be contacted. The number of return visits may be limited by cost and time factors, but at least two should be attempted unless excessive costs are involved.

5.75. It is usually preferable not to ask neighbours or others for the specific survey information if the household cannot be found at home. Such information may be inaccurate and possibly worse than imputed information in an adjustment procedure, and there may also be an issue of privacy or confidentiality. Some summary information, such as the number of persons or the major ethnic group, may, however, be solicited from others if needed for imputation purposes.

5.76. Certain specialized techniques have been developed to minimize return visits for persons not found at home. One of these is the Politz-Simmons method (404), which assigns to each household that is interviewed a weight equal to the reciprocal of the proportion of time the members spend at home. In this system, a household is visited only once, but information is collected for those found at home or when some responsible household member was at home in a specified period, such as the previous week, in order to develop the necessary weights. One weakness of the system is the difficulty of obtaining accurate information on precisely when people were at home and available for interview. Another approach is to make much more intensive efforts to obtain interviews for a subsample of the non-respondent cases. The information from those successfully interviewed can then be imputed to the entire group of households not found at home.

(b) *Refusals*

5.77. There may be a small proportion of cases where respondents refuse to supply information for some reason. The interviewer in such instances should attempt to provide a further explanation of the survey purposes and reiterate the guarantees of confidentiality. Not too much pressure should be applied, however, as this could be counterproductive.

5.78. If this initial attempt does not succeed, the case should be referred to the field supervisor. The supervisor may then make an independent attempt to obtain co-operation. If appropriate, the aid of a local official or other important individual whom the respondent might trust or respect can be solicited. Newspaper articles, letters from government officials and the like can be shown to convince the respondent of the importance of the programme. Excessive pressure should be avoided at this stage also, as information obtained under considerable protest is not

likely to be very reliable. This is also the reason for not invoking mandatory reporting requirements except in extreme cases, for example, if the individual is attempting to convince other respondents not to co-operate.<sup>2</sup>

(c) *Use of substitutes*

5.79. One way of dealing with non-respondent cases which cannot otherwise be resolved is through adjustments applied in the course of estimation. Another way is through the use of substitutes. For example, one or more additional sample cases can be selected for each ultimate sample cluster and held in reserve. If one of the basic sample cases in the cluster is a non-respondent despite the usual efforts to obtain an interview, one of the substitutes is added to the sample.

5.80. The use of substitutes does not reduce the potential bias any more than an adjustment procedure would. There can be a slight decrease in sampling variability, however, since the effective sample size is somewhat larger and none of the units (in contrast to an adjustment procedure) is assigned greater weight in the estimation. Some additional cost is entailed, however, in maintaining a reserve sample. In addition, it is possible that interviewers are less diligent in attempting to reduce non-response if they know that substitutes are available. Thus, it might be advisable to restrict the use of substitutes to situations where it is absolutely essential to build up the sample size and where tight control is maintained over the operation.

(d) *Inaccessible areas*

5.81. A different type of problem, which is difficult to overcome, arises when entire areas or major parts of areas become inaccessible during the survey period because of weather or road conditions, unrest or instability, or other reasons. One possibility is to postpone the enumeration until the area becomes accessible, provided this is feasible within the timetable for producing the survey results. Another approach, if this is a repeated survey covering some or all of the same subject-matter, is to substitute the information from the most recent prior enumeration. This can be reasonably satisfactory if the inaccessible areas are relatively slow-changing. Some combination is also possible, for example by using prior information to make preliminary estimates and later substituting information collected at the time the area becomes accessible to make the final estimates. In carrying out a postponed enumeration in a previously inaccessible area, the procedure can be accelerated, if necessary, by interviewing only a subsample of the original sample and assigning appropriate weights so as to represent the entire sample.

5.82. Still another possibility in the case of inaccessible areas is to substitute other areas from the same stratum.

<sup>2</sup> One case in which it was necessary to invoke the law was a socio-economic survey where a large company informed its employees that they did not have to co-operate in the interviews.

tum. The validity of this approach would depend on the subject-matter, since certain activities in the substitute areas could vary a good deal from those in the inaccessible ones.

7. *Special interviewing situations*

5.83. The section on sampling in chapter IV discussed special procedures for such groups as homeless persons, residents of collective living quarters and nomads. Data collection procedures must also be altered somewhat in these cases.

(a) *Homeless population*

5.84. The sampling procedure for homeless persons might call for delineating the areas where such persons normally sleep and drawing an on-the-spot sample at a single point of time, possibly on a single night. The interviewing could take place immediately upon selecting the sample. The process is probably best suited to a team of interviewers, possibly accompanied by a supervisor. Simplified questionnaires restricted to certain crucial subjects are usually necessary. In order to dissuade individuals from leaving the area precipitously, because of fear of some official action, loudspeakers or other means might be used to explain the purpose, assure confidentiality and otherwise attempt to allay suspicion. Some small monetary or other incentive might also be offered to those who participate.

(b) *Residents of collective living quarters*

5.85. For this group, the likely sample consists of a selection of individuals within designated places drawn from a list of such establishments. Interviews may be attempted in the usual manner. However, it can be difficult to gain access to individuals in certain situations. There may be a special problem in finding persons at home, so that non-response is excessive. An alternative or supplementary procedure is to ask the person in charge of the establishment, such as the landlord, manager or desk clerk, to collect the information from the specified individuals, perhaps using simplified questionnaires. If the individuals are reasonably literate, the forms can be left for them to fill out themselves and give to the person in charge, perhaps in sealed envelopes to preserve confidentiality.

(c) *Nomads*

5.86. As indicated in the section on sampling, the selection of nomads for survey purposes can be made on the basis of their living quarters in the off-season, at the watering places they use, stopping points on their migratory routes or some such. The interviewing should be conducted with each selected nomadic household in the usual manner. There may be instances, however, where the only feasible procedure is to obtain the information from tribal chieftains. The use of simplified questionnaires is especially indicated in the latter instance.

## VI. DATA PROCESSING

6.1. While data collection constitutes the most critical phase from the standpoint of the accuracy of the survey results, the ability to obtain these results within a reasonable time period rests even more on the efficiency of the data processing system. There are few countries, developed or developing, which have not suffered the embarrassment of having to bury surveys which have not survived that final stage. Even more awkward may be situations where data processing is so prolonged that the statistics attract little other than historical interest when finally issued.

6.2. The development of an efficient data processing system is a complex endeavour involving the co-ordinated efforts of different kinds of technicians and frequently the acquisition of computing equipment and facilities. In some cases, the difficulties have been such that countries with little prior experience in this field have considered having their data processing accomplished outside the country. The disadvantages of that arrangement, however, in terms of losing effective control over the data production and delaying the opportunity to develop within-country capacity are such that it should be pursued only where clearly necessary.

6.3. As noted earlier, a key factor in expediting data processing is the early completion of tabulation plans by the subject-matter staff. When this is done, data processing planning can proceed with the preparation of instructions for necessary clerical operations, specifications for the transfer of data to machine-readable form and especially preparation of computer programs or other tabulation specifications. Both at the start and throughout the survey period, it is essential to have frequent contacts and open lines of communication between subject-matter personnel and data processing specialists. The former must at the earliest stage of planning familiarize themselves sufficiently with data processing principles to be able to communicate their needs in comprehensive form. The latter must become sufficiently cognizant of subject-matter requirements to respond in kind.

6.4. The major steps involved in data processing are described in the following sections.

### A. OVERALL PLANNING

6.5. A first step, which falls within the framework of the planning phase, is the development of an overall processing plan. This entails decisions on what specific processing steps are needed, how they are to be carried out, what personnel and equipment are required, and what the timetable should be for each operation.

6.6. Nearly all countries have access, at least potentially, to electronic computers for purposes of data processing, but other methods may still be used in certain circumstances. Therefore, the discussion which follows should be interpreted in the light of the particular capacities of each country and the processing requirements of its

planned survey programmes. None the less, the potentialities of automated data processing are so great that the processing plan should be geared, in so far as possible, to taking advantage of them.

6.7. Even in countries with advanced capabilities in data processing, there is usually some mix of clerical and other manual operations along with computer usage. As previously indicated, simple hand tallies might be carried out to make early judgements concerning the validity of the information or to obtain some early, high-priority estimates. Overall, one of the important decisions is how much of such operations as data editing and coding is to be done clerically as opposed to being done completely automatically or in a computer-assisted manner. The availability and cost of clerical personnel as opposed to machine and computer programming capacity and existing programmes are factors in this judgement. The kind and complexity of the subject-matter usually have a bearing on these decisions as well. For example, for extremely complex subject-matter some initial clerical operations besides coding may be necessary to expedite the transference of data to machine-readable form.

### B. PROGRAMMING

#### 1. *Staffing and organization*

6.8. A crucial element, and often the limiting factor, in computer usage is the availability of a computer programming capability. It is possible to purchase programming services from a commercial computer firm or other such sources. Also, computer "software" packages are available commercially or elsewhere, for example from governmental and intergovernmental organizations, to meet various programming needs. However, unless a statistical agency develops its own capacity in this respect, it is difficult to carry out a continuing survey program in a satisfactory manner. The lack of such a capability may not be as critical as the absence of a permanent field staff, but could well represent one of the other most serious obstacles to progress.

6.9. Although the distinctions are sometimes blurred, there are usually at least two levels of personnel within a programming staff. First, there are the systems analysts who examine the processing and tabulation requirements and determine the number and type of specific computer operations that are required. They may then examine available computer software packages and determine which are usable for these purposes and what changes or additional programs are needed. Second, there are the programmers who prepare the specific programs in accordance with these overall plans, generally under the supervision of the systems analysts.

6.10. One of the roadblocks in computer usage is the often inordinate amount of time required to prepare and check out computer programs. For this reason, it is urgent

to determine tabulation requirements well in advance. Laborious testing and retesting of computer programs, using test decks or simulated survey data, are the usual means of proving out the procedures. These test decks attempt to cover all the kinds of situations that are likely to arise. However, it is difficult to anticipate everything, so some tests using actual survey data are valuable. The questionnaires completed in field pre-tests may be helpful in this connection.

6.11. The development and use of standardized programming languages such as Cobol and Fortran have reduced to some degree the problems and time required to prepare and test computer programs. Also, these standardized languages make it more feasible to use different programmers for separate phases of a given computer operation, while still obtaining a co-ordinated product. Furthermore, more general programs and programming systems for survey and census processing operations are now beginning to evolve, which should lessen *ad hoc* programming requirements.

6.12. Since computers are still relatively indivisible, the usual arrangement is to centralize responsibility for maintenance and operation of the equipment in a technical branch. With the development of "mini-computers" and remote access terminals, some element of decentralization is appearing in this regard and substantially more may be expected.

6.13. The assignment of responsibility for computer programming is a less evident matter. One approach is to centralize all programming work in a technical branch as well. Where the supply of skilled personnel is short, as may be the case in many developing nations, this arrangement can theoretically achieve a more efficient use of the staff. Also, the development of programming skills may better be accomplished in a technically oriented unit, and there is likely to be more consistency in the approaches used. A centralized staff usually permits some specialization in programming functions whereby, for example, some develop expertise in error detection and correction, others in table formatting and the like. It may be possible to assign one or more of the staff to the development of in-house generalized programs or software that can simplify a number of the operations.

6.14. One problem with centralization is that the programming personnel are often too far removed from the subject-matter planners, and there can be a loss of communication which results in misunderstandings and delays in completing the work. Also, subject-matter personnel may be insufficiently aware of the potential of computers when planning their tabulations and may thereby lose some valuable analytical opportunities. An alternative arrangement that has been attempted in some countries, therefore, is the assignment of computer programming staff to subject-matter units, or the training of subject-matter specialists to do their own programming. Again, the new programming "languages" make such decentralization more feasible.

6.15. A strong co-ordination effort is needed to retain the advantages of centralized programming while avoiding some of its evident drawbacks. Subject-matter specialists should be trained sufficiently in computer sciences so they at least understand the capabilities of the equipment and are able to specify and communicate their needs in an adequate fashion to the programming technicians. The latter,

in turn, should be expected to learn enough about subject-matter issues and requirements so as to be able to bridge the communications gap.

## 2. Selection and use of software packages

6.16. As previously indicated, the use of standardized computer software packages can appreciably reduce the programming burden. It is rare, however, that available packages completely satisfy processing requirements. Often, some modifications are needed and additional, specialized programs must be prepared. The value of the packages is such that the programming staff can concentrate on these additional requirements rather than on matters for which suitable procedures have already been developed and validated.

6.17. A large variety of software packages is available commercially. These can cover virtually the whole gamut of processing operations, from editing and recoding of the original data to the production of camera-ready tabulated output and the computation of sampling variances. Although certain packages are currently in widespread use, obsolescence is so rapid in this field that it would not be worth while citing and recommending specific ones.<sup>1</sup> Therefore, only certain principles which may be helpful in selecting software will be specified here.

6.18. In selecting software packages, it is important that the systems staff learn as much as possible about them in advance. Often, training sessions are held by the United Nations or other national or international agencies or by commercial firms to acquaint potential users with their packages. It is usually worth while to pay the cost required for the systems staff to attend such sessions.

6.19. In addition to assessing the capabilities of various packages, it is necessary to ascertain what kinds of computer facilities and configurations are required for utilization of the software and whether the agency possesses such capacities. After such a review, the number of possibilities for a given operation may boil down to two or three packages. The next step is to run tests of these alternatives using test decks to appraise their relative merits. Certain packages may require the conversion of the survey data to a specific form and arrangement. This is not necessarily a roadblock if other features of a given package result in less overall computer time and cost.

## C. EQUIPMENT

6.20. The term "computer hardware" refers to the actual computer system or configuration to be used in data processing and auxiliary equipment, such as that needed for transforming the input or printing the output. In many cases, computers and auxiliary equipment have been procured for purposes of the most recent census, and that may dictate the hardware to be utilized in a survey program. In other instances, the Government may have a centralized computer system which the various agencies are required to use. As the cost of hardware decreases over time it may

<sup>1</sup> The United Nations and its regional commissions, as well as the specialized agencies, have been devoting increasing attention to technical co-operation with member countries on data processing matters. The selection of software and general computer systems usage are among the matters on which advice can be obtained from these sources.

be desirable to invest in additional equipment if sufficient use of it is foreseen and if it offers clear comparative advantages.

6.21. The present discussion refers to situations in which these facilities do not already exist or where some changes or modernization are feasible or necessary. Some of the steps needed in the selection of computer systems are described below:

(a) The number and kinds of computer operations required to carry out the survey processing should be determined and the amount of computer time required for various purposes estimated by means of tests with available software packages;

(b) The various computers available should be examined in terms of meeting these requirements in accordance with a processing timetable. If the statistical agency has no acceptable computer system, the possible existence of some capacity in other government agencies should be explored, even if second or third shifts have to be used. The next alternative would be to rent time on computers operated by universities or commercial firms or other such sources. The use of other available capacity is generally preferable to acquiring a new computer system, as it could take a good deal of time to install such a system and achieve a state of readiness;

(c) If a new system is essential, an evaluation should be made of available systems of manufacturers already operating in the country or in a nearby country. Such manufacturers should be invited to submit documentation indicating how their systems could meet the specified requirements. The submissions should relate to systems already in operation, not those on the drawing boards;

(d) In the course of this examination, consideration should be given to the degrees of centralization and decentralization which might be adopted for the various aspects of data processing, including preservation and use of the data base following completion of the initial tabulation programme (see paras. 7.15-7.34). The need to make effective use of limited technical staff and support capabilities could point toward a greater degree of centralization. However, the principle that centralization will always promote greater overall efficiency is being increasingly challenged. In large countries, geographical decentralization of some data processing functions using a few zonal or regional centres may be useful. Even then, as the data must ultimately be compiled at the national level, the outputs of the regional centres must be carefully standardized;

(e) The support capabilities of each manufacturer should be examined, such as the extent to which programmers are assigned to help in the installation and testing of the system, the availability of maintenance personnel and the length of time needed to obtain such assistance, and the accessibility of replacement parts. Consideration should be given to possibilities in which compact, inexpensive, portable equipment can be shipped to a maintenance depot in another country for repair, when required;

(f) Once the field is narrowed, an appraisal should be made of the alternatives in terms of cost and performance. Tests should be run on the various systems using available software packages. Reliability as well as speed should be considered in choosing the best alternative;

(g) In the matter of purchase versus lease of equipment, it is probably better to purchase the system if there

is a big enough workload to occupy a good part of the capacity or if costs could be shared with another agency or even an outside user such as a university. It might be preferable to lease if the application is believed to be transient or if the major portion of rental payments can be credited to later purchase of the equipment.

#### D. PROCESSING OF QUESTIONNAIRES

##### 1. *Receipt and control of materials*

6.22. Control over the flow of materials is as important at the processing stage as in the field operation. It is not uncommon to learn at an awkward point that certain parts of the workload did not pass through necessary processing steps or were omitted entirely from the stream.

6.23. After the materials are checked in from the field, a common procedure is to combine them into more efficient lots or "batches" for processing. Control sheets should be attached to each batch identifying the components, indicating the number of units and providing for recording the processing stages through which the lot has passed. Some of the units may be removed at various points or the batches may be reorganized in various ways. In such instances, new or revised control information must be prepared indicating the changes.

6.24. An overall control record is needed for the entire processing operation. This indicates the status and location of each batch up to the time transference of the data to a machine readable form is accomplished. After that, a tape inventory and control system take over.

##### 2. *Editing of questionnaires*

###### (a) *General procedure in editing*

6.25. A field review of questionnaires such as that discussed earlier should identify and rectify many of the problems and errors in the data. However, some further checking is nearly always needed at the data processing stage to catch remaining errors. The editing of questionnaires can be carried out manually by clerical staff, perhaps in conjunction with any necessary coding of the information. This procedure may be justified in the early stages of a continuing survey programme or at a time when new subject-matter is being introduced and error rates are likely to be high. An advantage is to catch errors at a relatively early stage and before the information is transferred to punched cards or computer tape. The disadvantage of clerical editing is that it is relatively slow and inefficient in catching errors. It may be the necessary choice, however, if clerical personnel are plentiful and inexpensive and computer editing systems are non-existent or underdeveloped.

6.26. A more efficient and reliable process is the editing of survey data on computers. Editing programs are especially difficult and time-consuming to prepare, although the use or adaptation of software packages can be helpful. However, once achieved, computer programs also serve the important purpose of catching errors occurring in the course of the transfer of data from questionnaires to computer tape. A combined approach that is sometimes used is to provide for a limited clerical review to catch gross errors, followed by a computer edit to identify the

remainder. The scale of operations could be a factor in deciding on the editing approach, with computerization the more likely choice where the scale is large.

6.27. The procedure followed in the case of errors is generally similar regardless of the manner of detection. In the case of manual editing, the questionnaire is immediately available and the resolution of errors is made at the time of detection. In the computer processes, the usual procedure is to produce a "diary" or listing of the error cases, together with an identification of each survey unit, the nature of the problem and such other information as may be helpful in resolving the difficulty. The resolution may be made either on the basis of the information on the diary or by consulting the questionnaires.

6.28. Three broad categories of error may be distinguished: format errors, identification errors and content errors. Format errors involve various types of misspecification of the way in which the information is expected to be recorded. An identification error occurs when a particular unit is given the identification code of another unit or is otherwise incorrectly identified. Neither format errors nor identification errors cause many problems in manual editing, but they can be the cause of serious delays in computer editing. It is, therefore, particularly advisable that computer edit programs contain features that facilitate the location and correction of format and identification errors early in the computer processing operations.

(b) *Types of content errors and means of resolution*

6.29. The general types of content errors likely to be found in editing are the following:

(a) *Omissions.* Cases in which an entry is required for an item but none has been made;

(b) *Inconsistencies.* Cases in which the entries in two or more items are not consistent with each other, such as a 14-year-old boy indicated as being employed as a medical doctor;

(c) *Unreasonable entries.* Cases in which the entry is beyond the reasonable limits of an item, such as an amount of food consumption that appears physically impossible. Sometimes limits may be placed on an item in order to isolate unusual cases which may not be considered automatically as errors but call for review by a supervisor or technical specialist;

(d) *Impossible entries.* Instances in which, for example, a code "3" appears for sex, where provision has been made only for codes 1 and 2.

6.30. Various approaches may be used in resolving content errors found in processing. Generally, the best procedure is to resolve the problem from information in the questionnaire. If machine editing is done, the errors may have occurred in the course of data transfer and the correct information may actually appear in the questionnaire. For example, omissions for sex may be resolved from the name of the person, or omissions in age from information on date of birth or years of school completed. Inconsistencies can sometimes be resolved by considering the whole range of information and deciding which of the conflicting entries appears most reasonable. For example, from data on education, marital status and the like it may be evident that a 14-year-old medical doctor is more likely to be 41 years of age. Footnotes or write-in entries can

sometimes be helpful. In the case of computer edits, sufficient information may appear on the error listings or diary to settle the matter without the costly and time-consuming step of consulting the questionnaires. In order to reduce errors in a data file to an acceptable level, several runs of check and edit programs may be required.

6.31. When errors cannot be resolved in this manner, there is the choice of allowing an error to stand or making some kind of imputation. For example, if income is unreported, provision can be made for an "income unreported" category in the tabulations. Alternatively, an income value can be supplied on the basis of information for households or persons with similar characteristics. Although this can be done manually, it is much more readily accomplished on computers.

6.32. One approach is the so-called "cold deck" procedure, whereby unknowns are replaced on the basis of a distribution of known cases. For example, advance tabulations or those from a recent survey may provide a certain distribution of income for each major occupation group. Tables can then be prepared on the basis of this information, providing the proper proportions of income classes for each occupation group, and such tables inserted in the computer edit programs. As a person in a given occupation whose income is unknown is processed in the computer, he is assigned the "next" income value from the allocation table. The result is that the "unknown" cases are distributed in approximately the same manner as the previous known cases.

6.33. Another approach is the so-called "hot deck" procedure. In this case, again referring to the "income" illustration, the income value reported for each person in a given occupation group is stored, in turn, in a cell in the computer memory. As a person with unknown income is found, he is assigned the income value for the last known case in the same occupation group. The outcome is similar to that in the "cold deck" approach, but current information is used in the allocation.

6.34. Decisions on whether to impute values or to retain "unknown" categories depend on a number of circumstances. Although imputation may conceal a bias, the retention of unknown categories in such basic characteristics as sex and age can create problems for analysts. Often, the users are thereby induced to make their own imputations and do so on the basis of less adequate information than is available to the statistical agency. A rule sometimes followed is to make imputations for certain basic demographic items and also where the error rates are comparatively low. Another is to impute for items for which considerable prior information is available but to provide for unknown categories for comparatively new subjects. Where imputations are made, it is important to compute and provide information on the extent of imputation. It is also valuable to flag or otherwise identify imputed items so that tabulations can be made with and without the imputations.

6.35. When the editing is done on computers, imputations can be made automatically if the error rates are below an acceptable level for a given "batch" of records, without checking back with the questionnaires or even preparing detailed error listings. The purpose is to expedite the processing in instances where the damage to the information is slight and where the opportunities for cor-

rection are limited. Those batches which do not meet the error standards, however, are set aside for checking against the questionnaires, since it is likely that the problems resulted either from systematic errors in the questionnaires in a batch or in data transference to computer tape. If the former is the case, corrections of the entries in the questionnaires may be needed. If the latter is the case, however, only re-entry of data may be sufficient to rectify the errors.

6.36. Whatever the procedure for resolving errors detected in editing, it is important to compile statistics on the problems found in specific questionnaire items. Persistent errors in specific items often indicate the need for modifications in the questionnaire or in the training of interviewers. If it is feasible to compile error rates for specific interviewers, that information is also helpful in assessment of training needs.

### 3. Coding of questionnaires

6.37. Although many if not most questionnaire items may be self-coding—that is, pre-coded check boxes have to be marked or codes or numerical values entered—there are often some entries which require clerical coding at the processing stage. Descriptions of health conditions or occupational titles are examples of this type of entry. Since items requiring coding are usually of a more complex nature, it is important that instructional manuals be provided for this purpose and that coders be given sufficient training and be adequately supervised. It is essential in this context that they be aware of special cases which should be referred to technical specialists for decision. It is also important to document how coding “problems” were resolved by either the coding supervisors or the subject-matter specialists consulted. This information provides important guidance in revising and updating the coding instructions and in subsequent processing and analysis of the survey results.

6.38. Another important step is to provide for quality control over a coding operation. At the outset, probably all the work of a given coder should be verified by a reviewer, presumably a more qualified individual. When coders have exhibited a certain level of proficiency, the verification can be reduced to a sample basis, perhaps 10 per cent, to provide a continuing measure of performance. On the basis of experience, reasonable production standards can be established which coders, on the average, are expected to achieve. Various bonuses or promotion opportunities can be based on quality and production performance.

6.39. A question that sometimes arises is whether specialization should be introduced into a coding operation, whereby certain coders specialize in a given subject-matter, such as occupation or industry coding or health conditions. For highly complex subjects where repeated consultation of manuals is necessary, specialization can be important in terms of both quality and efficiency. The scale of operations can be another factor. It is difficult to achieve specialization if only a small number of coders or a small volume of questionnaires is involved. In some countries, manuals of national classifications and codes exist for subjects such as industry and occupation. There are distinct advantages in having and using such manuals to ensure uniformity and standardization in the collection

and presentation of data in surveys as well as other collection programmes.

#### 4. Data conversion to a machine-readable form

6.40. A basic step in the processing stream is the transference of coded information from questionnaires to a machine-readable form on computer tape, disk, or other medium for tabulation purposes. An important consideration in the design of questionnaires is to provide for an arrangement of items and code boxes in such a form that the transference can be readily accomplished.

6.41. In complex situations, for example when various forms of different kinds are used in the interview, the direct transference of data from questionnaires may be difficult or inefficient. An alternative is to provide for a clerical transcription of the coded information to a more convenient form. An example is a transcription sheet providing a separate line for each person with a number of columns for entering codes or numerical values. The use of such a procedure should increase the efficiency of data transference in complex situations and probably reduce the number of errors. However, clerical transcription is itself costly and time-consuming and can also be a source of error. Where transcription is combined with a coding operation, the efficiency of the procedure is improved.

6.42. At one time, card punching was the principal means of transferring data from questionnaires or transcription sheets to a machine-readable form. The information on punchcards was transferred to computer tape via card-to-tape converters. Today, there are numerous processes which are more efficient and convenient than card punching. One of the problems with punchcards was that they were usually limited to fixed records of a given size, either 80, 90 or 96 columns of information. As a result, it was often necessary to punch more than one card from a given questionnaire. In addition, punchcard stock was costly, the cards were bulky and created storage problems and were subject to loss, damage and warping. As a result, the use of punchcards is gradually being phased out, although they are still used for various purposes, especially where electromagnetic machines still exist for processing purposes.

6.43. The main current alternatives to card punching are key-to-tape or key-to-disk procedures. Using these systems, the information is transferred directly to computer tapes or disks via data entry stations which have a keyboard similar to a keypunch or typewriter. These procedures are generally faster and more flexible than card punching. The records can usually be of variable length rather than limited to the size of punchcards. Although some further machine processing may be needed to convert the output of these procedures to computer inputs of efficient size and arrangement, the process is much less cumbersome than the previously required card-to-tape conversion.

6.44. As in the case of card punching, key-to-tape or key-to-disk operations are subject to errors on the part of the machine operations. It is therefore necessary to provide for a quality control procedure similar to that discussed in the case of manual coding. Some of the newer key-to-disk machines have memories which can be programmed to edit at least partially some of the output. The

establishment of production standards is also important to achieve an adequate degree of efficiency.

6.45. Other processes exist which provide for mechanical transference of information from questionnaires to computer tape, without a punching or keying operation. Some of these, such as mark reading and character reading devices, are discussed in the section on questionnaire design in chapter IV. Although such systems are being used increasingly and many improvements have been installed, they are still generally less reliable than the more conventional approaches. An even more sophisticated method is transmitting survey information directly into computers via input terminals, either locally or remotely via communication lines, without even recording it on questionnaires. This process has been used for some telephone interview surveys but its application in general survey taking is still rare.

6.46. Whatever transference processes are used, the results are still subject to human or mechanical failures of various kinds. In fact, when mechanical failures occur, they can be quite widespread and affect a large proportion of the records. This is the reason that a computer edit of the data is so essential a part of the processing stream.

#### E. PREPARATION OF OUTPUTS

##### 1. *Implementation of weighting and estimation procedures*

6.47. An important aspect of data processing is the implementation of the weighting and estimation procedures which have been decided on for the survey. In the simplest form, this may involve the insertion of the sample weight, usually the reciprocal of the sampling ratio, on the computer records as part of the programming.

6.48. Adjustments for non-response, as discussed in the section on estimation procedures, may be accomplished manually or by machine. In a simple situation where, for example, one household was not interviewed in a final cluster containing eight cases, an interviewed case can be selected manually, at random, and designated to be duplicated, that is, counted twice, in the tabulations. Another alternative, which is more readily accomplished on computers, is to spread the adjustment for the non-respondent case uniformly over all of the interviewed households in the cluster; this is generally a more reliable procedure. Other refinements are possible whereby adjustments are made within various categories of households, such as those of a specified size.

6.49. More sophisticated estimation procedures, such as ratio estimates or regression estimates, require determination of the relationships between variables and/or the introduction of independent data from other sources. One of the advantages of computers is the ability to carry out complex estimation procedures which improve the reliability of the data.

##### 2. *Recoding or creation of variables*

6.50. A useful and often necessary step in the processing stream is the recoding of information or the creation of variables from a combination of the initial data elements, which is most effectively accomplished on computers. For example, the responses to a whole series

of questions relating to economic activity could be translated into a final employment status classification for tabulation purposes. Data on single years of age could be converted into various recodes representing groups which correspond to the planned tabulations (e.g., 5-year or 10-year age groups). This recoding process greatly simplifies the programming of tabulations and also increases the usefulness of the computer tapes for later analytical purposes.

#### 3. *Preparation of tabulations*

6.51. One of the ultimate goals of data processing is the preparation of the planned tabulations. For this purpose, careful preparation of specifications is required for each proposed table. Among other things, the specifications must spell out the codes or values which comprise each listed category in the table and the location of this information on the computer record. A procedure sometimes followed is to prepare a chart for each table laying out all of these specifications. Where derived numbers such as ratios and percentage distributions are specified, the means of derivation must also be indicated. The data processing group should also have the capacity to prepare special tabulations on a contractual basis to meet emerging data needs. This matter is discussed further in the next chapter.

6.52. Other considerations to be kept in mind in the preparation of tabulations are the following:

(a) All the tables included in the tabulation programme may not have the same urgency. Tables may be categorized according to priority;

(b) Before the final tables are obtained, a few test tables may be prepared. These may be scrutinized with a view to detecting any major flaws in the whole processing system. Even when the system has been meticulously planned, there may still remain some aspects which have escaped the attention of the system analysts. This step will also provide actual survey data to test the programmes prepared for generating tabulations;

(c) The results of some tabulations may indicate desirable changes in the tabulation programme. For example, too many cells of the original programme may turn out to be blank or based on very few cases, and it may be decided to pool some of the classes or otherwise recast the tables;

(d) Post-tabulation checking is essential. Consistency checks should be carried out between marginal totals of different tables based on the same basic data, class ranges and estimates within classes, estimates of related items and the like. Tabulation by interpenetrating subsamples is also a good aid in post-tabulation scrutiny. Close liaison between the data processing staff and the subject-matter specialists is essential for this work.

#### 4. *Computation of sampling variances*

6.53. The processing system is not complete without provision for the computation of sampling variances. The preparation of specifications for this purpose is, in a sense, an extension of the process discussed above for tabulations. Where certain subject-matter is repeated over time, it may not be necessary to compute the variances each time. If reasonable stability in the variances is observed, as is frequently the case, the previous computations may

be usable for current purposes. Occasional updating is desirable, however.

5. *Maintenance of the data base*

6.54. One of the prime considerations in a comprehensive survey system is the development and maintenance

of a continuing data base embodying the information gathered in the course of the program. The data base can consist of both macro-data (tabulated output) and micro-data (information from individual respondents), together with relevant data from other sources. This matter is discussed further in the next chapter.

## VII. REVIEW, DISSEMINATION, ANALYSIS AND PRESERVATION OF SURVEY RESULTS

7.1. The dissemination and analysis of survey results are aspects of survey planning that are often given insufficient attention in the planning process, and there is often a tendency to devote inadequate resources to these key activities. One reason for this may be a lack of recognition of the complexity and potential value of this phase, yet there are few endeavours more difficult and challenging than digesting what often appears to be a bewildering array of tabulated numbers and extracting the essential elements.

7.2. The development of the dissemination and analysis plan is an essential element in survey planning. Although the statistical office will usually take the leadership in this respect, extensive consultation with users is an obvious requirement. The dissemination and analysis plan should consider not only immediate data needs and standard publications but other potential uses and analytical opportunities for the future.

7.3. It is possible to publish or otherwise disseminate tabulated statistics in elemental form with little or no comment, on the assumption that the numbers speak for themselves. This is often done in the case of advance or preliminary release of summary data. The issuance of data with little review and discussion may also be precipitated if there have been undue delays in processing and the clamour for the statistics is great. While detailed review of the data is not always necessary initially and may well be deferred to a later stage, a minimum requirement in releasing any data should be to include at least sufficient commentary and technical information so that users are not misguided.

### A. TECHNICAL REVIEW OF RESULTS

7.4. Whatever other analysis is done, an essential first step is a technical review of the results. This is not the same as quality control, which has been discussed earlier. The various stages of quality control are concerned with the accuracy of specific survey operations. A technical review is concerned with the overall adequacy of the final survey results. Some of the possible elements of technical review are described below.

#### 1. Review of non-response rates

7.5. An important factor in appraising the survey results is the extent of non-response, that is, the proportion of eligible households or individuals from which no information was obtained for various reasons. Although the estimation procedure, as previously discussed, can provide for an adjustment process for non-response, serious biases can nevertheless remain if non-response rates are high or are variable from one area or population group to another.

7.6. It is essential, therefore, that as much information

as possible be compiled on non-response rates, by reason for non-response, for different geographical areas and the like, and that these measures be available to the data analysts. It is usually too late at the analytical stage to take remedial action for purposes of the immediate statistics. However, where rates are comparatively high, for example, greater than 10-15 per cent for particular areas, steps should be taken to explore the reasons interviewers failed to complete their assignments and to determine what measures are needed to avoid a repetition of that kind of performance. Equally important, the extent of non-response should be cited in survey publications, together with any knowledge, such as may be derived from evaluation studies, as to the likely impact on the statistics. For example, if it is found that non-response is particularly high in impoverished areas, it is likely that such measures as illiteracy, unemployment or inadequate housing are understated, subject to very high sampling variances or both.

#### 2. Examination of item error rates

7.7. Other measures the analyst should review are the counts of errors or omissions found in data processing for specific questionnaire items. As noted earlier, errors that cannot be resolved from other information on the questionnaires can be treated in two different ways. Either the errors are allowed to remain, which usually requires provision for "unknown" categories in the tabulations, or values are "imputed" to replace the erroneous or missing information. In either case, it is important to keep records on the extent of the original errors.

7.8. In the technical review, the information on item errors can affect various publication decisions. If the errors are especially numerous in a given item, for example, that item can be suppressed (that is, not shown) in the publication, with a footnote explaining the reason for suppression, on the basis that the information is not usable. Where imputations have been made for items where error rates turn out to be high, one choice is to undo the imputation, that is, to include an unknown category. Alternatively, the extent of the imputation can be specified in the table, by footnote or otherwise. Perhaps most importantly, the information on item error rates can be used to improve the product in the future. This can be done by focusing more training on the weaker aspects of the questionnaire or by modifying or improving the questionnaire itself.

#### 3. Review of reinterview or other evaluation data

7.9. The data available from reinterviews or other evaluation programmes should be reviewed to identify any evident deficiencies in the survey statistics. Account should be taken of these in preparing the analyses and

publications. In addition, information from evaluation studies should be included in publications, wherever possible, at least in generalized form, if the complete findings are not yet ready.

#### 4. *Internal validity checks*

7.10. Once the tabulations are received, one of the first steps is to review them from the standpoint of internal consistency and validity. Some spot checks on the accuracy of the arithmetic, for example, whether individual lines or columns add to totals and whether percentages are accurately computed, are clearly in order. Another obvious type of check is to be sure the same item is consistent from table to table.

7.11. Judgements as to the reasonableness of the data represent a next step. Certain patterns are to be expected on the basis of common sense judgements or other data in the subject field. For example, birth-rates would be expected to decline in an orderly manner for each successively older female age group, and income would be expected to rise with increasing education or occupational skill. Sometimes, certain theoretical models, such as stable population models in the case of demographic inquiries, can be used to make tentative judgements concerning the survey data. Allowances have to be made for likely deviations in the country in question from the theoretical assumptions.

7.12. Various special techniques are available for making internal validity checks. One example of these, known as "spectral analysis", entails plotting the data in graphical form. A more specialized technique aimed at assessing age reporting is the so-called "Whipple's" index. These are described in chapter VIII on data evaluation. When prior data are available for a given subject, an examination of the changes from the previous data is also in order to assess the reasonableness of the trends. Allowance must be made for seasonal variations if the two sets of data relate to different periods of the year.

#### 5. *External validity checks*

7.13. Comparisons could also be made with various sources external to the survey such as census data or data from business establishment surveys, social insurance and other administrative records. For example, survey data on births could be compared with information from the civil registration system. Unemployment data can be compared with the number registered for work at public employment offices. School enrolment estimates from the survey can be compared with statistics from the school system. In making such comparisons, appropriate allowances must be made for such matters as differences in concepts and coverage, sampling variations, differences in timing, and known deficiencies in the sources used for comparison.

#### 6. *Procedure in case of serious discrepancies*

7.14. Where serious discrepancies are observed in the course of internal or external checks, after appropriate allowances for incomparabilities, a further examination of the survey procedures is in order. One area to investigate is the possibility of failings in the computer programs or other tabulation specifications or even some consistent er-

rors made in coding or other manual operations. Although it is rare, it is even possible sometimes to detect a consistent and correctable error made by an individual interviewer. Where operational errors are found, they should be corrected to the extent possible, even if this requires some delay in publication. A preliminary release can be issued, omitting those parts subject to correction. If evident errors are not found, the best course may be to issue the original data but include some caveats in the text of the reports concerning unusual patterns.

### B. *DISSEMINATION IN REPORTS*

7.15. The term dissemination is rather broad, and can encompass anything from a rather superficial to a very extensive effort. Different levels or degrees of detail and analytical depth are not only possible but may be desirable in the course of presenting and disseminating survey results. Some of the possibilities are discussed below and in section C following.

#### 1. *Types of reporting*

##### (a) *Advance reporting*

7.16. Although a technical analysis of the type described above should be carried out prior to any issuance of data, a relatively brief substantive analysis may be sufficient for purposes of disseminating preliminary or advance data in a brief report or press release. For this purpose, the highlights of the material in question should be identified and presented, together with any important cautions concerning the coverage or validity of the data.

##### (b) *Detailed reporting*

7.17. The next stage entails a review of basic interrelationships and trends within the data, including comparisons among demographic, socio-economic and geographical groups, current levels and changes and trends which have occurred since previous periods, and other such essentials for an understanding of the survey findings. Various tests for statistical significance should be part of this analysis to ascertain whether the differences and trends observed are statistically significant.

7.18. Such reviews normally lead to the preparation of a detailed report or publication. The development of publications is a highly individualistic matter and it is unlikely that any two statisticians will use precisely the same approach. Based on a review of many different kinds of report, a selection of the more typical ingredients of a reasonably detailed publication is discussed below.

##### (i) *Summary section*

7.19. The publication can usefully begin with a summary of major developments. A summary text table, containing the main summary statistics, is helpful in this context.

##### (ii) *Detailed sections*

7.20. The summary is likely to be followed by more detailed sections which explore various aspects of the subject in greater depth. For example, in a health survey report, there may be a detailed section on acute illnesses, a second on chronic conditions, a third on hospitalizations,

and so on. Text tables can also be included in the detailed sections for the purpose of illustrating some of the principal patterns, such as illness rates by age and sex.

(iii) *Graphs and charts*

7.21. The use of graphs and charts can be very helpful in the exposition of a given subject and also add interest and variety to the presentation. "Trend" charts are used to depict changes over time. "Bar" charts constitute a good way of comparing different groups, such as birth- or death-rates for various regions. "Pie" charts are useful in illustrating the components of a total, such as the ethnic composition of the population. Many statistical texts provide illustrations of charts of various kinds.

(iv) *Technical appendix*

7.22. This essential section can cover a number of points. First, there can be a brief description of the survey operation, the size and distribution of the sample, the data collection procedures used, and so on, with references to other publications where more detail may be found. Second, the basic concepts and definitions and other terms used in the report should be explained in a concise manner. Finally, available information bearing on the validity of the results should be included, such as sampling variances, level of non-response, and other known sources of error. A facsimile of the questionnaire should be included, especially in the case of a new inquiry.

(v) *Detailed tables*

7.23. The report will usually contain a set of detailed tables presenting the full survey results or at least those deemed worthy of publication. In addition to absolute numbers, these may include various derived figures helpful in making comparisons, such as percentage distributions and ratios of one element to another. The detail should generally be limited to statistics with a stated minimum level of reliability in terms of sampling variances. Sometimes, some figures which fall below that standard are included in order to round out a distribution. It is useful in such instances to identify estimates (such as by asterisks) based on fewer than a minimum number of sample cases.

(c) *Specialized reports*

7.24. Various more specialized reports can be prepared using the survey results. These are most often accomplished after the initial publication. One example is the preparation of monographs on a given subject, which use not only the survey data but information from various other sources which bear on the issue. Another kind of study is concerned with the development of social and economic indicators of one kind or another on important conditions in the population. The objective is to find from among the whole array of statistics selected measures which clearly and concisely depict the condition of interest. For example, extensive analysis may reveal that a few measures, such as the unemployment rate, the proportion of the work force earning below a certain minimum, and the proportion in unskilled occupations, accurately describe the adequacy of employment in a given area. A detailed discussion and illustrations of social indicators are

provided by United Nations publications on this subject (66, 76, 114).

7.25. Survey data also have many uses in conjunction with other statistics in the development and maintenance of major integrated statistical programmes such as the national accounts and balances and integrated social and demographic data (67, 111). Vital statistics and fertility data can be used in the preparation of current population estimates and population projections for future dates. Projections can also be made of the work force, school enrolment and the like on the basis of levels and trends exhibited in a continuing survey programme.

(d) *Policy-oriented analysis*

7.26. Still another type of study is related to the programme or policy implications of the survey findings. For example, a survey may find and the statistical agency may report that large numbers of children in certain areas or population groups are not attending school. While this finding may be strictly objective, the reasons for the situation reported and the possible programme and policy implications of it are matters which may require further analysis, interpretation and judgement beyond the competence or authority of the statistical agency. Since one of the main purposes of statistics is to guide policy decisions and their implementation, it is obviously important that this type of analysis be done, but a statistical agency must exercise care to avoid becoming involved in political or partisan matters. Otherwise, the objectivity of the agency may be called into question. Thus, it may be advisable to have policy-oriented analysis carried out within the government agency responsible for a particular substantive programme or in a general overall planning group. In such instances, however, the statistical specialists should be prepared to provide such guidance as is needed to promote a better understanding of the data and their problems and limitations, as well as ensure the data meet the analytical requirements as fully as possible.

2. *Preparation of publications*

7.27. The most common means of disseminating statistical information is through reports and publications. Some of the possible elements of a typical report have been discussed earlier. Certain additional guidelines in the preparation of publications are given below.

(a) *Standardization in format*

7.28. Although reports will obviously have different format requirements, some effort at standardization can be helpful to readers. For example, the captions used to describe a given subject-matter should be the same from report to report. Table formats should be standardized with respect to titling procedures, footnote designations, and other common notations. Rounding procedures for numbers, base periods for index numbers, and similar arithmetic elements should be the same, unless there is a compelling reason for variations. Technical appendices should cover the necessary material in some consistent order and format in different reports. The review of reports by a centralized publications section can assist in achieving the desirable consistency. Such a section could also be responsible for monitoring the printing of publications (even

when contracted outside of the agency) and attempting to avoid the delays and other difficulties often associated with that phase.

(b) *Writing style*

7.29. The writing should be clear and concise and should be aimed at the general user including the policy-maker, not the technician. The use of highly technical terms should be avoided if possible. Where some technical terminology is essential, the meaning should be explained.

(c) *Description of numbers*

7.30. A cardinal rule is to avoid long recitations in the text of the numbers which appear in the tables. Nothing is more destructive of interest than the endless citation of statistics. Only those numbers should be mentioned which are clearly necessary to the exposition. The charts and tables will more clearly depict the details.

(d) *Rounding of numbers*

7.31. Any numbers quoted in the text should usually be rounded (to the nearest thousand, hundred thousand, or whatever, depending on the size of the numbers). Appropriate rounding of numbers should also be done in the published tables, taking into account the level of reliability of the statistics.

(e) *Limitations of the data*

7.32. The presentation should not attempt to draw conclusions from the data which the data do not completely demonstrate, or which do not take account of known statistical limitations and discrepancies in the data. The report should be forthright in noting these limitations of the data.

(f) *Objectivity in conclusions*

7.33. It is essential to retain objectivity in reaching conclusions if the agency is to gain public and professional confidence. Conclusions should be based only on factual evidence and not on interpretations and inconclusive analyses that can be seriously questioned.

(g) *Review procedure*

7.34. Aside from matters of format, it is important to provide for some orderly review procedure for publications within the issuing agency. One type of review may involve sampling specialists who appraise the presentation from the standpoint of statistical reliability, that is, the extent to which the analysis can be supported by the facts. A final review by officials in a policy position in the agency or persons designated by them for this purpose can assess the extent to which the presentation is in accordance with agency standards of quality and objectivity.

### C. OTHER FORMS OF DISSEMINATION AND USE

7.35. Aside from publications, there are various other ways in which survey data can be disseminated and used. Some of the more important ones are discussed below.

#### 1. *Issuance of unpublished data*

7.36. Usually, not all tabulated results are published because of the cost and space involved, lesser public interest in some aspects or other reasons. Some of the unpublished results, however, may be of considerable interest and value to specific users. One way of meeting these needs is to provide unpublished data to users in some informal manner, such as on worksheets, copies of tabulation sheets or photostats of computer print-outs, perhaps charging the cost of reproduction. It is usually desirable to limit this kind of dissemination to data which meet minimum reliability standards. The statistical agency may also wish to specify certain restrictions regarding publication by the user. Alternatively, or additionally, the statistical agency may ask to review any proposed publication by a user prior to actual issuance.

#### 2. *Mail and telephone requests*

7.37. It is common for a statistical agency to receive mail and telephone requests for information. Sometimes the requests are for information that has actually been published, but the user may be unaware of it or does not have access to it. At other times, unpublished data may be requested. The agency should have the capability to meet such requests to the extent feasible. Those involving published data can be met by sending publications. Otherwise, the request can be satisfied by letter or telephone reply.

7.38. If the volume of such requests is large, it can impose a burden on the subject-matter staff, which can interfere with other duties. An alternative or supplementary procedure is to establish a central information unit which handles as many of these requests as possible, certainly those which involve mailing publications or quoting published data. Only where special treatment is required does the subject-matter staff have to be engaged.

#### 3. *Preparation of special tabulations*

7.39. The tabulations prepared by a statistical agency will not necessarily meet the needs of all users in terms of level of detail, cross-classification of subjects, or in other ways. Users must always be consulted in planning the tabulations; however, some of the expressed needs may be too costly or time-consuming to be feasible. Some additional needs may also have emerged since the planning date and some potential users may have been overlooked.

7.40. One way of accommodating specialized or emerging needs is for the statistical agency to have the capacity to prepare special tabulations of the survey data. A common practice is to charge the users, which can be private as well as public groups, for the actual cost of preparation. It is also generally advisable to restrict the tabulations to a level of detail which is supportable from the standpoint of statistical reliability. The ability of the agency to prepare special tabulations can be appreciably enhanced through the availability and use of various "generalized" computer software packages, as discussed in chapter VI on data processing.

#### 4. Access to computer data via terminals

7.41. An emerging development is the opportunity for analysts to gain direct access to data stored in computers via remote access terminals. This facility generally requires the existence of a carefully developed and fully documented data base, whereby the location and identity of each piece of information in the system is ascertainable. The availability of simple programming languages for analysts to use in accessing the information is usually another requirement.

7.42. Access of this kind is sometimes restricted to analysts within the statistical agency. In other cases, authorization may also be given to analysts in other agencies and also to approved persons in universities, research centres, and similar individuals. Where the data system is restricted to aggregate, tabulated data, the access can be more widespread. Where individual data are concerned, the necessary measures to safeguard confidentiality and prevent abuse of the information are essential. In such cases, authorization should be given only in cases where observation of confidentiality can be guaranteed.

#### 5. Release of micro-data

7.43. Still another and increasingly common form of data dissemination is the release to users of computer data tapes or sets of punched cards in non-computerized operations containing the individual survey results or micro-data. These can either be complete data sets or various subsamples. With the rapid growth and availability of computers in universities, business firms, and other private institutions, as well as throughout the Government, this approach reduces the pressure on the statistical agency for special tabulations while enhancing maximum utilization of the survey data.

7.44. One problem in the issuance of these materials is the protection of confidentiality. Usually, this can be accomplished by removing any information from a record which can possibly identify an individual. This restriction should not be limited to obvious identifiers such as names but can also include exceptional characteristics such as a highly unusual occupation or an exceptionally large income, which might inadvertently reveal an individual's identity.

7.45. Another problem is controlling the way in which the data are used and avoiding misuse which could discredit the information. It would be very difficult, and probably unrealistic, to expect the statistical agency to monitor every usage of the data where tapes or punched cards have been widely disseminated. Probably the best that can be done is to provide technical advice and assistance to users at least to the extent that they can understand, and will hopefully observe, the limitations of the data. Recipients of the survey materials may also be asked to provide the agency with any copies of publications they prepare, for informational and longer-range monitoring purposes. They might also be expected to put disclaimers in any publications they prepare, absolving the statistical agency of responsibility for any analyses shown or conclusions reached.

#### 6. Preservation of survey data

7.46. Although survey data may be collected to meet certain immediate objectives, their usefulness does not normally end at that point. In fact, it may not be until a considerable body of information has been accumulated over time that the full value of the data can be realized. In this, as in other matters, the whole can amount to considerably more than the sum of its parts. Moreover, many important analytical uses and interests take considerable time, perhaps years, to develop and cannot be accommodated unless the necessary information is maintained in some acceptable form.

7.47. Even from the standpoint of sheer frugality, it stands to reason that data gathered at such great cost and effort should not be hastily discarded after serving some brief, immediate purpose. Provision for the preservation of survey data should, therefore, command some priority in the planning process. At the same time, it is important to achieve this objective in a manner which does not condemn the agency to being crushed under the weight of accumulated files and materials.

7.48. It is not difficult or especially burdensome to retain published or even tabulated, unpublished information over considerable periods of time. One problem is that published or even tabulated detail is often inconsistent over time or among different projects. Thus, it may be difficult to merge historical, aggregate data of these kinds into a body of consistent statistics for analytical purposes. Also, even where a reasonable degree of consistency is possible, a good deal of physical effort is required to extract the necessary details from a massive file of "hard copy" information represented by publications and tabulation sheets.

7.49. Potentially much more useful resources for research and analysis are the micro-data files, that is, the information for individual respondents derived from survey undertakings. The availability of such information in an accessible form makes it possible to derive statistics in the manner and level of detail required for specific analytical purposes, regardless of the way the data are initially tabulated and published. Of course, a resource of this kind cannot supply details which were not reflected in the initial data collection, but there are frequently important potentialities in the available data set which are not realized at the time the tabulations are made.

7.50. Historically, the characteristic problem with preservation of micro-data has been the sheer bulk of the material involved and the space limitations for storage purposes. The difficulty has been compounded by the fact that so-called "dead" storage, that is, virtual burial of the records, is not the answer. Unless access to the information is possible without excessive cost and effort, it is dubious whether retention is worth while. Striking technological developments of the past couple of decades have materially enhanced the possibilities for data preservation even at the micro or most detailed level. Some of the relevant advances are cited below.

##### (a) Computer tapes and disks

7.51. The emergence of computer tapes and disks in place of bulky punched-card files has almost eliminated

storage problems for aggregate data but especially for micro-data. As the technology has advanced, it has been possible to include increasingly more information on a tape or disk of a given size. Tapes are less costly than disks from the standpoint of storage. One approach is to use disks while the data are in fairly frequent use and transfer to tapes when the main intent is storage.

(b) *Microfilm or microfiche copies of questionnaires*

7.52. Usually, the stored data on computer tapes is sufficient for historical and subsequent analytical purposes. However, there may be instances where questionnaires are of so unusual a nature, or where not all of the potentially useful information has been extracted, that it is desirable to retain the original records. The use of microfilm or microfiche represents a way of radically reducing storage problems for such records.

(c) *Development of a computerized data base<sup>1</sup>*

7.53. The computer age has greatly enhanced the opportunity for creation, maintenance, and expansion of a country's data base. A data base entails mechanisms for the preservation of data over time but is more than purely a depository. It implies an organization of data in a form that maximizes its comprehensibility, accessibility and utilization. Instead of maintenance of separate data files for each statistical project, the process requires assembly of material for each subject field, regardless of its origin, in a way that provides a comprehensive source of data on that subject. The system must also provide for consistency in treatment of data from different subject fields, which enables the examination and analysis of interrelations among them.

7.54. A data base can embrace both aggregate tabulated statistics and micro-data. The tabulated data can be organized, within a given subject-matter, in terms of available statistics for various geographical areas, different demographic and socio-economic groups, and trends over various periods of time. The micro-data files can provide for collation of information from different sources for the same individual units to the extent that this is possible.

7.55. A key requirement for a data base is a comprehensive system of documentation. Adequate documentation is needed for any storage system, indicating what is available, where it is located, and how to gain access to it. So-called "tape libraries" are necessary in any statistical agency which maintains data in this form. The distinction in the case of a data base is that the documentation must be in a form and level of detail that is understandable not only to computer technicians but also to analysts and others who might be accorded access to the system via remote access terminals or other means. Another essential is that the data should be scrupulously "clean" before they are installed in a data base. Regardless of the editing that may have been done during the initial data processing, a further review is indicated at this stage.

<sup>1</sup>This subject is discussed in more detail in two United Nations reports (67, 111).

7.56. The development of a data base is a complex process, which can only be approached on a gradual basis and will probably take a long time. Technical advice and assistance from international agencies, consultation with countries which have developed such systems, even contracts with computer or management firms may be necessary. Once accomplished, many benefits accrue in terms of making the most use of data and advancing analytical opportunities. A data base approach can also reduce the immediate tabulation requirements in a given statistical undertaking, since the micro-data will still be readily accessible, as needed, for subsequent specialized analyses. The cumulative data from various sources embodied in the system are more likely to meet various emerging data needs without undertaking new surveys and adding to respondent burden.

7.57. The data base approach, however, also entails certain dangers, especially where micro-data are combined from various sources for the same individuals. In such instances, the issue of confidentiality is often raised. It is important that the legislative and administrative mandate for statistics carries the necessary safeguards to protect confidentiality and preclude misuse of the information. Also, direct access to the system should be limited to those whose need for the data can be clearly justified from the standpoint of research and programme requirements and whose usage of the information can be adequately monitored.

## 7. *Publicizing data availability*

7.58. A government statistical agency has an obligation to inform the public of its work since it is financed with public funds. There are various ways in which the availability of statistical data can be made known. Catalogues and brochures can be prepared and circulated announcing and listing available publications and including order forms for obtaining the material. Articles can be prepared for newspapers, professional journals, and other media for the same purpose. For recurrent series of special public interest (such as periodic unemployment or price data), it is important also to publicize in advance the publication timetable in order to avoid the appearance of timing the release to support some particular government policy.

7.59. Speeches by agency officials before various groups and organized conferences of users represent other means of acquainting the public with available data and also provide a forum for discussing the potential use and limitations of statistical information. Libraries may be supplied with copies of available publications and associated announcements for the information of their users. Replies to telephone and mail requests provide a direct outlet for clarifying the kinds of data that can be supplied and the conditions, if any, associated with availability.

7.60. A cohesive agency effort along these lines can be enhanced if there is a central information office staffed by information specialists for this purpose. As indicated earlier, such an office can also relieve the burden imposed on subject-matter staff by a heavy volume of special requests.

## 8. *Feedback from data users*

7.61. Whatever the means for disseminating survey results, it is important for a statistical agency to find out how its data are being used and what problems have been encountered in such use. It is not an easy matter to obtain this kind of "feedback". Most users can supply adequate reasons for wanting certain kinds of information but find it much more difficult to describe their actual use.

7.62. Nevertheless, some effort to explore this matter can pay valuable dividends. One approach is to inquire about data use and any problems that have arisen by means of questionnaires sent to persons and groups on the mailing list for publications, those who have purchased data tapes, and others known to have received survey information. Another is to invite comments on this issue at meetings of advisory groups or to organize special meetings of known users to discuss the subject. Some direct feedback might be obtainable from those who make spe-

cial requests for information by letter or telephone or who contract for special tabulations.

7.63. The purpose of this kind of investigation is to find out whether the agency output is satisfactorily meeting user requirements and what kinds of changes or improvements may be indicated. Persons engaged in intensive kinds of analyses or in construction of models, statistical frameworks such as the national accounts and balances and the like, can often provide considerable guidance in this respect. They are in an especially good position to identify any data gaps and inadequacies that they uncover in the course of their efforts. Not only is it important to solicit requirements for new or expanded data but attention should be devoted to identifying present series which are no longer serving user purposes and can be discontinued or curtailed. In fact, with limited resources, it may be possible to provide new or improved data only if some offsetting reductions in obsolete series can be achieved.

## VIII. EVALUATION OF DATA QUALITY

8.1. One previously neglected aspect of survey taking which is receiving increasing attention is the need for evaluation of the quality of the data. The various types of technical review discussed in the previous chapter constitute the minimum degree of evaluation essential in such an undertaking. The present chapter is concerned with a more systematic approach whereby not only the possible existence of deficiencies is examined but an effort is made to measure the magnitude of errors in the data.

8.2. The information obtained from an evaluation programme should aid in detecting those aspects of the survey operation that clearly require attention and improvement. The evaluation results are important in guiding analysts in interpreting the survey data and in advising and perhaps cautioning others in their use of the statistics. By taking the initiative in evaluating its survey results, a statistical agency can often silence unreasonable criticism by outside interests who are not satisfied with the survey findings.

### A. ERROR ANALYSIS AND ADJUSTMENTS

#### 1. Types of survey errors

8.3. It may be useful at the outset to review the various kinds of errors to which survey results are subject. Most of the attention in the past has been devoted to sampling errors, that is, the degree to which results from a sample survey are likely to differ from those from a complete canvass of the population because of chance factors alone. The need for computation of sampling errors and various ways of deriving them from the survey results have already been discussed in chapter IV. The present discussion is devoted primarily to non-sampling errors and biases which in many cases may represent the larger and more serious deficiencies in the statistics. The theoretical objective is to measure the total error, combining both sampling and non-sampling errors and biases. The usual formulation is the "mean square error", which may be defined as the square root of the sum of the sampling variance, the non-sampling variance, and the square of the bias. Unfortunately, without a knowledge of the "true" value of a statistic, it is extremely difficult to develop an overall measure of bias.

#### (a) Coverage errors

8.4. Coverage errors arise from failure to cover adequately all components of the population being studied. Incomplete sampling frames often result in coverage errors. For example, the list of areas being used to select primary or secondary sampling units may exclude certain parts of the country, or the population counts used to determine sampling ratios may be less accurate for some areas than for others. In such cases, the deficient areas can be improperly represented in the sample. If such areas contain atypical population concentrations, such as excep-

tional proportions of a given ethnic or socio-economic group, the sample is biased accordingly. In the course of developing the sample design, inadequate or incomplete field listings of ultimate sample units can be another source of coverage errors.

8.5. Coverage errors also arise from incomplete enumeration in the course of the survey. Non-response due to failure to obtain interviews in sample households is probably the main factor. As indicated previously, an adjustment procedure can reduce but is not likely to eliminate the bias from this source. Omission of individuals even within interviewed households represents another coverage problem. For example, there is sometimes a tendency to overlook infants because they are not thought of as full-fledged members of the household. There may be inconsistencies in the reporting of temporary visitors or regular household members who are temporarily away, which can result in either omissions or duplications in the counts.

#### (b) Response errors

8.6. Response errors may be defined as those arising from the interviewing process.<sup>1</sup> In complex surveys, these may constitute the main source of inaccuracy in the data. Such errors can result from a number of circumstances, such as the following:

(a) *Inadequate concepts or questions.* Inadequate or erroneous concepts and improperly worded questions which lead to varying interpretations can result in serious response errors. Poor arrangement of items or confusing instructions on the questionnaire can have a similar result;

(b) *Inadequate training.* Lack of sufficient training or incomplete or poorly written instructional manuals increase the likelihood of response errors;

(c) *Interviewer failures.* Aside from shortcomings in the training or survey materials, the interviewer can contribute materially to the survey errors. Such problems can result from poor interviewing techniques whereby respondents are antagonized or frightened, from asking questions improperly, from failure to follow instructions on the form, and the like. Misunderstanding of the concepts and/or misinterpretation of the respondent's answers constitutes another source of error. Sheer mechanical errors such as inadvertently checking the wrong box or making arithmetic errors can also add to the problem;

(d) *Respondent failures.* In most surveys, the respondent is likely to be the main source of response errors. These can arise because the respondent misinterprets the questions, does not understand the concepts, does not possess the relevant information, or provides inaccurate

<sup>1</sup> For a comprehensive discussion of the whole range of response errors, with references to hundreds of experimental and other studies, see (429).

answers either inadvertently or deliberately. A joint problem exists where the interviewer does not select the most knowledgeable respondent in the household for purposes of the interview.

(c) *Processing errors*

8.7. Many kinds of errors can arise in data processing. Format errors, coding errors, errors in clerical transcriptions of data, or in transference of data to punched cards or computer tape probably represent the main sources. Errors or misinterpretations in computer programming or other machine specifications can contribute to the problem. Mechanical failures at various stages are also a common occurrence.

(d) *Analytical or publication errors*

8.8. The analyst can contribute to the error picture by failure to detect evident inaccuracies or by misinterpretations of the findings. Publication errors are certainly not unknown, judging by the frequency of issuance of "errata" sheets.

## 2. *Measurement of survey errors*

8.9. Various means exist for the measurement of survey errors of these various kinds. Some of these require rather specialized investigations. Others can also partially serve the needs of quality control at various stages of the operation.

(a) *Assessment of population coverage*

8.10. In some countries, independent population estimates are made by projecting the latest census results to the current date using data on births, deaths and migration. These are sometimes prepared by age and sex, major ethnic groups, or even for principal regions of the country. A comparison of the survey results with independent population estimates may provide some guidance regarding the adequacy of survey coverage of various segments of the population.<sup>2</sup> Even where population estimates of this kind are not made, comparisons of survey distributions against those from the most recent census, making reasonable allowances for changes, can supply some useful clues. However, these various kinds of comparisons provide relative rather than absolute measures of possible error since the census could be deficient in coverage in various respects. Moreover, possible estimation errors in independent population estimates, which can be appreciable for detailed population groups, also have to be taken into account in appraising the differences.

(b) *Exploration of non-response bias*

8.11. The extent of bias introduced by non-response can be explored by follow-up studies of non-respondent households. It is usually too costly and time consuming to follow up all non-respondents. However, a random or systematic subsample can be chosen to be pursued more intensively in an effort to obtain interviews. Comparisons between the results of these follow-up interviews for various subjects and the imputations made for these same

households in the adjustment procedure for non-respondents provide some measures of the bias arising from non-response.

8.12. Another technique which has been used is to match a subsample of the interviewed and non-respondent sample cases with the most recent census. A comparison of the census data for interviewed as opposed to non-respondent sample cases will provide an indication of non-response bias.

8.13. Still another suggested approach is to compare survey findings for households interviewed only after considerable effort (such as after the third visit or attempt) against those interviewed readily at the first attempt. Those interviewed only after considerable difficulty might resemble non-respondents in some ways. A comparison with those interviewed readily could, thereby, provide some measure of non-response bias.

(c) *Record checks*

8.14. Mention has already been made in the previous chapter of various "external" checks, whereby the survey information is compared against administrative or other sources of data, such as by comparing survey estimates of births and deaths against data from vital registration records. A more detailed approach is to attempt comparison on an individual basis.

8.15. One technique is a so-called "primary" record check. In this approach, samples of cases are drawn from various administrative or other records. These cases are then added to the survey sample and their households are interviewed in the usual manner. Comparisons are made between the survey data and the record data for the same individuals.<sup>3</sup> As an example, let us assume that information is wanted on occupational skills. Samples of employees can be drawn from the rolls of various industrial or business establishments, together with information on their names and addresses and the precise tasks to which they are assigned. The addresses containing these individuals can be added to the survey sample in a manner which does not identify them to interviewers as special cases and the usual survey questions on employment and occupation can be asked. The information on occupation collected in the survey can then be compared on a person by person basis with that obtained from the employment records.

8.16. An alternative technique is known as the secondary or "reverse" record check. In this case, the basic survey sample is not augmented. Instead, enough information is obtained in the interview to subsequently locate a record for purposes of making comparisons. For example, to pursue the above example further, each person reported in the survey as employed can be asked for the name and address of his employer, as well as for a description of his job. At a later point, information is solicited from each named employer on the job assignment of each of the specified individuals. The reverse check is more costly because a larger number of record sources has to be consulted. Also, there is the problem of making an exact match, that is, being sure that the records are obtained for the proper individuals. The advantage is in obtaining a wider range of observations than is usually provided through a primary record check.

<sup>2</sup> These independent estimates can also provide a basis for improved estimation procedures via ratio estimates (see chap. IV).

<sup>3</sup> For a series of studies entailing record checks of this kind, see (329).

(d) *Reinterviews*

8.17. The use of second interviews or reinterviews as a means of quality control has already been discussed. This procedure is also useful for purposes of evaluating the survey findings. Since reinterviews are costly, they are usually conducted for only a subsample of the original cases.

8.18. In conducting reinterviews, one approach is merely to repeat the survey questions. In this way, the procedure provides an indication of the consistency or "reproduceability" of the survey results. Another procedure is to use more detailed questions and better trained data collectors in an effort to find out how close the original survey results are to the "true" answers. Since the reinterview results, whether using the original questions or more detailed ones, can also be in error, it is important that any differences be reconciled. One way is for the reinterviewer to also have possession of the original information. He should be cautioned not to consult the original answers until the reinterview is completed. At that point, a comparison is made and the reinterviewer asks the respondent about any differences to find out which of the answers is most likely to be correct.

8.19. Almost any of the survey subjects can be examined through reinterviews. One important topic is the coverage of individuals in the survey. Through the reinterviews, information can be developed on the number of persons erroneously omitted in the original interview and also on those who were improperly included. From reinterview results, preferably after reconciliation, information can be developed on so-called "gross" and "net" differences in the survey. Gross differences reflect the total differences between the reports on the original interview as compared to the reinterview and are a measure of response variability.<sup>4</sup> Usually, some of the gross differences cancel each other out and the resultant net differences tend to be much smaller. The net differences provide a measure of the response bias in the survey results. These measures assume that the reinterview results (reconciled or otherwise) can be accepted as the standard for judging the original survey findings.

8.20. A simple illustration may be helpful. Assume, for this purpose, that one of the survey subjects is literacy and that the population is to be divided into "literate" and "illiterate" components. Assume, further, that a reinterview has been conducted for a subsample of cases with the following results.

Reinterview classification	Original classification		
	Literate	Illiterate	Total
Literate .....	500	100	600
Illiterate .....	200	1 000	1 200
TOTAL	700	1 100	1 800

8.21. The boldface numbers represent the gross differences, a total of 300, since these constitute the total number classified differently in the two enumerations. The net differences amount to only 100, however—either the differences between the total number of literate persons (700 versus 600) or illiterate persons (1,100 versus 1,200) in the two interviews. If the reinterview results are accepted as accurate, it can be concluded that the original survey

<sup>4</sup> See (339). Response variability is usually reflected in the measures of sampling error derived in the manner discussed in chapter IV.

showed an upward bias of about 15 per cent in the number of literate persons. A summarization of reinterview results is sometimes made via the so-called "index of inconsistency".<sup>5</sup> It should be noted that the record check procedure described earlier could be analysed in a similar manner. In that case, the record data would replace the reinterview results in the table.

(e) *Interpenetrating samples and interviewer variability*

8.22. One type of interpenetrating sample is the selection of two or more primary sampling units from each sample stratum, as was discussed in the section on sampling in chapter IV. That procedure is important for purposes of calculating sampling errors from the survey data. Another form of interpenetration is the assignment of alternate sample clusters of two or more interviewers within the same primary sampling unit. One purpose is to measure "interviewer variability", that is, the extent to which different interviewer practices affect the survey results.<sup>6</sup> Differences between the summary results, for example the number of births, reported by the different interviewers in this type of design can provide some measure of this factor.

(f) *Graphic or fractile analysis*

8.23. A relatively simple technique which is helpful in observing margins of error is the so-called graphic or "fractile" analysis (see (369)). This approach assumes the existence of interpenetrating subsamples at various stages of the operation. Within each such subsample, the ultimate sample units such as households are arranged in some order of ascendancy in terms of the subject being explored. For example, if household income is the subject, the units can be arrayed in the order of lowest to highest income.

8.24. The array of units in any of the subsamples is then divided into a number of roughly equal parts. In this example, these could be "deciles", with each containing about one tenth of the distribution. An average is computed for each part, or "decile", in the example. For each subsample, the average for each successive part is plotted on graph paper and the successive plotted points are connected by straight lines. The same procedure can be followed for the sample as a whole, divided, in the example, into income deciles. Comparisons among the lines for the subsamples and the sample as a whole provide a visual image of the variability in the results.<sup>7</sup>

(g) *Recall analysis*

8.25. When the survey calls for remembering past events, the errors are usually greater when long recall periods are used. At the same time, the use of longer recall periods is less costly because more information is obtained in each interview.

<sup>5</sup> See (339). A simpler measure of inconsistency is sometimes given as  $(I-r) \times 100$ , where  $r$  is the number classified in the same category in both interviews (e.g., 500 literate in above table) divided by the number in that category according to the reinterview (600 literate).

<sup>6</sup> See (373). Interpenetrating samples can be used to examine various other matters as well, such as the effects of questionnaire variations and different collection procedures.

<sup>7</sup> For a more elaborate appraisal of the "error area" (space between lines) in the fractile approach, see (434).

8.26. In cases where it is necessary to use longer recall periods, it is useful to estimate how much error is associated with that approach. One way is to designate a subsample which is interviewed more frequently, using shorter recall periods, as a basis for comparison.<sup>8</sup> Assume, for example, that a basic objective in a survey is to obtain information on births during the preceding year. For purposes of evaluation, a subsample is visited each quarter to obtain births for the preceding three-month period. A comparison can then be made between the annual estimates derived from the main sample with those built up from the quarterly interviews with the subsample, to assess the impact of the longer recall period.

8.27. In theory, this effect can be examined by asking about different time periods for the same sample, for example, asking the same households both about births in the previous year and in the last quarter. The problem is that seasonal differences can affect the results. The shorter reference period can also be subject to greater "end effects", that is, misreporting the specific timing of an event.

#### (h) *Merging of data sources*

8.28. Sometimes, a composite estimate can be made from two or more data sources which provides a superior measure to that obtainable from a single source. Such a composite estimate can also be used to appraise the adequacy of a survey statistic. In developing demographic estimates such as births and deaths for example, some countries have used a dual approach. A survey is taken in the usual manner, asking about births and deaths in the previous year. At the same time, a sample registration method is attempted in the same areas. This is accomplished by having selected "registrars" talk to knowledgeable informants in each area on a continuing basis to find out about any births and deaths. Samples of households are also visited by the registrars from time to time for this purpose.

8.29. The estimates derived in these two ways are probably both incomplete and deficient for the usual reasons. However, a composite estimate can be prepared by various means which is likely to be superior to either one. One approach is the well-known Chandrasekaran-Deming technique (see (302)), which assumes that the two estimates are independent (that is, one is not influenced by the other and both are not influenced by the same third factor). Differences between the composite and the survey estimate can be used as a measure of the reliability of the survey approach.

#### (i) *Other specialized techniques*

8.30. Various other specialized techniques are available for purposes of appraising certain kinds of subject-matter. For example, comparisons can be made between sample population estimates and estimates based on various models, such as stable population models (see (292)).

8.31. A technique that has been found helpful in assessing age reporting is the so-called Whipple's Index of Concentration.<sup>9</sup> A tendency has long been observed for respondents to round ages to the nearest 5 or 10 years. The

extent of this error can be approximated by this index. In brief, the number of persons in the sample between 23 and 62 years of age whose reported age ends in 0 or 5 is determined. This number is then divided by an amount equal to one fifth of the total number reported in that age range. An index of 100 is regarded as an indication of accurate age reporting from the standpoint of rounding. A value over 200 is regarded as indicative of excessive rounding.

### 3. *Adjustment of survey results*

8.32. The question often arises whether adjustments should be made in survey results to counteract obvious data deficiencies. For example, various adjustment factors can sometimes be developed from reinterview results or record checks. These factors can theoretically be applied to the original survey results to reduce evident biases. Where the survey estimates are so deficient as to be misleading, the case for making adjustments is stronger. An alternative is to suppress the deficient information with an explanation as to why it is being withheld.

8.33. Where the differences are moderate, the use of an adjustment procedure is more questionable. Evaluations are often based on small samples because of costs and may be subject to appreciable sampling errors as well as other problems such as conceptual and matching difficulties in record checks. A preferable procedure may be to allow the survey estimates to stand but to provide as much information as possible in the technical appendices of publications on the estimated magnitudes of various kinds of errors. The interpretation of the survey findings should also take these margins of error into account.

### B. COST-BENEFIT ANALYSIS

8.34. The need for careful cost records for purposes of survey planning has already been discussed in chapter IV and elsewhere. A more difficult assessment, but one which is often called for, involves weighing the benefits obtainable from the survey findings against the costs. A problem arises from the fact that statistics are not a final product or an end in themselves but a tool for use in planning and implementing substantive programmes. Also, as previously indicated, it is extremely difficult to determine precisely how statistical data actually enter into the planning process or how decisions would be affected in the absence of these data.

8.35. Any efforts to carry out a cost-benefit evaluation are likely, therefore, to be quite subjective in nature. Where cost data are available or can be developed over time for various alternative statistical plans, some subjective assessments may be possible with respect to the perceived relative utilities of the alternative data sets.

### C. METHODOLOGICAL DEVELOPMENT

8.36. If it is not already evident, data evaluation will usually confirm the need for material improvements in survey methodology. Evaluations may indicate the existence or even the magnitude of deficiencies but not usually the manner in which improvements may be achieved. It is only through an organized research and development effort that such advances are ordinarily possible.

8.37. Methodological research and development can

<sup>8</sup> For a study of this kind, see (395).

<sup>9</sup> For a discussion of this and related measures, see (410).

encompass a wide range of issues. Data collection is frequently a major focus of such efforts. Alternative approaches to a given subject-matter, differences in concepts or question wording, variations in time references, and the like are among the matters that can be explored. Differences in data collection methods, in the assignment of interviewers, and choice of respondent represent other possible elements. Alternative sampling and estimation procedures including methods of adjustment for non-response often constitute important research objectives. Data processing issues, such as manual versus machine editing, different approaches to imputation, and the like, also call for exploration.

8.38. The extensive needs for methodological research and development often place a strain on statistical resources, perhaps even more in terms of technical personnel than of money. As a result, there is sometimes a tendency to assign a lower priority to this function, to be accomplished when and if time and money are left over from the operational programme. This is an unfortunate approach as an adequate research and development pro-

gramme can pay important dividends not only from the standpoint of quality but also in efficiency of operations. In other words, such a programme can eventually more than pay for itself.

8.39. One way of financing research is to place a modest proportionate levy on each statistical budget to be devoted to this purpose. Even if this means some small retrenchment in programme size, the potential gains in quality from a research effort and the consequent reduction in non-sampling errors can eventually produce a superior overall product.

8.40. Assignment of needed personnel may be a more difficult matter. Unless technicians are specifically relieved of other responsibilities for a given period to work on research, it is likely never to be accomplished. Almost inevitably, where an attempt is made to work simultaneously on research and current operations, the crises certain to develop in the latter will swallow up the entire time. Some alternation of personnel into a research unit may be the most feasible arrangement where overall technical resources are strictly limited.



**Part Two**

**ISSUES IN SURVEY CONTENT, DESIGN AND OPERATIONS**



## IX. DEMOGRAPHIC CHARACTERISTICS AND TOPICS

9.1. The size, structure, distribution and demographic characteristics of the population and changes therein have a fundamental bearing on the processes of socio-economic development. Up-to-date information on population and on factors affecting population dynamics is essential for planning, formulating and monitoring development policies and programmes. General demographic information provides a context and structure for the organization and interpretation of all other statistical information about a population.

9.2. Practically every country in the world has conducted one or more population censuses. Many countries have also instituted civil or vital registration systems to monitor population changes. However, while the information obtained from a census is extensive and permits detailed breakdown by small areas, censuses can be conducted only at relatively long intervals and can only provide information of rather limited variety due to the size of the operation involved. At the same time, the establishment of registration systems with good coverage of vital events has proved to be difficult in many developing countries. Hence, in conjunction with these sources, household sample surveys are a widely used mechanism for obtaining demographic information. During the past two decades a number of household surveys specializing in demographic topics have been carried out in many countries. For example, according to an inventory compiled by Baum and others (39, 40, 41, 42), at least 175 large-scale demographic surveys were conducted in developing countries between 1960 and 1973. During the second half of the 1970s, about 45 developing countries participated in the World Fertility Survey programme. In addition, demographic topics are often covered in other household surveys, for which no comprehensive review has been made.

9.3. Naturally, household surveys can vary greatly in the detail and complexity of demographic information collected. At one extreme, practically every household survey or survey round, whether concerned with labour force, income and expenditure, social conditions or some other topics, is likely to include some basic information on demographic characteristics, such as age and sex of the population in households. At the other extreme, one can have multi-round or longitudinal surveys focusing on specific demographic phenomena in detail. Section A of this chapter provides a general description of the type of information which can be, and has been, collected in specialized demographic surveys of various types. For this purpose the various topics have been grouped into five major fields:

- (a) General demographic characteristics, such as age and sex composition of the population;
- (b) Fertility and factors affecting fertility;
- (c) Mortality, including infant, child and adult mortality;
- (d) Migration and mobility;
- (e) Relevant socio-economic background characteristics.

Section B examines important conceptual and definitional issues, and section C discusses issues of survey design which have special relevance to obtaining data on demographic topics. These sections are confined to a rather brief review of these issues where they appear specifically relevant to the substantive topic under discussion. A more general and detailed treatment of conceptual and methodological issues is available in other United Nations publications, in particular the *Principles and Recommendations for Population and Housing Censuses* (77), and in part one, especially chapters I and III, of the present *Handbook*. In addition, selected issues of survey design and procedures will be given more elaborate treatment in technical studies being planned to complement the *Handbook*, which are being developed in the context of the National Household Survey Capability Programme (see the preface above).

9.4. Sections D and E provide, respectively, a brief review of data processing and tabulation aspects and of evaluation and analysis of demographic data from household surveys. It should be emphasized that in the present chapter no attempt is made to provide an exposition of the numerous direct and indirect analytic techniques which have been developed. For this, the interested reader may refer to specialized publications, such as that prepared by Hill and others (230) and other references noted in the text.

### A. USES AND SCOPE OF DEMOGRAPHIC DATA

#### 1. General demographic characteristics

9.5. Composition by age and sex and geographical distribution are among the most basic data describing any population or group in the population. These provide a context within which all other information, such as that on labour force, income, education, health, nutrition, migration, fertility and mortality, can be placed. These data are essential for planning and monitoring any development programme. For example, age-sex distribution of children, classified by geographical location and possibly other socio-economic characteristics, is required for educational planning. The requirements for school buildings, teachers and other educational facilities can be estimated only on the basis of numbers and distribution of population at the school-going ages. The distribution of educational attainment or literacy classified by age and sex can indicate the stock of educated persons in the country and the progress of the educational system and of literacy campaigns, and illuminate important social issues, such as disparities between males and females in educational opportunities and attainment. The same is true of policies and programmes in many other areas, such as health and employment.

9.6. In addition to age and sex, other basic demographic characteristics are marital status and household

and family composition. These latter are not only biological characteristics but also reflect socio-economic, legal, cultural and often religious circumstances (201). In most developing countries, the household or family is the centre not only of socio-cultural activity but also of much of economic production and consumption. Households rather than individuals are often the more appropriate target for many development, educational and information programmes.

9.7. Hence, the basic demographic items collected in most censuses and household surveys, including surveys not specifically focused on demographic variables, are:

- (a) Name and relationship to the head of household;
- (b) Sex;
- (c) Age or date of birth;
- (d) Marital status.

## 2. Fertility

9.8. Fertility, mortality and migration are the components determining changes in size, composition and distribution of the population. With the relatively widespread decline in levels of mortality over recent decades, information on the levels, trends, differentials and determinants of fertility has become particularly important for planners and policy-makers. Countries increasingly recognize population changes, and more specifically levels of fertility, as essential factors influencing the whole spectrum of socio-economic development. Most Governments have formulated explicit population policies and promote family planning programmes, often within the context of promotion of family health and welfare.

9.9. Household surveys can be used to collect a wide range of information on the basis of which current and past levels of fertility, fertility trends and its determinants may be estimated. As will be described later, a variety of survey arrangements and analytic procedures have been developed for this purpose. The main fertility and fertility-related items collected through household surveys are as follows:

(a) Basic items included in most population censuses and surveys are the number of children born alive (and number still living) to women in the population. Classified by the mother's age, these items provide information on "cumulative" or lifetime fertility and on "traditional" levels of fertility and family size on the basis of reported information by older women. Under certain restricted circumstances such information may also be used to estimate levels of current fertility;

(b) In a household survey, data on current fertility may be obtained more directly from retrospective questions on: births occurring in a specified recent time period (during the past 12 or 24 months, say, from the date of the last birth); a detailed history of lifetime fertility (as, for example, in surveys conducted under the World Fertility Survey project); changes in the composition of each household by repeated observations over a period of time. Detailed histories of lifetime fertility can also provide information on fertility levels over several years in the immediate past, and hence on trends in fertility;

(c) In addition, estimates of fertility based on the above approaches may be adjusted for deficiencies by sup-

plementing the retrospective information by additional data collection operations as, for example, by independent registration of vital events. Adjustments can often also be made by using various methods of demographic analysis;

(d) In many societies childbearing takes place largely within the context of marriage, whether legal, religious or common law. Apart from data on marital status, a demographic survey may also collect information on age at first marriage, duration of marriage, or even full marriage histories involving dates of beginning and termination and outcome of past marriages. More elaborate data may be included in societies with more complicated marriage patterns, such as polygamy or frequently changing or multiple sexual partnerships;

(e) The practice of contraception and other aspects of fertility regulation covered by household surveys have included attitudes towards and knowledge of various traditional and modern methods of contraception; ever-use and use of contraception; availability and use of family planning advice and services; and birth-interval-specific information on factors other than contraception affecting fertility, such as breast-feeding, post-partum amenorrhoea, abstinence and temporary separations within marital union, and incidence of spontaneous and induced abortion.

## 3. Mortality

9.10. Levels and differentials in mortality are generally indicative of levels of living and of socio-economic disparities. Information on mortality rates, particularly among infants and children, is essential for the formulation and monitoring of health and social welfare programmes. As noted earlier, changes in mortality rates strongly affect the pace of population growth in most developing countries, and it is important to monitor these rates periodically.

9.11. Data on mortality collected through household surveys have included the following:

(a) In many developing countries the only source of information on infant and child mortality has been simple questions on lifetime fertility (children ever born) and proportion of children dead for each age group of mothers. These proportions have been converted into estimates of life-table probabilities of dying by specified ages, such as one, two and five years, using indirect estimation techniques;

(b) Procedures have also been developed to obtain indirect estimations of adult mortality on the basis of information on the survivorship of parents and spouse. The indirect questions are considered rather simple in principle and are often included in population censuses and large-scale, single-round demographic surveys. Their use depends upon certain assumptions regarding demographic patterns and trends;

(c) For direct estimation of mortality rates it is necessary to record deaths (classified by age at death, sex and the like) during a specified period of time, such as 12 or 24 months. In single-round surveys, this takes the form of retrospective questioning about deaths in the household. For infant and child mortality estimation, the information may be collected in the form of retrospective birth histories of mothers, in which date of birth, sex, and survivorship status of all children born alive are recorded. In a less elaborate form, such information may be obtained only for

the last or most recent live birth to estimate current levels of infant mortality;

(d) In multi-round surveys, one may obtain the retrospective information several times during the period from the same or a different sample of households. An alternative approach is to record population changes in the same household over a period of time;

(e) As in the case of fertility, estimates of mortality based on the above approaches may be adjusted for deficiencies by supplementing the retrospective information by, for example, independent registration of vital events, as in the dual-record (or population growth estimation (PGE) system) discussed in paragraphs 9.92 to 9.95 below;

(f) Some attempts have also been made with varying degrees of success to collect information of cause of death within general socio-demographic surveys using essentially lay (non-medical) interviewers (140).

#### 4. Migration

9.12. In addition to fertility and mortality, the third factor affecting population change in a given area is migration. The movement of population from one area to another affects its age, sex and geographical distribution. One distinguishes between movement within the national boundaries of a country or internal migration and that across national boundaries or international migration. Population movement has been regarded as closely related to social and economic development by many countries, particularly developing countries. Rural-urban migration, for example, has been the primary cause of rapid population growth in urban areas and has created major problems for national and city governments in planning the development of cities. Information on the pattern and reasons of migration from one area to the other is essential to the effort to find solutions to problems caused by such population movements.

9.13. In the study of migration it is very important that a clear definition be established with regard to the area of origin and the area of destination to determine whether a move from one area to the other will be considered as migration. Another important criterion in determining migration is the length of time that a person must stay in the area of destination in order to be considered a migrant.

9.14. Censuses and household surveys are becoming very important sources for migration information. Information on migration which may be obtained through household surveys includes the following:

(a) The most common questions relevant to internal migration included in censuses are: place of birth, place of previous residence, duration of residence and place of residence at a specified date in the past. Based on these, the population in a given area can be classified into migrants and non-migrants (52, 77). The migrants category may then be further subdivided into migration streams from the place of birth or from the place of previous residence. Migration data obtained from censuses are among the most important sources of information, particularly since they can be compiled for smaller geographical areas and are free of sampling error. However, based on the information mentioned above, censuses can only be used to produce very limited tabulations. In particular, migration informa-

tion from the census lacks the subject-matter detail which is required for analysis in policy-oriented research;

(b) A large national household survey may overcome some of the deficiencies mentioned above since, in addition to the migration questions normally asked in the census, more detailed background variables on migrants as well as non-migrants can be collected. Besides the general demographic characteristics, the information collected on migrants may include current employment information (for example, occupation, industry, status, income, hours of work, principal reason for moving and economic activities prior to moving). For non-migrants, additional questions, such as current employment, intention to move and perceptions of opportunities elsewhere, may be included in the survey. Besides migration surveys, these data are also often collected in conjunction with labour force surveys as part of multi-subject socio-economic survey programmes;

(c) In specialized household surveys concentrating on migration it is possible to collect more in-depth information (34). However, such surveys are normally concentrated on small areas or individual communities or a big city and cannot, therefore, be generalized for the whole country. The type of information which can be collected through such a survey is widely varied, depending on the objectives of the survey. For example, a survey can be designed to specifically collect information for measuring selectivity and adaptation of migrants or to give more coverage to economic variables such as wages, self-employment, cash transfers and job prospects. It can also be designed to collect information to facilitate study of movement from a specific area or from one province to the other. Such surveys may also include the recording of a complete life-history matrix of movement of the respondents and investigate further the living conditions at the place of origin as well as the place of destination (34).

#### 5. Socio-economic background characteristics

9.15. In addition to the collection of information related to demographic topics, it is important to supplement such information with information on other socio-economic characteristics of the population. The most important socio-economic characteristics commonly covered in conjunction with demographic topics include: literacy, education, ethnicity, language, economic activities, income, housing conditions and amenities, and socio-economic data at the community level.

9.16. Such characteristics are thought to be associated with fertility, mortality and migration, and therefore are very useful in providing further explanation of levels and trends of these. The level of detail in the collection of these variables depends on how such information will be used in the study of demographic measures. In migration surveys, for example, it may be desirable to collect very detailed information on economic activities and income. In some countries, ethnicity could be a very important factor in the study of fertility differentials.

9.17. It should be noted, however, that while information on socio-economic characteristics can be extremely valuable in enhancing the usefulness of demographic data, a balance must be maintained within any given survey so as to ensure that the amount of background information

collected does not adversely affect the quality of the substantive data which is of primary interest in the survey.

## B. DEMOGRAPHIC CHARACTERISTICS AND CONCEPTUAL ISSUES

9.18. This section discusses issues concerning concepts and definitions of demographic characteristics and how statistics on these can be collected in a household survey. It is very important that the concepts and definitions of certain demographic characteristics be kept consistent or at least comparable to those used in the previous censuses and surveys. The consistent use of concepts and definitions will enable comparisons of those variables and the establishment of trends. Sometimes, however, differences are unavoidable. For example, currently used concepts or definitions may no longer meet certain specialized purposes of the users. In such cases it is necessary to make every effort to provide the users with means to compare the results of the new concepts or definitions with the old ones, at least during the transition period. In practice, when such changes occur both definitions, if possible, should be included in the same questionnaire at least once but preferably several times. For example, if the measurement of migration patterns was made based on the questions of "duration of residence in present province" and "province of previous residence", but now the users require that it be measured based on "province of residence five years ago", then it is recommended that all three questions be included in the survey; otherwise there will be no comparable measure over time.

9.19. The issue of population coverage has been discussed in general in chapter III above. This discussion is elaborated below since coverage of the population is among the main concerns of this chapter. As mentioned in chapter III, an early decision needs to be made whether the survey should include persons in collective living quarters, homeless persons and nomadic populations. In general, it is not advisable to include such populations in the main survey unless technical and financial consequences have been carefully considered. In most countries the proportions of the population in such categories are not significant. However, in countries where there are significant numbers of nomads it is advisable to conduct a special survey covering this particular population group.

9.20. Another principal issue faced by survey planners is whether to use the *de facto* or *de jure* approach in enumeration. Each approach has its advantages and disadvantages. At the national level the estimated total population based on either approach should be approximately the same, but at the subnational level, particularly for the urban areas, the population estimate based on each approach could be slightly different. Differences are primarily caused by temporary visitors and people who are temporarily absent from their place of usual residence during the survey period. Using the *de jure* approach such persons should be enumerated at their place of usual residence and using the *de facto* approach they should be enumerated at the place where they are present during the survey. Some countries may use a combined or comprehensive approach where the enumerator records everyone present on the reference night, as well as the usual residents of the household. In this case, it is necessary to have special codes in order to indicate temporary visitors, usual residents who

are present and absent residents. At the processing stage, persons may be identified as either *de jure* or *de facto* residents. However, the use of the comprehensive approach usually requires the full understanding of the enumerators regarding the identification of "temporary visitors" and "absent residents" in the survey. If there is a lack of understanding on the part of the enumerators, this approach may cause more problems than improvements in the accuracy of the coverage.

9.21. Although application of the above approaches in most cases will result in approximately the same figures, it is advisable to decide at an early stage which approach is to be used. In making the decision the following issues should be considered (98, p. 31): (a) given local conditions, which approach is the easiest to implement in the field, (b) which approach is the most likely to give better accuracy in the data collected, (c) which approach will result in data which are most needed by the user (for example, the urban planners may prefer the *de facto* approach), and (d) which approach has been most used in past censuses and surveys, so that consistency can be maintained. In addition to these considerations, the type of survey may also affect the decision on which approach to use. For example, in a multi-round survey the *de jure* approach will be more advantageous since the usual residents will be more permanent than the present residents. Some countries use both approaches; for practical reasons, persons who have a permanent usual residence are covered by the *de jure* approach and the population without permanent usual residences, such as the homeless or nomadic populations, are covered by the *de facto* approach.

9.22. Concepts and definitions of some demographic characteristics are discussed below. Most of these are also described in *Principles and Recommendations for Population and Housing Censuses* (77, paras. 2.18-2.219).

### 1. General demographic characteristics

9.23. General demographic characteristics here mean those characteristics which are considered to have a general importance for various purposes in the demographic investigation. They may also be referred to as "basic" demographic characteristics. Items considered to be general demographic characteristics include relationship, sex, age and marital status.

#### (a) Relationship

9.24. Relationship to the head or to the reference member of a household is normally asked at the beginning of an interview. Although this is not a demographic characteristic, it provides very important information when used in conjunction with information on demographic characteristics such as sex, age and marital status. In addition, the relationship question is also very useful for checking completeness in the recording of household members during the interview and for checking internal consistency during the data editing stage. The question is normally begun by identifying the head of household or any member to whom the relationship of other members of household will be determined. The head of household is defined as the "person who is acknowledged as such by

the other members” and usually “the person who has the primary authority and responsibility for household affairs, and, in the majority of cases, is its chief economic support” (77, paras. 2.65–2.66). Once the head of household is identified, the other members will be asked their relationship to the head of household, such as wife, son, daughter, father, mother, brother, son, or in-law. Another method is to utilize simple family relations and the line number of the previously listed members. For example, if No. 1 is head, No. 2 is wife of No. 1, No. 3 is son of 1 and 2, No. 4 is wife of 3, and so on. This latter method has several advantages over the first one. It provides more possibilities for consistency checking and for more detailed linking of one member to another, for example, between a mother and her children.

9.25. Data on relationship will also be useful for the study of various types of households and families. According to the United Nations recommendations, a household is defined as “person or persons who have made arrangements, individually or in groups, for providing themselves with food or other essentials for living (77, para. 1.223). As in population censuses, although the household is the unit of enumeration, it is also of interest to study the concept of “family” within the household. “The family within the household is defined as those members of the household who are related, to a specified degree, through blood, adoption or marriage” (77, para. 2.76). The primary aspect of the family that should be considered is the conjugal family nucleus (77, para. 2.79). “A family nucleus consists of one of the following types (each of which must consist of persons living in the same household): (a) a married couple without children, (b) a married couple with one or more never-married children, (c) a father with one or more never-married children or (d) a mother with one or more never-married children. Couples living in consensual unions should be regarded as married couples” (77, para. 2.80).

9.26. In general, there are two types of household: (a) one-person households and (b) multi-person households. The multi-person household can be reclassified based on information on members’ relationships to the head or other reference member of the household, supplemented where necessary by information on name and marital status. Types of multi-person households can be distinguished as follows:

(a) “Nuclear household”, defined as a household consisting entirely of a single family nucleus;

(b) Extended household, defined as a household consisting of a single family nucleus with other persons related to the nucleus, two or more family nuclei related to each other, with or without additional related persons, or two or more related persons who do not comprise a family nucleus; or

(c) Composite household, defined as any household which includes any unrelated person. However, the recommendations also state that “countries may find it appropriate to modify the classification according to national circumstances. For example, in countries where almost all households contain only one family nucleus at most, the distinction between nuclear, extended and composite households may be applied only to households containing one nucleus or no nucleus; multi-nuclear households may be shown as an additional category without any further classifications by type” (77, para. 2.85).

## (b) *Sex and age*

9.27. As mentioned earlier, sex and age data are the most frequent characteristics cross-classified with other characteristics and used as the basis of various analyses. Therefore, it is of vital importance that these data be collected with minimal error. Information on sex can normally be obtained without difficulty. Questions on age, however, may be subject to different interpretations in different cultures. The United Nations recommendations state that age is the interval of time between the date of birth and the reference date used in the enumeration expressed in completed years (77, para. 2.88). In practice, age at last birthday is recorded as the respondent’s age. If possible, the date of birth should be asked.

9.28. However, in many developing countries exact knowledge of one’s age is not important and registration of births is uncommon, so it is very difficult to obtain information on age. Normally, respondents have some knowledge about their age, but it may be only a rough approximation or even non-numeric. It is also very common for one person to become the main respondent and to supply all the information on all the members of the household. Experience shows that proxy respondents contribute a large part of age misreporting. The problem is largely caused by ignorance concerning the respondent’s age as well as the age of the other household members (226); if a person thinks that his own age is not important, someone else’s age is even less important. Besides the respondents’ ignorance, in many situations the enumerators themselves can be the source of age misreporting. Enumerators often make an uninformed judgement regarding the respondent’s age. Although the respondent has already told the enumerator his correct age, many respondents in less literate societies agree to whatever the enumerator says. The ideal situation is where the birth date (month and year) is known, but in many developing countries where levels of literacy are still relatively low the population may not take note of birthdays, or if they do, sometimes only in local calendar systems which may not be easily convertible into the “western” solar calendar. It is also very common in countries where the population consists of different ethnic groups for each group to use a different calendar system to count their ages. In this situation the interviewers should be prepared to convert the different calendar systems in each society into the standard calendar system. If a conversion formula can be developed to convert each calendar system to the solar system, it is better if the conversion can be carried out as part of the computer editing work (418, 77).

9.29. When it is anticipated that the interviewers will be expected to estimate the age of a large proportion of the respondents, it is necessary that the interviewers be given sufficient training and be equipped with a calendar of historical events of both national and local significance to be used in probing questions to ascertain the best estimate of the true ages. It is advisable that the questionnaire be so designed that it is possible to indicate whether the respondent’s age is exact or estimated. Such an indication will be very useful when it comes to analysis and evaluation of the data.

## (c) *Marital status*

9.30. The concept of marital status of individuals may be different from one country to another. The United

Nations recommendations state that "marital status is the personal status of each individual in relation to the marriage laws or customs of the country. The categories of marital status to be identified are at least: (a) single, i.e. never married; (b) married; (c) widowed and not remarried; (d) divorced and not remarried; and (e) married but separated" (77, para. 2.97).

9.31. It is important to clarify the precise meaning of each of the above categories, taking into account local customs, situations and practices. It is also stated in the United Nations recommendations that in countries where contractual marriages at a very young age are common but the couples do not live as man and wife until they reach a certain age, a separate category may be required. Otherwise they should be considered as married only after they have been living as man and wife. Also, in countries where extra-legal unions (also known as customary, consensual or *de facto* union) are common and legal under the customary law, those persons should be classified in a separate category or otherwise considered as "married". In countries where annulled marriages are numerous, an additional category should be used. Otherwise the individual should be classified according to his or her marital status before the annulment took place. The difference between some categories is sometimes vague, especially between the legal and *de facto* status—for example, persons who may have lived together and are recognized by the community as man and wife although formally they are not married, or persons who are not legally divorced but in reality have permanently separated. In such a case it is important that local customs be followed, and, if necessary, further breakdowns in addition to those of the international recommendation mentioned above should be made. If national practice should differ from the international recommendations, it is advisable to give a clear explanation in the tabulations and provide rules for equivalence.

9.32. Marital status is considered to be the most important characteristic affecting fertility and to a certain extent it also affects other population variables, such as mortality and migration, as well as education and employment. Data on the number of married population, particularly females in certain age groups, are very important data for the study of fertility. In the estimation of fertility, the basic data required are the distribution of ever-married women by age, supplemented by data on the number of children ever born.

## 2. Fertility

9.33. Items for fertility estimation to be discussed here are age at marriage and duration of marriage, children born alive and children still living, and live births within 12 months preceding the survey.

### (a) Age at marriage and duration of marriage

9.34. Information on age at marriage and/or duration of marriage is often collected for the purpose of studying fertility. Age at marriage is the age of the woman, in completed years, at the time when the marriage took place. Where it is considered appropriate, *de facto* unions should be included among marriages. Information on age at marriage can be obtained by asking directly the age of the woman at the time of marriage or by obtaining the date of marriage. In the event that the date of marriage can be

given (even if only the year), the determination of the age at marriage can be done during the processing stage. It is important to note that in some countries where contractual marriages are common at an early age, the age at marriage is the age of the woman when she began to live with her husband. Duration of marriage, which is the interval between the date of marriage and the reference date of the survey or the date of the dissolution of the marriage prior to the survey, is expressed in completed years. The information can be obtained by asking directly how long the woman has been married or by asking the date of marriage (or if relevant, the date of dissolution).

9.35. The questions on age at marriage and duration of marriage are normally related to women in their first marriage, and those widowed, divorced or separated who have had only one marriage. However, in a specialized demographic survey it is common for questions on the number of marriages to be asked of women who have been married more than once, followed by questions on the duration of each marriage or the dates of each marriage and the dates of each dissolution of marriage. In this manner any confusion on the time reference of either "date of marriage" or "duration of marriage" may be overcome.

### (b) Children born alive and children living

9.36. Information on the number of children born alive and the number of children still living is collected from women above a specified age. The number of children born alive should include all children born alive during the lifetime of the woman up to the survey date, whether born during the present or a prior marriage. The question should be directed to all women above the specified certain age (ranging from 12 to 15 years) regardless of marital status. The United Nations recommendation states that "the number recorded should comprise all live born children, whether born in or out of marriage, whether born out of the present or prior marriages or *de facto* unions and regardless of whether they are living or dead at the time of enumeration or where they may be living" (77, para. 2.124). This type of question may not be possible in some countries, but in any event, it should be directed to all ever-married women. Children still living include all the children who have been born alive to the woman and are now still living. It should, therefore, exclude foetal deaths and step- or adopted children.

9.37. Information on the number of children born alive and still living is normally collected through a sequence of questions on:

- (a) The number of children ever born alive;
- (b) The number of children living with the mother;
- (c) The number of children living away;
- (d) The number of children dead;
- (e) The total number of children still living.

For the purpose of the study of mortality it may be required that the number of children of each sex be recorded separately (38). It is also advisable that the questions be asked directly of the woman concerned in order to obtain the most accurate responses. Using the above sequence of questions it is possible to do an internal check in the field since  $(b) + (c) = (e)$  and  $(d) + (e) = (a)$ . If there is any discrepancy, some probing questions should be asked to obtain the correct responses.

9.38. In the case of a specialized fertility survey, where it is possible to collect more detailed information, it is recommended that the questions be expanded to cover the whole maternity history of the woman. The information collected should include:

- (a) For each live birth: sex, date of birth, current age, if no longer living, age at death, whether or not still living at home and whether single or multiple birth;
- (b) Incidence of infant and child mortality;
- (c) Incidence of pregnancy wastage;
- (d) Prevalence and duration of lactation (at least for the last two children);
- (e) Proportion of women currently pregnant, with expected birth date and sex preference.

9.39. The above information should be collected as accurately as possible, particularly the data on all pregnancies and births of the woman in her lifetime. Experience shows that the use of female interviewers will improve the respondent's co-operation considerably, as well as enhance the possibility of obtaining more accurate information. Further detailed discussions on these topics may be found in the World Fertility Survey publications (38).

(c) *Live births within 12 months preceding the survey*

9.40. Information on live births occurring to women within the last 12 months preceding the survey, if collected with reasonable accuracy, may be used to measure current fertility. However, due to errors in dating and omissions, this question alone cannot reliably produce an estimate of current fertility.

9.41. The question should be asked directly of women above a specified age and care should be taken to ensure accuracy, particularly with regard to the time of the births. It is very common in collecting this information for births occurring more than a year ago to be included or births occurring almost a year ago to be excluded. In addition, it is also possible for a woman to have had two births during the past 12 months, particularly if the youngest child is less than two months old.

9.42. Another problem which often arises is that the proportion of women who have given birth during the last 12 months preceding the survey is relatively small and there is a tendency for enumerators not to ask this question to all eligible women but only to those whom the enumerators think may have had a child during the last 12 months. In order to overcome this problem, experience in some countries shows that information on births occurring during 12 months preceding the survey can better be approximated through the question on the data of the last live birth since in this case an answer must be given for every woman who has had at least one live birth in her lifetime. However, this last question will not yield the number of children born during the 12-month period preceding the survey but only the number of women who have had their last live birth during the last 12 months. This information can be calculated during the tabulation stage.

### 3. Mortality

9.43. Items for the estimation of mortality which will be discussed here are deaths within 12 or 24 months preceding the survey and orphanhood and widowhood. Data

on children ever born and children surviving discussed above (paras. 9.36-9.39) in connection with the estimation of fertility are also used to estimate infant and child mortality (230). The method is also briefly described below (paras. 9.130-9.131).

(a) *Deaths within 12 or 24 months preceding the survey*

9.44. There are two types of questions which are usually used: (a) deaths of infants born within 12 months preceding the survey, for the measurement of infant mortality, and (b) deaths of members of the household occurring within 24 months preceding the survey, which is primarily used to derive adult mortality. Experience shows that neither question has given satisfactory data, and as in the case of births the results also suffer from dating errors and omissions errors, as well as low incidence in the sample. The first question is normally asked in combination with births during 12 months preceding the survey. The second question will produce useful results if it can be assumed that the completeness of the reporting of deaths is the same for all ages. If so, an analytical technique has been developed to adjust the observed death rates to obtain a better estimate of true mortality conditions (230). In both cases the data collected should include sex, age and month of occurrence.

(b) *Orphanhood and widowhood*

9.45. Information on maternal and/or paternal orphanhood, which is concerned with the survival of own mother and/or father, and on widowhood, which is concerned with the survival of first spouse of the respondent, can often be collected through household surveys. This information will be useful in the estimation of adult mortality. Estimation of adult mortality through household surveys has not produced satisfactory results except through multi-round surveys or dual record systems, but if these two types of information can be collected with sufficient accuracy, they can be used as an alternative method for obtaining adult mortality estimates (230).

9.46. For orphanhood data, the information to be collected is whether the respondent's mother (and/or father) is still alive. It should be made clear to the interviewers that the mother (father) of concern is the biological mother (father) of the respondent. In a society where adoptions are very common it quite often happens that the respondents do not even know if they are adopted. Even if they know, in many situations they do not want any other person to know they are adopted. Additionally, it is necessary that one mother (father) be referred to only once by a respondent. In order to avoid more than one reference for those who have more than one child, the first question should be whether the respondent is the oldest living child of his (her) mother (and/or father) (287).

9.47. The widowhood information is collected by asking whether the respondent's first spouse is still alive. In addition to this information, the estimation technique also requires the age at marriage of the respondent's first spouse. However, the age at marriage of first spouse may be replaced by the average age at marriage of the population (345). Appropriate tabulations and some discussion on the analysis of this topic are given in section D below and in (230).

#### 4. Migration

9.48. Migration characteristics which are discussed below include: place of birth, duration of residence and place of previous residence, and place of residence at a specified date in the past.

##### (a) Place of birth

9.49. Information on place of birth is often collected in a household survey for the purpose of studying lifetime migration. For persons who were born within the country, at the outset, it is necessary to determine the level of subnational administrative division which will be used as a defined place of residence. The same definition of subnational administrative division should also be used for the current place of residence, which will determine whether a move from one place to another is classified as changing the place of residence. The level of subnational administrative division to be used should be determined by the individual country and, depending on the level of detail of the information required, it might be a state, province, county, district, village, town or city.

9.50. Place of birth is defined as the place of usual residence of the respondent's mother at the time of his or her birth. It should be made clear that for the purpose of most studies the information required is not the exact place of birth of the respondent but rather the usual residence of the mother. It is not unusual for a woman to give birth at a place other than her usual place of residence, often due to the availability of maternal assistance.

9.51. Persons who were born outside the country should be identified separately, in particular when there is a significant number of foreign-born population. It may be necessary to assign different codes for different countries (or selected countries) or at least for different continents. However, if the number of foreign-born population is very small then detailed classification of foreign-born population may be meaningless. In this case, perhaps one code for all foreign-born population is sufficient. The alternative would be to carry out a specialized survey designed to oversample international migrants so that more detailed immigration information can be collected (73).

##### (b) Duration of residence and place of previous residence

9.52. The information on duration of residence is normally collected at the same time as that on place of previous residence because separately this information has only limited value. The duration of residence item provides information on the length of time during which the respondent has lived in the present place of residence (subnational administrative division defined for the survey), measured in completed years up to the date of the survey. The place of previous residence item provides information on the place where the respondent resided prior to migrating to the present place of residence.

9.53. From the above information it is possible to estimate the number of immigrants to a certain administrative division from other parts of the country, according to the year of migration. However, the data will only indicate the last move of the respondent to the present administrative area regardless of when the move was made and

will not provide information on any previous moves that may have taken place.

##### (c) Place of residence at a specified date in the past

9.54. Another variable which is useful in the study of migration is the place of residence at a specified date in the past. The place of residence of people at a point in time in the past, normally one or five years earlier, is recorded; but they are not asked where they were from that point in time until they moved to the present place of residence. These data provide information on the number of people who changed residence from one administrative division to another within a specified time in the past (one or five years) either directly or indirectly. It is also useful to code the localities of origin and destination as rural or urban areas, so that rural-urban movements can be tabulated.

#### 5. Socio-economic background characteristics

9.55. As discussed earlier, some socio-economic background characteristics are often collected in household surveys specializing in demographic topics. Education and literacy, economic characteristics and urban and rural classification are discussed briefly below.

##### (a) Education and literacy

9.56. Education and literacy topics are discussed in detail in chapter XV below. In the present chapter, the collection of education and literacy data as background information for demographic topics will be discussed briefly. The literacy question is normally asked directly of the respondent with the aim of distinguishing those who are literate and those who are illiterate. The United Nations Educational, Scientific and Cultural Organization (UNESCO) defines as literate a person "who can, with understanding, both read and write a short, simple statement on his or her everyday life" (124). However, experience shows that a direct question to the respondent with possible answers as "yes" or "no" does not always give reliable results. The question should be accompanied by a prompt card with a test sentence for the respondent to read. Such a test is not easy to implement, and in addition, if, during the interview, other household members are present, the quality of subsequent interviews may be biased unless the interviewers are equipped with several tests.

9.57. Information can be collected on three different aspects of education, school attendance, educational attainment and educational qualifications, as follows:

(a) School attendance refers to whether the respondent is currently attending school. This question is normally concerned with persons of school-going age, that is, from the usual age for entrance into the first level of school to 24 years of age inclusive. The purpose of this question is to obtain information on current enrolment and to determine the proportion of the population in the school-going age attending school. This item is, therefore, of little value as background information for demographic topics;

(b) Educational attainment refers to the highest level or grade completed within the most advanced level at-

tended in the educational system of the country, such as sixth grade, eleventh grade or two years of college. This information is very useful as a background characteristic, particularly for fertility and migration topics. Educational attainment is preferably asked of all persons at or beyond the usual age of entrance into the regular school system, but may be limited to persons aged 15 years and over, or to those not currently attending school. In its most useful form, the question refers to "the highest grade successfully completed" rather than attended. Error due to one year overstatement is common, but this error will be insignificant when the analysis is based on broad groupings into educational levels. As far as possible, the classification of grades into levels should be designed to be consistent with the International Standard Classification of Education (ISCED) issued by UNESCO (118);

(c) Educational qualifications normally refer to the type of qualifications, for example, degrees, diplomas or certificates, that the respondent has acquired. In some countries a diploma or certificate is given for each level of the normal school system, such as primary school (first level), junior high school (second level, first stage), senior high school (second level, second stage), and so on. As a background characteristic for demographic topics, this information is not always useful, since in many developing countries the possession of such qualifications is rare, and in some cases the groupings are too broad.

(b) *Economic characteristics*

9.58. Detailed discussion of this topic is provided in chapters X and XI below. The items normally included in household surveys are:

(a) *Activity status.* Whether a person is economically active. A person is considered economically active if he or she during the time reference period chosen for the investigation supplies labour for the production of economic goods and services (77, para. 2.191 and 30). This includes those who are employed and unemployed. The not economically active include homemakers, students and retired persons;

(b) *Status in employment.* Whether the person is an employer, employee, own-account worker or unpaid family worker;

(c) *Occupation.* The kind of work done during the time reference period. The data are normally collected by obtaining as clear a description as possible of the work done and later coding the results in accordance with the *International Standard Classification of Occupation (ISCO)* issued by the International Labour Office (31);

(d) *Industry.* The type of economic activity of the establishment in which an economically active person worked during the time reference period, for example, agriculture, manufacturing or trade. As in the case of occupation, the data on industry should be coded after collection, in this case in accordance with the *International Standard Industrial Classification of All Economic Activities (ISIC)* issued by the United Nations (69).

9.59. Other information which may be significant is hours of work during the reference period, and some countries have attempted to obtain information which may be used as a proxy for income, since information on income

is known to be very difficult to collect, particularly in developing countries. Such proxies might consist of a rough estimate of monthly expenditure, ownership of important durable goods and the like.

(c) *Urban and rural*

9.60. The classification of areas or localities into urban and rural is particularly important in the developing countries. However, due to differences in national characteristics no international recommendations have been developed for use in all countries. The classification of all areas in the country into urban and rural is normally carried out during the implementation of a population census.

9.61. The main purpose of the classification is to identify the population which live in these two distinct types of areas as their characteristics are usually significantly different, particularly in their ways of life, social and economic conditions and demographic behaviour. These differences are generally more apparent in the developing countries than in the developed countries. However, due to difficulties in the classification of areas, many developing countries base their classification on administrative divisions which in reality may not totally reflect these differences.

9.62. In more industrialized countries where the differences in characteristics between urban and rural population may be less significant, the distinction is often made based on the degree of concentration of population in areas or localities. Urban centres are characterized by high density of population.

9.63. In developing countries, however, the density of population in a given locality may not necessarily reflect the degree of urbanism of that locality. In many developing countries, where agriculture is the predominant occupation in rural areas, the distinction between urban and rural areas can be made through the combined use of three characteristics: (a) density of population, (b) proportions of the population engaged in non-agricultural activities, and (c) the availability of urban facilities, such as access to health services, electricity, running water and public transport.

9.64. Although this combination approach may be ideal, there are still many problems in its use because in many developing countries even the density of population for each locality is not easy to determine, either due to unclear boundaries of the localities or to unavailability of population data prior to the survey. As a result, the proportion of population engaged in non-agricultural activities in each locality is not available either. Another problem is how to combine the three variables. The definition should be made as simple as possible so that it can be implemented easily without too much variation. In Indonesia, where such a procedure has been used, the collection of the required information was combined with the census activities. The combination of the three variables was done by determining the cut-off points for each variable and then using simple addition.

9.65. Whatever definitions are used for determining the urban and rural areas in a survey, it is recommended that consistency be maintained with those used in the last census and other surveys so that the data will be comparable.

## C. SOME DESIGN ISSUES IN HOUSEHOLD SURVEYS COVERING DEMOGRAPHIC TOPICS

9.66. General aspects of survey design have been discussed in chapters I and III above. In addition, an in-depth review of issues relating to the quality of survey data has been undertaken for the United Nations study, *Non-Sampling Errors in Household Surveys: Sources, Assessment and Control* (80), developed in the context of the National Household Survey Capability Programme. The issues raised in the above documentation are relevant to all surveys, including demographic surveys. This section highlights some issues of design and data quality which are specially relevant to household surveys collecting data on demographic topics.

### 1. Continuing programmes of household surveys

9.67. There is an increasing emphasis in developing countries on undertaking household surveys as continuing programmes rather than individual surveys in isolation. A continuing programme implies that the various surveys undertaken utilize common infrastructure facilities, such as a permanent field staff and sampling arrangements, and that these are substantively integrated to various degrees. Continuity and integration can have a profound effect on the economics of household survey operations and on considerations involved in the choice of appropriate survey design and procedures. There are numerous advantages, both substantive and economic, in an integrated and planned approach to survey taking. Some of these of special relevance to demographic surveys may be noted here.

9.68. First, the collection of information on general demographic characteristics of the population enumerated in households is almost always an essential component of any household survey programme. This is because basic demographic data provide the context within which all other statistical data can be placed. Furthermore, the linkage of data across a number of surveys in the programme provides an opportunity for the accumulation of demographic data collected as a part of those surveys, and hence for gradually building up a more comprehensive and up-to-date body of information on the population.

9.69. Secondly, it has often been found that data on many demographic topics, in particular data on vital events, are better obtained in multi-round or repeated interview surveys (and possibly with matching of events from different sources), than in single-round retrospective surveys. (A description of the various data collection arrangements is given in subsection 3 below). However, a serious limitation of multi-round surveys, and especially of systems involving matching of micro-level data from different sources, has been the substantially higher costs usually involved. Developed as parts of a continuing programme of household surveys using a permanent survey machinery, these alternative approaches to single-round inquiries are likely to become more economical and feasible.

9.70. Thirdly, household surveys collecting demographic information on relatively rare vital events normally require large sample sizes, at least compared with, for example, detailed surveys on income and expenditure. Linking of large-scale demographic surveys with small-scale specialized surveys in other fields in a continuing

programme provides opportunities for using two-phase sampling schemes and hence for sharing costs between surveys. In certain circumstances, valuable demographic information may be collected almost as a by-product of the listing operation for sample selection for other surveys.

### 2. Sampling and non-sampling errors

9.71. As discussed in chapter III above, errors in survey data may be divided into two broad types: sampling errors and non-sampling errors. Sampling error arises from the fact that the survey is confined to a sample rather than covering the entire population, and is inherent in the very process of statistical estimation from the sample for the population. There are numerous other sources of errors, for example imperfect sample implementation, shortcomings in the sampling frame, response errors and processing errors. These are collectively termed non-sampling errors.

9.72. Though in many circumstances the contribution of non-sampling errors to the total error exceeds the contribution of the sampling errors, it is necessary to pay due attention to both types of errors. Perhaps more than any other field, sampling and non-sampling errors for demographic variables have been studied in a number of situations, and a few general issues relevant to the present context are summarized below.

#### (a) Sampling errors

9.73. As noted earlier, it has been the general experience that surveys aiming to obtain information on relatively rare vital events require relatively large sample sizes. Some 10,000 to 20,000 households, or say five times as many individuals, has been the usually recommended sample size per major reporting domain. It should be emphasized that the level of sampling error will be affected by the level of detail in which the survey data are to be classified, that is, the number of individual cells in cross-tabulations. For example, assume that it is necessary to obtain the distribution of the female population in single years of age according to the number of children ever born alive in each province or state. In this case the number of cells to be estimated is 35 single years of age, times the number of children, say 10, times the number of provinces, states, or some other subnational breakdown. Each cell will be represented by a subgroup of population. If each subgroup is too small, then the estimate will be subject to very high random fluctuations and therefore the data will be of little value.

9.74. This consideration is particularly important in the present context, since in addition to the usual cross-classifications of the data by various geographical and socio-economic categories necessary in any survey, demographic analysis requires careful control of (and hence classification by) "compositional" variables such as age, sex and parity.

9.75. Apart from the sample size and the detail of cross-classification, the magnitude of the sampling error depends upon the structure of the sample design. The two main factors determining the efficiency of a design are (a) the cluster sizes involved, that is, the degree to which the units enumerated are clustered in the sample, and (b) the relative homogeneity of units within clusters. The latter is

usually measured by the "intra-class correlation" known as *roh* (see chapter IV above). For a given sample design and cluster size, the magnitude of *roh* determines the magnitude by which the sampling error of a survey estimate is increased due to departure of the actual design from a simple random sample of ultimate units. The value of *roh* is expected to vary from one variable to another, depending on how homogeneous units within a cluster are on a particular variable. Fortunately, *roh* values for many demographic variables (such as fertility and mortality, though usually not for migration) tend to be small compared to those for other variables in, say, socio-economic and agricultural surveys. The implication is that often one is able to use more heavily clustered samples in demographic surveys.

9.76. Studies in Africa suggest that for the collection of vital rates, that is births and deaths, the cluster size should ideally be between 200 to 400 persons (98). A study in the United Republic of Cameroon (416) using data from 1960 through 1965 shows that the average values of *roh* for births is around .001 and for deaths is between .002 and .003. Another study (439), using the results of the World Fertility Survey, presented median values of *roh* for selected groups of variables which, averaged over results from a number of countries, for nuptiality and fertility variables is around .02, for fertility preference variables is around .03 and for contraceptive use variables is around .05. The study also shows that given the particular analytical objectives, some countries in their WFS surveys could have employed more heavily clustered samples (and hence reduced costs for a given sample size) without greatly affecting the magnitude of sampling errors involved. A discussion of the effect of different levels of *rohs*, total samples and cluster sizes to the 95 per cent confidence interval of the estimate of crude birth rates is given in 227, pp. 210-216.

9.77. Obviously, the overall sample size has a significant effect on the reliability of the estimates. As a general rule, when the overall sample is not very large the cluster size should be kept as small as possible, particularly for variables for which the *roh* values, from past experience, are high.

#### (b) *Non-sampling errors*

9.78. To reduce non-sampling error in a survey collecting demographic data, as is true in any survey, it is necessary to have good survey organization, a well-designed questionnaire and a well-organized field operation. The quality of the data collected is also affected by the quality of the interviewers as well as by the co-operation of the respondents. Unlike some other topics, demographic topics often require the collection of retrospective information covering a long period, for example the collection of pregnancy history data in fertility surveys. It is often the case that even if respondents understand the question and are willing to answer it, they themselves do not know the answer. In such situations the ability of the interviewers to estimate the most accurate answer correctly is very important. In this respect, it is necessary to re-emphasize the need to have a well-organized training programme for interviewers and supervisors. This becomes even more important if all the interviewers cannot be trained in a single group or where the training has to be decentralized and conducted in stages due to the size of the country or of the survey operation.

9.79. Systematic errors in age reporting represent probably the best known and best documented type of response errors. They are particularly important because the analysis of data by age group is important to the understanding of most phenomena studied in demographic or indeed in any household survey. Another frequent problem in demographic surveys is to obtain a full record of vital events such as births and deaths. It is often found that some respondents do not report all the relevant events or do not place the events in the time period during which they actually occurred. Among other things, these errors depend upon the type of event and the method by which the data are obtained. For example, if women are asked to report the number of births they have had, certain categories of births are more likely to be omitted than others, among them births occurring a long time ago, and in many cultures female births and births of children (especially girls) who died early in childhood. One may also expect the level of omission to be lower in a relatively small-scale intensive survey than in a large-scale survey or census. Among the numerous studies of response errors in demographic surveys, the reader may find it useful to refer to references 80, 226 and 423.

### 3. *Types of surveys*

9.80. For the purpose of collecting demographic information, in general there are three types of surveys which have been used in many countries. These are single-round surveys, multi-round surveys and dual record systems. The first two types of survey designs are distinguished by the number of interviews conducted with each respondent. The third type of survey can either be single-round or multi-round and is designed to improve the coverage of reporting of vital events (births or deaths) from two independent systems of data collection.

#### (a) *Single-round surveys*

9.81. In a single-round demographic survey each respondent is interviewed only once. The survey may be part of a continuous multi-subject survey programme but it can be considered as a single-round demographic survey if in a particular round the survey is devoted to collecting data on demographic characteristics and vital events.

9.82. When the survey is concerned only with a single subject or issue, a single-round survey becomes a specialized survey. Specialized surveys aim at collecting in-depth information on a particular subject. This type of data collection is important where detailed information is required or where the subject is rather complex. An example of a specialized single-round survey is a fertility survey. Although some countries participated in the World Fertility Survey programme as part of a multi-phase or multi-round survey, a great majority of the countries conducted their surveys as a specialized single-round survey. In fertility surveys, in addition to retrospective questions on vital events (such as number of children dead), questions on fertility history or pregnancy history are also asked.

9.83. Another example of a specialized single-round survey is the detailed migration survey of the type developed by the Economic and Social Commission for Asia and the Pacific (ESCAP) (105). In this model, basic questions on migration characteristics are asked, and very detailed information on migration history from age 15 years to the present is obtained from each respondent. These questions include number of years living in each place of

residence, and for each place of residence further questions concerning economic activities, schooling activities, marital status and the like.

9.84. Except for surveys involving very specialized arrangements, single-round surveys tend to be less expensive and easier to administer than multi-round surveys involving repeated visits to the same households. However, single-round surveys may be subject to response error. Experience shows that these surveys tend to under-report births, deaths and persons temporarily absent. While specialized surveys can improve the quality of information by obtaining more detailed information, they tend to be more expensive.

#### (b) *Multi-round surveys*

9.85. In multi-round surveys each respondent is interviewed at least twice. The second and subsequent visits serve as follow-up visits. At the initial interviews the usual residents of the household are determined and their demographic and other characteristics are recorded. At each follow-up visit, the aim is to obtain information on changes in the composition of the household due to births, deaths, migration, and changes in marital status which have occurred since the previous round.

9.86. There are two possible approaches to carrying out the second and subsequent rounds (98): (a) the interviews are conducted without making reference to the first or previous rounds, but later a case by case match is made with the results of the previous round in order to detect changes and the occurrence of demographic events. This is called "blind follow-up"; (b) the interviews are conducted by checking the list of household members from the previous round and changes and the occurrence of vital events are noted.

9.87. There are certain advantages and disadvantages to each of the above approaches. The first approach is aimed at making the inquiries of a particular round completely independent of those in the previous round and the interviewers do not have any knowledge of the names and household composition in the selected area. The enumerators are requested to list as completely as possible the current members and any vital event occurring in the period since the last round. Although independence is very important in order to keep the enumerators from being influenced by the list of names from the previous round, this approach also has some drawbacks. First of all, if the boundaries are not very clear or addresses are not available, the enumerators may unintentionally be interviewing a household which should not be in the sample. This can only be discovered during the matching operation. Secondly, if a person reported in the first round is unreported by the household during the second round, the enumerator will not be able to probe concerning the status of this person. In both situations a third visit will be necessary in order to reconcile any non-match items as either migration, death, birth or error. Due to these drawbacks the blind follow-up approach is considered to be impractical and very seldom used. The second approach is more commonly used. It is facilitated by using the household listings and the names of members prepared by the enumerators. In this way they are able to make special efforts to account for every member of the household who was present in the previous round and to obtain information about

births, deaths and movement of members of the household since the previous round.

9.88. The collection of data on vital events through multi-round surveys, if correctly implemented, can improve considerably the under-reporting of events which normally occurs in single-round surveys, in particular those events occurring between two consecutive rounds. This improvement is attributed to the fact that household composition from the previous round is checked by the interviewers, including such characteristics as the status of pregnancies, and is matched with the present composition of the household. The interviewers can probe for any unaccounted members so that omissions of vital events which may occur in a single-round survey can be reduced.

9.89. Among the drawbacks of multi-round surveys is the need for more careful supervision. The interviewers can easily state "no change" in household composition without physically visiting the household or can accept the respondent's first reply that there has been "no change" without further probing (98, 227).

9.90. In other words, the main problem is the conscientiousness of the enumerators in carrying out the data collection. There are various safeguards, such as those suggested in the *Manual on Demographic Sample Surveys in Africa* (98). One is that continuous survey rounds tend to provide a self-checking mechanism. An event missed in one round eventually will be mentioned by some members of the household in the future survey and a correction can be made. Another suggestion is to use the rotation of enumerators, so that each one expects his work to be checked by another in the next round. Another precaution is to include a new question in every round so that a visit to the respective household will have to be made in order to fill out the questionnaire. Another suggestion is to ask the enumerator to begin the follow-up interview by making a list of current household members without looking at the list from the previous round (blind listing). He then compares the two lists and further questioning is done based on this comparison. The blind listing should also be returned to the office so that the enumerator will expect it to be checked.

9.91. Care should also be exercised in multi-round surveys when collecting retrospective data where there is an overlapping time reference in two consecutive surveys. There is a danger of recording the same vital events more than once in different rounds of the survey. On the other hand, an overlapping time reference can be used as a check to make sure that no event went unrecorded.

#### (c) *Dual record systems*

9.92. A dual record system is a system of demographic data collection which uses two independent data collection activities with the purpose of recording the same events occurring in a certain period of time and in a defined area, so that events missed by one activity may be picked up by the other. One of the systems is normally a continuous recording of vital events—births, deaths and migration—carried out by the civil registration system. This registration activity may either be an existing one or specifically created for the purpose of the dual record system project. The other system is normally a multi-round household survey where, after the first baseline survey, in

each repeated visit the interviewers ask retrospective questions on vital events occurring since the last visit. After each round, case by case matching is carried out in order to detect: (a) the events recorded by both activities, (b) the events recorded only by registration and (c) the events recorded only in the survey. After the matching procedure has been carried out it is possible to estimate the number of events which may be missed by both activities (263, 265, 377, 441).

9.93. The dual record system has been used in many countries. Although it tends to be very costly, it can nevertheless provide valuable information on the level of completeness of the ongoing civil registration and the degree of content error (for example, age) in both the survey and registration. In addition, from dual registration better estimates of fertility and mortality and to a certain degree migration can be made.

9.94. There are certain conditions which have to be met in carrying out dual record systems. First, the two activities must be completely independent of each other. This requirement is not satisfied in many instances. Secondly, case by case matching must be carried out very carefully. Problems in matching often occur due to recording or response errors and also due to incorrect boundaries. Recording or response errors may cause a failure to match two events or false matching of two different events. The likelihood of these errors occurring also depends on the strictness of the matching rules applied. If very strict rules are applied, this would normally cause the first type of errors to occur more frequently. If the rules are loose then the second type of error is more likely to occur. The dual record system also requires, as far as possible, the verification of all doubtful non-matches by a revisit to the concerned households to obtain clarification. The same procedure is also followed for non-matches which may be caused by incorrect boundaries and which should therefore be classified as out of scope.

9.95. The cost of carrying out a dual record system is influenced not only by the size of sample areas but also by the frequency of repeated visits in the survey and by the cost of the matching operation. For example, the survey may be conducted three times, twice or once a year. The shorter the interval between visits, the more accurate the recording of events can be expected to be. A very serious drawback of this procedure is the relatively high cost, but this will be very much reduced if there is already in existence an ongoing civil registration system so that the additional cost required is only for the survey and the matching activities.

## D. DATA PROCESSING AND TABULATION

### 1. Data processing

9.96. The processing of demographic data collected through household surveys will in general be similar to that for other topics, and survey data processing in general is discussed in chapter VI above and in a United Nations technical publication (82). In this section some further details will be discussed with specific reference to processing of demographic data. The stages of processing demographic data are similar to those for other topics, the main difference being in the substantive preparation of the pro-

cessing itself. The bulk of the activities during the planning stage consists of the determination of guidelines by demographers for the computer specialists. Editing and imputation rules for each demographic topic covered in the survey need to be prepared. For this work, distributions of various characteristics from previous tabulations, such as censuses or demographic surveys, are very useful. For example, a minimum number of years needs to be fixed for the difference between the age of mother and her own child, the relationship between the age of the woman and the number of children ever born and the like. Rules for checking individual characteristics, as well as a decision on how to correct errors, must be specifically written out to be used as guides by the computer specialists.

9.97. Another stage which is noteworthy is the stage of preliminary checking, coding and manual editing, which is prior to transfer of the data into machine-readable form. This is a very important stage since minor corrections at this stage may help avoid an otherwise roundabout correction process. For example, if the checker notices that the entry for sex is blank, in most of the cases he can correct it easily by looking at the name, while the computer may have to check several other characteristics and the correction may still be wrong. A combination of computer and manual editing is often utilized whereby the checking of consistency is done by computer and the error lists are checked manually.

9.98. There are computer software packages available for the processing of surveys collecting demographic data. CONCOR, for example, is a widely used demographic data editing package which was first developed by the Latin American Demographic Centre (CELADE) and has been further developed by the United States Bureau of the Census so that it can be used for relatively small-sized computers of any type. Some other editing packages are UNEDIT, CANEDIT and OSIRIS. Software packages for tabulation are also available. These packages can prepare the required tabulation from a "clean" data file with relatively simple preparation. Some of the packages have been designed for people who may not have a computer programming background. Some of the tabulation packages are CENTS, COCENTS, TPL, OSIRIS and SPSS and XTALLY of the United Nations. CENTS and COCENTS are packages designed for the tabulation of census data but can also be used in the tabulation of household survey data. SPSS is also a very commonly used software package for general analysis, including regression and life table analysis. The United States Bureau of the Census has produced various computer software packages for demographic analysis which are contained in its publication, *Demographic Computer Library* (206). *Computer Programs for Demographic Estimation: a User Guide* (228), which contains various computer programs for a variety of demographic estimations, has recently been published in the United States.

### 2. Tabulation

9.99. The selection of tables should be made during the planning stage. It is recommended that the list of tabulations be divided into two parts (98) of first and second priority. The first-priority tables should include the distribution of basic demographic characteristics of the popula-

tion, namely, age, sex and marital status, as well as those tables which are needed for the estimation of demographic measures such as fertility, mortality and migration. However, the exact list of first-priority tables may also include those tables which will be considered for the first publication or first report of the survey.

9.100. The second-priority tabulations should comprise all other tabulations which are more complicated in nature and will not be included in the first publication(s), but may be needed for further analysis by relatively fewer users than the first-priority tables. These may include such tables as those required for the study of differential fertility and mortality or of the socio-economic background of migrants and non-migrants.

9.101. The following important tables should be included in the first priority list as far as it is feasible and other tables which are important to the country concerned should be added to this list. The following list of tables was drawn up based on the needs for demographic analysis which are discussed later in this section and in (77, 98, 229, 435):

(a) Population by single years of age, with five-year subtotals, and sex (national);

(b) Population 15 years and over by age group, marital status and sex;

(c) Population by age group, survivorship of parents and sex;

(d) Female population 15 years and over by age group and if possible also in single years by number and sex of children born alive;

(e) Female population 15 years and over by age (single years or groups) and number of children, living status and sex of children;

(f) Children ever born to women aged 15 years and over, by age (single years and groups) of mother, living status of children and sex;

(g) Children 14 years or younger by single years of age and living status by single years of age of own mother (living in the same household);

(h) Population 15 years and over in their first marriage or married only once by age group, age at first marriage (or duration of marriage) and sex;

(i) Ever-married population 15 years and over, by age group, sex and survival status of first spouse;

(j) Female population 15 years and over, by age group and month of last live birth;

(k) Female population 15 years and over reporting birth in the last 12 months preceding the survey by age group and number of children ever born;

(l) Deaths during 24 months preceding the survey by age group of deceased, sex and month and year of occurrence;

(m) Population by duration of residence in current place of residence, age and sex;

(n) Population . . . years of age and over by place of usual residence at a specific date in the past, age and sex;

(o) Population by place of usual residence, duration of residence, place of previous residence and sex.

9.102. If the survey includes more detailed information on fertility, mortality or migration, further detailed tables should be designed in order to present the available

information. The *World Fertility Survey Guidelines for Country Report No. 1* (37) may be used for additional guidance in the preparation of tables containing more detailed fertility and mortality information.

#### E. ANALYSIS AND EVALUATION OF DEMOGRAPHIC DATA

9.103. The analysis and evaluation of demographic data from household surveys should also be planned in advance, particularly with regard to the availability of other demographic data from past surveys, censuses or civil registration for comparison, as well as with regard to the analytical techniques which will be utilized to produce the demographic measures required. A continuing programme of household surveys collecting demographic data can provide information for establishing time trends for some demographic measures. With the utilization of retrospective questions the past trend of some measures of fertility and mortality may be established even from a single survey round. However, due to response error which often occurs in the retrospective questions, trends constructed from a single survey tend to suffer from biases which, if not carefully interpreted, can be misleading. Overlapping trend data using the results of several successive surveys can therefore help in the interpretation of trends.

9.104. At the beginning it is necessary to evaluate whether the estimates of total population from the sample are acceptable with reasonable accuracy, as the total population will be the basis for the distribution of population characteristics. Examination of subnational totals also needs to be done. The "balancing equation", using supplementary data from the last census and vital registration if they are available, should be applied (201). In this equation, the estimated current total population of an area is equal to the total population in the last census year plus the total births and in-migrants minus the total deaths and out-migrants occurring between the census and the survey.

9.105. If the estimated total population shows an irregular increase, either too low or too high compared with the last census, further investigation of the sampling selection, the inflation factors and the implementation of the sample listings may need to be carried out. Errors and biases, as discussed in part one of the present *Handbook*, may have crept in at some stage of the survey operation.

##### 1. Age and sex data

9.106. As mentioned above, age and sex are very important data to be collected in household surveys. It is therefore necessary to make an assessment of whether those data are sufficiently reliable. Unfortunately, the most common error occurring in household surveys is that of age misreporting and age-selective underenumeration. Underenumeration of some groups of the population in different ages results in deficits in the number of population at those ages. The most common problems are the underenumeration of infants under one year old and of young adults.

9.107. There are several approaches to evaluate the error caused by age misreporting and age-selective underenumeration (228). Some of these are costly while some others are relatively inexpensive. The first employs a specially designed reinterview of selected individuals using

better age estimation techniques and comparison or matching of the results. This approach is commonly applied in postenumeration surveys for censuses and also was used in several countries for the evaluation of age reporting in WFS data. The second approach is matching the individual age reporting in a survey with reporting in other sources such as birth registration. This procedure is the same as that applied in dual record systems. In the third approach, cross-tabulations of age distributions with other characteristics are examined to see whether there is any sign of error in various age groups. In some developing countries there is a tendency for certain sex-specific age groups to show more age misreporting error. Unfortunately, it is very difficult to clearly separate such errors. Sometimes, if case by case matching with a specially designed survey or other independent sources can be done, the types of errors can be detected. The fourth approach is to compare the age distributions of the survey with those of other sources for the same population, such as previous censuses or surveys. For a closed population it is possible to study the change of size of specific cohorts by comparing the age distribution with other sources, particularly those which are 5 or 10 years apart, and examining the survival ratios of the cohorts. The fifth approach is to compare the age distribution from the survey with an expected distribution, for example that of the appropriate stable population model.

9.108. There are also several techniques which can be used to measure the quality of age reporting. These include Wipple's and Myer's indices, which were developed for determining whether there is any preference or avoidance of certain digits by using single age distribution. Another index, proposed by the United Nations, is known as the age-sex accuracy index and utilizes a five-year age distribution by sex. Further discussion of these indices may be found in the United Nations Manual II (49).

9.109. The distribution of population by sex and five-year age groups is very commonly published from any survey covering demographic topics. The age and sex distribution of the population is also required as the basic input for many demographic techniques. Although a single-year age distribution should also be prepared and published, most analytical techniques only require a five-year age group distribution. The single year age distribution often contains age misreporting or underenumeration error and it is very common to find heaping at ages ending with 0 and 5, or at the even numbers, particularly in countries where a large proportion of the population is less educated. Although it is not recommended that defective data on age distribution be adjusted or smoothed prior to further analysis, if the quality of data is such that adjustment needs to be made, there are techniques which have been developed to do this (50, 230). However, the adjustment of such data should be made with great care since the techniques are essentially forcing the observed data into some other type of distribution which may still be different from the unknown true distribution. Analysts should always be aware of the possibility of a genuine peculiarity of the data due to specific demographic situations in the past. In cases where there have been certain rapid changes in fertility, mortality or migration, it can be expected that the sex and age distribution may not be smooth or well-graduated (227).

9.110. Besides analysis of the nature of the sex and age distribution, some other measures may be computed, such as the median age, per cent of the population below 15 years, per cent of the population 60 or 65 years and over and the age dependency ratio. The age dependency ratio is defined as the proportion of population aged below 15 years (children) and aged about 60 or 65 years and over (elderly persons) to the population aged between 15 and 59 or 64 (the "working age" population). As mentioned earlier, the age dependency ratio may be used as a rough measure of economic dependency. The proportion of population economically inactive over all ages may also be used in this way.

## 2. Fertility

9.111. Using data on demographic characteristics and topics collected in household surveys, there are several fertility estimates which can be made, depending on the characteristics for which data have been collected. Various fertility estimation techniques have been developed utilizing data which are normally provided by household surveys. Such techniques are among those contained in the United Nations publication *Manual IV: Methods of Estimating Basic Demographic Measures from Incomplete Data* (51). This manual is currently being updated and will be reissued as Manual X (230). This new version will include a number of new techniques for estimating fertility and mortality levels and trends, as well as refinements of earlier methods.

9.112. In this section a brief discussion of some of these fertility estimation techniques is presented, but for a detailed discussion of the techniques themselves and how to use them, the reader should consult the various references.

9.113. In the analysis of fertility it is necessary to assess the quality of the data used for fertility estimation. In addition to age of women and age at marriage, which are common sources of errors, data on number of children ever born are also very often distorted, due to faulty omissions as well as faulty inclusions (227). Faulty omissions include (a) children who died in infancy, (b) children who left the home, (c) children born of a husband other than the current one, and (d) children given out in adoption. Faulty inclusions include (a) still births reported as children who died in infancy, (b) children born by another wife to the current husband, (c) adopted children, and (d) grandchildren. If the inclusions and omissions errors occur mostly for women older than 35 years the effects may not be very serious since most methods of analysis use very little data on women in this age group. However, it is very important during the data collection stage to stress the importance of collecting these data as accurately as possible for all women.

9.114. Another possible error affecting the quality of data on number of children ever born is the tendency to have an excessive frequency of women who are classified as "don't know" or "not stated". One explanation which has been given (323) suggests that enumerators tend to leave the entry blank rather than to record zero for childless women. During the coding stage such an entry is considered as "don't know" or "not stated." A method for

the adjustment of such data is proposed in the same source.

(a) *Brass-type estimates of fertility*

9.115. The estimation of fertility using Brass-type methods is based on the comparison of reported average parity with the accumulated age-specific fertility rates. The average parity is obtained by dividing the total number of children ever born to women of a given age by the number of women of that age. The average parity is, therefore, a measure of the level of lifetime fertility of a certain cohort. The current fertility rate may be obtained from a question about births occurring within 12 months preceding the survey or from other sources such as civil registration. The accumulated age-specific fertility rate from the beginning of the child-bearing age up to a certain age from this data is similar to the average number of children that would have been born by women experiencing those rates from the beginning of the child-bearing age up to that age. Since information on number of children ever born is often distorted due to omissions, particularly by older women, the technique suggests that this information may still be fairly reliable if reported by younger women up to the age of 30 or 35. Comparison of accumulated current fertility with the reported lifetime fertility of women younger than 30 or 35 will provide the adjustment factor for the current level of fertility rates and produce a better estimate of actual current fertility rates. However, the estimates resulting from this exercise are only valid if the underlying assumptions also remain valid. These are, first, the fertility pattern of younger women remains more or less constant over time, so that the lifetime fertility may still be expected to be consistent with the accumulated current fertility rates, and secondly, the number of children ever born reported by younger women reflects the level of fertility, and the age-specific fertility rates as measured through number of births within the last 12 months preceding the survey reflect the true pattern of fertility (see 51, 230, 292).

9.116. Several variants of the above method have been proposed. First, if comparisons are not made for all births occurring to women but only for births of any particular birth order, for example the first birth, then the first-birth-specific fertility rates should be comparable with the proportion of women reporting to have had at least one child. Second, if the average fertility rates can be provided by other surveys or censuses, particularly those which are 5 or 10 years apart, then the cumulative inter-survey fertility rates can be constructed and the assumption concerning constant fertility in the recent past can be relaxed. Third, information on fertility rates may be available from a vital registration system or some other data sources (230).

9.117. The main objective of the Brass fertility estimation procedure is therefore to produce adjustment factors for the age pattern of fertility based on the information on recent births by the level of fertility implied by the average parity of younger women in age groups 20 to 24 or 25 to 29. The Brass method of fertility estimation has been widely used, particularly in developing countries where data from vital statistics are lacking. However, the method is best suited for estimating fertility in countries

where there is no severe systematic age misreporting and there have been no major changes in fertility.

(b) *Estimation of fertility based on reported parity by duration of marriage*

9.118. As discussed earlier, in fertility estimation one of the most common errors is that of misclassification of parity arising from misreporting of the age of the women considered. When five-year age groups are used, the misclassification error only arises when a woman is wrongly classified into the adjacent age group. However, because one's marriage is a more easily remembered event than one's own birth, classification of parity by duration of marriage may be less distorted compared to that by age. A technique has been developed (230) for estimating fertility by using data on children ever born classified by duration of marriage. In this case, data on duration of marriage should refer to the duration of time women are exposed to sexual relations in marriage. However, since such relations may predate formal marriage and there may be other problems, such as remarriages or second marriages, for practical purposes such problems may be minimized by asking questions which refer to the first marriage only. In addition, the applicability of the technique is also limited to populations where consensual union is not very common and a small proportion of all births occurs outside marriage.

9.119. The procedure involves comparison of the reported average parity for each five-year group of duration of marriage with a standard natural fertility pattern, and results in the estimation of marital fertility. The overall fertility may be obtained as the product of the proportion married and the estimated marital fertility.

(c) *Estimation of fertility rates based on the increment of cohort parities between two surveys*

9.120. This method utilizes information on children ever born tabulated by five-year age groups of the mother from two different surveys approximately 5 or 10 years apart. The method suggests the calculation of average parities by age groups of women for two points in time approximately 5 or 10 years apart. The difference between the two average parities of the cohort in the first and second surveys reflects the fertility experience of that cohort during the inter-survey period. The age-specific fertility rates during the inter-survey period can then be estimated by accumulating the inter-survey parity increments and estimating the average parities for a hypothetical cohort. For further discussion of this technique and examples, the reader should refer to (230).

(d) *Estimation of fertility based on fertility histories data*

9.121. Often much more detailed fertility data are obtained from a specialized demographic survey including fertility histories. Such data are not limited to the number of children ever born to each woman but also include the date of occurrence and the status of each child born. If the data are collected with reasonable accuracy it is then possible to produce fertility rates in five-year age groups of women for each calendar year preceding the survey. However, the quality of such data needs to be investigated

carefully since the more detail collected the more complex the errors which may be involved.

9.122. In order to produce fertility estimates it is necessary to tabulate the number of births by five-year age groups of mothers at the time of the birth for each calendar year preceding the survey and to divide these births by the number of years of exposure to the risk of childbearing of women belonging to the age group in each calendar year. Detailed questions on fertility histories are also useful for the evaluation of fertility data. Some methods for this purpose have been developed and are presented in (230).

(e) *Estimation of fertility by the own-children method*

9.123. This method is used to estimate age-specific fertility rates for the past 10 or 15 years preceding the survey, based on information on the number of children ever born classified by single years of age of their mothers. In order to produce this table it is necessary that the mother and her own children below age 10 or 15 years (who are living in the same household) be linked by means of questions on relation to the head of household, age, marital status and the like. It is advisable that if the own-children method of fertility estimation is intended to be used in the fertility analysis, the line number of the mother on the questionnaire be placed beside each child who is living with his own mother, so that the matching of the mother and child can be done easily.

9.124. The technique requires first, reverse surviving the children and mothers and adjusting for unmatched "non-own" children, and then computing the ratio of the reverse survived births to reverse survived women by age. The technique requires that the age reporting be reasonably reliable and the proportion of young children not living with their own mothers be relatively small. It is also necessary that mortality in recent years be estimated with reasonable accuracy. For countries which do not have vital statistics this technique can produce reasonable estimates of fertility rates from the survey data. For further information on this technique see (303).

### 3. Mortality

9.125. The analysis of mortality from household survey data may be based on several different variables. In recent years there has been a series of developments in methods of mortality estimation, particularly for indirect estimation. A direct estimation procedure for estimating mortality requires the availability of data on vital events from a civil registration system and reasonably accurate data on population counts from censuses. Since in many developing countries such data are not available or not reliable, the estimation of mortality (as well as fertility) is more often being done using other parameters, on the basis of information that is only indirectly related to mortality.

9.126. An example of these indirect techniques is the widely used Brass method for the estimation of childhood mortality. Other techniques which have recently been developed include the use of orphanhood and widowhood information for the estimation of adult mortality. In this subsection some of these techniques are discussed briefly. However, as in the case of fertility analysis, the discussion

here does not include a detailed description of the methods or of their use.

(a) *Use of model life tables and stable populations*

9.127. In mortality analysis, the use of model life tables is essential, particularly in developing countries. Model life tables, which express the mortality experience that a hypothetical cohort would have if it experienced the mortality rate observed in a given period of time, contain several measures, including the proportion of persons surviving, the probability of dying and the expectation of life at different ages. The life tables may be used for a variety of purposes, including the estimation of mortality using data from demographic surveys, constructing stable population models and making population projections. Several model life tables have been constructed, the best-known being the United Nations model life tables (48) and the Coale-Demeny Regional Model Life Tables (304). Other life tables include the Ledermann System of Model Life Tables and the Brass Logit Life Tables System.

9.128. The first United Nations model life tables were developed in the 1950s and were based on a collection of 158 observed life tables for each sex. The new United Nations model life tables (48) are based on data from developing countries. However, although the availability and reliability of data from the less developed regions have increased remarkably since the publication of the early United Nations life tables in 1955 and the Coale-Demeny tables in 1966, such data remain essentially poor. As a result, careful evaluation, selection and adjustment procedures were used to construct the data base upon which the new United Nations models were constructed. This data base consists of 36 life tables by sex (72 in total), covering a wide range of mortality levels. Sixteen pairs of male/female life tables were obtained from 10 countries of Latin America, 19 from 11 countries of Asia and one from Africa. The new United Nations model life tables are similar to the Coale and Demeny set in that distinct patterns of age-specific mortality schedules have been identified and are published in detail. In addition, the new models incorporate a greater degree of in-built flexibility, allowing the user to construct mortality patterns different from those actually published. Four distinct patterns of mortality were identified on the basis of the data available. Because of the predominance of these patterns in certain geographical regions, they are identified in regional terms as the "Latin American", the "Chilean", the "South Asian" and the "Far Eastern" patterns. A fifth pattern, called the "general" pattern, was constructed as the overall average of those listed above.

9.129. The United Nations stable population models describe the population based on the assumptions that the age-specific birth rates and death rates are constant for an indefinite period of time, that the population is closed, and that there is a constant proportional age distribution over time. By using a variety of procedures it is possible to calculate the approximate intrinsic rates associated with the stable population. An extensive series of stable population models has also been developed by Coale and Demeny (304). The tables can be used to produce estimates of fertility and mortality rates based on survey data, particularly when data from vital registration are not available or are unreliable. The procedure requires the matching of the ob-

served accumulative age distribution at a certain age with the closest selected stable age distribution. It also requires the knowledge of either the annual growth rate or the gross reproduction rate and the mean length of generations.

(b) *The estimation of childhood mortality*

9.130. This method, which was first developed by Brass, employs the information on child survivorship classified by age of women. It has been shown that given fairly normal patterns of fertility and mortality, the following relationships exist: the proportion of children dead among children ever born to women aged 15–19 is similar to the probability of dying within the first year of life; the proportion of children dead among children ever born to women aged 20–24 is similar to the probability of dying within the first two years of life; the proportion of children dead among children ever born to women aged 25–29 is similar to the probability of dying within the first three years of life; the proportion of children dead among children ever born to women aged 30–34 is similar to the probability of dying within the first five years of life; the proportion of children dead among children ever born to women aged 35–39 is similar to the probability of dying within the first 10 years of life, and so on. The values of mortality up to age two, three and five years are the most reliable, while the value of mortality up to age 10 years is not too reliable due to underestimation of dead children and rapid changes in mortality which may not reflect the current situation (365).

9.131. The child survivorship data are obtained from the questions on the number of children ever born and still living. Then the proportion of children surviving is calculated and tabulated by five-year age groups of the mother. The proportion of children surviving can then be converted into the probability of dying from birth to certain ages by using a set of multipliers. New sets of multipliers have been developed more recently (432, 435).

9.132. The limitations of this technique, as in the case of fertility estimation, are due to omissions of children ever born and still living, particularly from older women, which may have caused the proportion of children surviving to be unrealistic. In some countries, the collection of data on children surviving is better, using the question on the number of children born and the number of children dead rather than the number of children still living. In some cultures a direct question on the number of children dead may be considered sensitive and may not yield a better result. In addition to omission errors, such data are also affected by age misreporting and misdating of vital events. This method was developed based on the assumption that fertility and childhood mortality have remained constant in the recent past. If they are not constant, data resulting from a cross-sectional household survey (or census) will not reflect accurately the fertility experience and childhood mortality experience during the recent past and therefore will not provide a realistic estimate.

9.133. One variant of this method is use of duration of marriage of the mother to classify the data on childhood survivorship. In some cultures, women tend to give more reliable answers to the question on duration of marriage than on their own age, so that the estimation based on data on duration of marriage is preferred. However, it should be borne in mind that data on duration of marriage should

refer to the first marriage and the method is more appropriate when the majority of women married once through the end of their reproductive age. It is also not recommended for use in societies where consensual unions are very common.

9.134. As in the case of fertility estimation, if there are available data from two surveys which are 5 or 10 years apart, it is possible to estimate childhood mortality for a hypothetical cohort of women which refers specifically to the inter-survey period. The estimation procedure is similar to that described above and the proportion of children surviving can either be classified by the age of women or the duration of marriage.

(c) *Estimation of adult mortality from information on orphanhood and widowhood*

9.135. Using the logical principle that the survival of children ever born is related to data from mothers, childhood mortality can be estimated. In this subsection procedures for estimating adult mortality from the information concerning the survival of parents and of spouses are discussed.

9.136. The first estimate is based on the proportion of persons without surviving mother (or father), classified by the person's age. The proportion of orphaned population can be related to the probability of the mother (or father) dying between the age at the time of the child's birth to the present time. The mean age of mothers at the time of the children's births can be obtained from the age pattern of fertility data, while the father's age, if not directly available, can be estimated from the differences of ages of couples based on the mean age of mothers.

9.137. The estimation of ages of mother and father at the time of the children's births is a relatively difficult problem in the orphanhood technique. In addition, there is a possibility that parents may be referred to by more than one child and childless parents may not be referred to at all. The first part of the problem can be overcome if the data only refer to the oldest living child, but the second part of the problem still remains (287, 294, 346).

9.138. The widowhood estimate employs the survivorship of the respondent's first spouse classified by the respondent's age and sex. It also requires data on the first age at marriage and the duration of marriage. The proportion of the respondents with the surviving spouse will be used as the basis for calculating the probability of surviving from the age at the time of the marriage for the duration of marriage. Although the orphanhood technique has provided satisfactory estimates, the widowhood technique, due to various problems in data quality, has not produced a satisfactory estimate and therefore the resulting estimate should only be used as a rough measure of adult mortality (230, 345, 346).

4. *Migration*

9.139. The analysis of migration data from demographic surveys should be carried out very carefully due to the probability of high sampling error for some of the estimates of migration characteristics. The size of the sample in a demographic survey is normally such that the esti-

mates can only be made in very limited geographical detail. Although it is possible to collect information in a demographic survey which is normally collected through a census, the analytical possibilities of these data are very much reduced due to sampling limitations. However, migration data from repeated surveys for several years may be accumulated and the analysis concentrated on the average rates, percentage distributions and the like (52). Such analysis is more defensible when the true rates are almost unchanged during the period covered by the data and differences among the estimates are mainly caused by sampling fluctuations.

9.140. If the survey collects census-type information, then the analysis should be carried out on such measures as lifetime migration, recent migration and rural-urban migration. Lifetime migration information is obtained from data showing differing place of birth and current place of residence. Cross-tabulations on place of birth and current place of residence need to be made at a level of acceptable geographical detail. With such a cross-tabulation matrix it is then possible to estimate the number of in-migrants and out-migrants as well as non-migrants in a population in reference to a certain geographical area. Net lifetime migrants for a particular area may also be estimated by comparing data from two different surveys or with the census data.

9.141. Although lifetime migration gives some idea of the extent of population movement, it is not a very useful measure. Lifetime migration cannot give any indication when such a move was made. On the other hand, individuals who have returned to their place of birth just before the survey are not considered as migrants.

9.142. Other useful analysis is the use of information on the duration of residence combined with the place of previous residence. This analysis gives better information on the extent of recent migration. Such data should be tabulated for each area of interest, broken down by duration of residence in the area and by place of previous residence as the place of origin. These data will show the last movements of individuals to the current place of residence but will not be able to give information on the extent of movement from one place to another during the recent past. Such data should be obtained from the question on the place of residence at a specified time in the past. Various measures of migration may be calculated based on combinations of the above information (52).

9.143. The analysis of migration, which is of particular interest to developing countries, is concerned with the consequences of migration and determinants of migration, for example, the consequences and reasons for the movement of people from rural to urban areas. If such analysis is specifically needed for development purposes, then it will even be more useful to supplement the analysis with data on reasons for migration, occupation before and after migrating, and similar topics.

9.144. While it is feasible to collect reasons for migration through household surveys, care should be taken in the interpretation of the data because of possible multiple reasons which cause people to move. Whether different reasons by order of priority can be tabulated depends on the type of items entered in the questionnaires and the coding which has been done during the collection and processing of the data.

## 5. *Differentials in demographic measures*

9.145. In addition to analysis of levels and trends of demographic measures, it is very important that the analysis be done in relation to other socio-economic variables, such as education, economic activities, occupation, income and housing characteristics. If such data are available and have been collected at the same time from the same individuals as those on demographic topics, it is possible to produce cross-tabulations for analysis. The socio-economic variables mentioned above are thought to be directly related to various demographic variables, and therefore often become very important explanatory variables in examining differences in levels of demographic measures.

9.146. Levels of fertility, for example, may be investigated in relation to different levels of education or socio-economic status. Although, in general, education is thought to have an inverse relationship with fertility, it has been shown that in some countries the relation may not be linear but rather an inverted U-shaped curve. Peculiar phenomena such as this may also be found in other demographic measures for different countries. The analysis of differentials in demographic measures can generally be carried out based on cross-tabulation of such variables as average parity or proportion of surviving children or migrants using selected socio-economic variables to determine if certain patterns of relationship exist. The use of percentage tables, standardized tables or graphic presentation is often instrumental in differential analysis.

## 6 *Population growth*

9.147. Another useful analysis is the preparation of population estimates and projections. From the results of demographic surveys it is usually possible to estimate the total population of that year classified by age and sex. Comparisons of these estimates and the past census should be made both for the purpose of the evaluation of the data and to analyse population growth since the last census. With the assumption that changes in population size and composition follow a fairly regular pattern, it is possible to produce population estimates for the years since the last census to the time of a survey. Supplementary information on the development of fertility, mortality and migration during these years will also help in refining the population estimates. Knowledge of the development of these factors in population changes is also valuable in the formulation of assumptions for population projections.

9.148. Population projections, which are the estimates of total size or composition of populations in the future, are constructed using certain assumptions. Two different methods are commonly used. One is referred to as the mathematical method and the other is the component method. The mathematical method assumes a constant rate of growth, either the same as a past trend or with modification, to obtain future populations. This method is very simple, but the assumption is almost always in error when it is used to project to the far-distant future.

9.149. The component method of population projections utilizes separate projections for each component of population change, that is, fertility, mortality and migration. For national population projections, in countries with small international migration, the migration factor is often

omitted or considered as zero on a net basis, but this assumption may not be suitable for making subnational population projections. The component method is usually developed by calculating expected births and deaths in relation to each age and sex group of the population. This method requires the application of explicit assumptions for each component of change and these assumptions must be examined carefully to make certain they are compatible with the known facts. The component method of population projections has an advantage over the mathematical method in that it takes into account the age-sex structure of the population and its effect on population, and these are applied to each component of change which may be

adjusted to the current as well as the most probable future status of birth and death rates. The projection is usually made by sex-age groups and the projected total population is obtained by combining the projections for age-sex groups. In addition to projections of population by sex and age for the whole country, projected populations by subnational areas are also very important, especially for urban and rural populations.

9.150. Further detailed discussions regarding population projections may be found in (50, 201). Computer software packages are also available for population projections, for example, that developed by the United Nations (47).

## X. INCOME, CONSUMPTION AND EXPENDITURE

10.1. The purpose of this chapter is to highlight some issues which face planners of surveys covering income, consumption and expenditure topics and to present some approaches to deal with these issues.

10.2. Section A briefly presents some uses and objectives of survey data on income, consumption and expenditure and discusses the potential scope of these data. In section B the role of household surveys in collecting data on household income, consumption and expenditure is considered in the context of overall data needs in this field. The treatment of income, consumption and expenditure topics in a continuing survey programme is also examined. Section C deals with questions regarding the organization of household surveys covering income, consumption and expenditure topics, including such issues as periodicity, sample design and data collection. Section D outlines the existing recommendations and guidelines on concepts, classifications and definitions of the United Nations and the International Labour Organisation (ILO) in this field and discusses some of the issues which arise in their interpretation. The practical data requirements for income, consumption and expenditure topics in surveys and some related measurement issues are discussed in section E. In section F some illustrative tabulations and suggestions for evaluation and analysis of the survey results are presented. Finally, section G discusses the importance of developing and maintaining a data base in this field at the national level and the use of survey data for this purpose.

### A. USES, OBJECTIVES AND SCOPE OF INCOME, CONSUMPTION AND EXPENDITURE DATA FROM HOUSEHOLD SURVEYS

#### 1. *Uses*

10.3. Data on household income, consumption and expenditure obtained through household surveys serve a wide and growing variety of uses. They are frequently used as a basis for decisions on, for example, welfare-oriented policies and fiscal policies. These data may also be used to study redistributive effects of taxation and social benefits and the economic welfare of the population in general. Data on expenditure are used in the computation of weights for consumer price indices, in national accounts and balances and for analyses of demand. It is likely that the use of income, consumption and expenditure data will continue to grow in the future. In particular, income, consumption and expenditure data have an essential role to play in integrated systems of social and economic data and the associated data bases.

#### 2. *Objectives*

10.4. Surveys covering household income, consumption and expenditure topics are usually intended to supply

basic data needed for policy-making and to facilitate determination of needs or the establishment of targets. They can be designed to serve various specific objectives, including:

(a) To obtain weights and other useful data for planning the collection of statistics or the construction or revision of consumer price indices, indices of comparative costliness, and the like;

(b) To furnish data on levels and distribution of household income, consumption and expenditure that may be used for analysis of changes in levels of living over time and disparities among households in various socio-economic groups, geographical areas, rural and urban zones and the like;

(c) To provide data for assessing the impact on household living conditions of existing or proposed economic or social programmes;

(d) To provide data for compiling household accounts in the systems of national accounts and balances;

(e) To provide data for estimating the distributive effects of direct and indirect taxation and social benefits for formulating fiscal policies and studying the incidence of taxation.

10.5. Information obtained from surveys covering household income, consumption and expenditure topics may meet various other needs of government departments, research and social organizations. For example, data derived from surveys may be used in connection with the determination or revision of minimum wage levels for rural and urban wage earners. Surveys may also be designed to serve as a source of information on food consumption and the housing and health conditions of the population in relation to household expenditure.

#### 3. *Scope*

10.6. As indicated above, the range of possible objectives in collecting household income, consumption and expenditure data is very wide. It is obviously not possible to satisfy simultaneously all these objectives in the design of one survey or survey round. It is therefore necessary to keep the particular goals of each survey in mind while designing it. If, for example, weights for consumer price indices are desired, the main items of data collection are cash consumption expenditures. But, if it is desired to examine the levels of living of the population, information on both cash and in-kind income and/or consumption expenditures should be collected. Similarly, the particular objectives of each survey affect the choice of population to be covered.

10.7. While accepting the design requirements imposed by the major objectives of a survey or survey round, it is also important to consider the value of obtaining information on related subjects as well as on general socio-economic characteristics of households and household

members. Such information may be used directly in the presentation of survey results to highlight conditions associated with the income, consumption and expenditure patterns. It may also be valuable in enabling results of different surveys to be integrated, or at least compared.

10.8. In surveys primarily concerned with income, consumption and expenditure, it is desirable to collect detailed information from each individual on each of his or her income, consumption and expenditure items. This procedure has two advantages: it maximizes the usefulness of the survey results for the many applications which require considerable detail, and it results in more reliable measurement of aggregate income, consumption and expenditure.

10.9. In planning the geographical scope of a household survey covering income, consumption and expenditure topics, it is generally preferable to cover the whole country, since this will increase the usefulness of the data for most purposes. However, economic and practical considerations often determine that the geographical coverage must be limited. In very sparsely populated areas, distances between households are great, and it may be difficult even to locate the households. This makes each interview extremely expensive and time-consuming.

10.10. The scope of the survey in terms of population groups should also, in principle, be universal, including persons living in collective living quarters such as barracks, hospitals and prisons. However, due to practical problems involved, this population is often excluded. Finally, the time scope of the survey should be of sufficient length to ensure that relevant seasonal fluctuations are covered (see paras. 10.25–10.27 below).

## B. USE OF HOUSEHOLD SURVEYS IN COLLECTING DATA ON HOUSEHOLD INCOME, CONSUMPTION AND EXPENDITURE

### 1. *Sources of household income, consumption and expenditure data*

10.11. Information on household income, consumption and expenditure may be obtained from several different sources. For example, income data may be collected through population censuses, income tax returns and social security records, as well as household sample surveys. Information on consumption and expenditure may be acquired indirectly from sales records and production and trade statistics, or directly from household sample surveys. Each of these sources has advantages and disadvantages for particular purposes and depending on national circumstances.

10.12. Without discussing the merits and drawbacks of each source, it may be said that a household survey programme constitutes a particularly effective tool for the measurement of household income, consumption and expenditure. In comparison with other sources of information, household sample surveys have the advantages of wide scope and coverage. They can cover all of the population and at the same time distinguish among important groups, such as rural and urban, low-income and high-income households, agricultural and non-agricultural workers, economically active and inactive persons, taxpayers and non-taxpayers etc. Another distinctive feature of household surveys is their flexibility in stipulating def-

initions, concepts and techniques according to the specific purpose of the inquiry and in determining the degree of detail in the information to be collected. Household surveys also have the advantage of permitting the collection and use of data on various related subjects. It is, for example, common in collecting data on income, consumption and expenditure topics to collect data on demographic characteristics, economic activity and other related subjects along with data on income, consumption and expenditure. Given these advantages, household surveys are often the most important single source of statistics on household income, consumption and expenditure, but it should be noted that household survey data are not usually substitutes for data from other sources. They should, in fact, be complementary to other data sources and, to the extent this complementarity is planned for, the uses and reliability of the data will be enhanced.

### 2. *Importance of income, consumption and expenditure topics*

10.13. In recent years, levels, trends and distribution of levels of living and related socio-economic circumstances have attracted increased attention among policy-makers and planners. Since comprehensive information needed to assess many aspects of these conditions is seldom available in existing administrative records, household surveys have been used to an increasing extent for data collection. This is particularly true of income, consumption and expenditure, which are crucial factors in living conditions. Consequently, many countries place a high priority on these topics in setting up their survey programmes. This can be seen, for example, from the planned statistical activities of the countries participating in the United Nations National Household Survey Capability Programme. Irrespective of the level of statistical development, these countries in general give a high priority to survey coverage in this area. This is in line with a growing awareness of the importance of assessing the impact of development efforts on the population, including distributional effects.

### 3. *Income, consumption and expenditure topics within a continuing survey programme*

10.14. It is important that household surveys concerned with income, consumption and expenditure topics be co-ordinated with other surveys as well as with censuses and administrative records. If concepts, definitions, classifications and methods are compatible, the statistics derived can be used jointly. Awareness of the importance of having integrated survey programmes covering several subjects is fast growing among countries.

10.15. In addition to income, consumption and expenditure topics, integrated survey programmes may cover subjects such as the following: demographic topics and characteristics, labour force and employment, time use, food consumption and nutrition, housing, agriculture, health and education.

10.16. Kenya is a country which has established a national integrated sample survey programme, including a comprehensive statistical infrastructure for collecting and processing socio-economic data from urban and rural areas of the country. Participating countries in the United Na-

tions National Household Survey Capability Programme are encouraged to set up a co-ordinated survey programme in order to maximize the usefulness across various fields of the data gathered.

## C. ORGANIZATION OF HOUSEHOLD SURVEYS TO COVER INCOME, CONSUMPTION AND EXPENDITURE TOPICS

### 1. Periodicity

10.17. Surveys covering household income, consumption and expenditure topics may be carried out continuously, periodically (for example, quarterly, annually or less frequently) or on an *ad hoc* basis. In determining the frequency of data collection, the following aspects must be borne in mind: the purposes for which the data are to be collected, the cost of collecting data and the availability of updated sampling frames.

10.18. If, for example, the purpose of the data is to measure levels of living and related conditions, the frequency of data collection largely depends on the rate of changes in the major components of the living conditions of the population. Broad elements of these conditions usually change rather slowly, so that frequent observations may not be necessary. On the other hand, certain key aspects may be found which may change more quickly and perhaps unexpectedly. It may be useful to monitor these limited items much more frequently. If the aim is to obtain weights for consumer price indices, the periodicity of survey taking is essentially determined by the speed of the changes in consumption patterns. Many countries update the weights in their consumer price indices at regular but rather long intervals, such as every 5 or 10 years, but some countries revise their price index weights annually and therefore undertake annual surveys of household expenditures.

10.19. As between frequent, less detailed surveys and more comprehensive and detailed inquiries conducted at longer intervals, each has its respective advantages. Periodic but less frequent large-scale inquiries may be co-ordinated with population and housing censuses in order to take advantage of a new sampling frame on each occasion. They also allow more time for evaluating methods of work and basic concepts and definitions and for testing new techniques, within the necessary constraints of maintaining broad comparability between successive surveys. One potential disadvantage of surveys less frequent than one year is that they may happen to fall in an abnormal year in regard to climatic or economic conditions, and thus not be representative. To guard against this possibility, it is possible to spread the survey over more than one year, for example two years as in the 1972-1973 Consumer Expenditure Survey of the United States of America.

10.20. Continuous or more frequent surveys, on the other hand, provide data for monitoring relatively rapid changes in consumer patterns and living conditions more closely. This may be particularly important in countries with few other sources of current information.

10.21. Often, a suitable compromise is to carry out large-scale surveys at fairly long intervals with small-scale surveys in between. The small-scale surveys can then be

designed to estimate changes in important aggregates and to cover specialized topics not fully touched upon in the large-scale surveys.

10.22. Continuous household expenditure surveys are carried out by Bangladesh, Bulgaria, New Zealand and other countries. *Ad hoc* surveys or surveys with five-year or longer intervals have been undertaken by such countries or areas as Hong Kong, Israel, Malawi, Portugal and Singapore.

10.23. Many countries may need detailed information on a one-time or infrequent basis on household income, consumption and expenditure and other living conditions for certain special groups of the population or for certain regions in the country, such as pensioners, low-income households or those living in economically depressed areas. Surveys should be designed to ensure that special groups for which data are required are properly identified and sampled. In some cases, more detailed data may be collected for specified groups than for other groups within the context of a general survey. Alternatively, special surveys or survey rounds referring to such groups may be used.

### 2. Survey design

10.24. Many aspects of survey design are discussed in part one of the present *Handbook*. A few factors which are particularly relevant to surveys covering income, consumption and expenditure topics are discussed below.

#### (a) Seasonal fluctuations

10.25. It is important in designing surveys covering household income, consumption and expenditure topics to consider carefully and if possible avoid the influence of effects caused by season, climate and holidays. The consumption expenditure and income patterns of substantial population groups vary significantly between different seasons, for example, expenditure on fruits, vegetables and clothing, and income of agricultural workers. If the survey falls in a holiday period, this will probably affect leisure and travel expenditures, in addition to the likely effect of reducing the response rate.

10.26. Regular interviews repeated over the year are more likely to give reliable annual results, since the recall period does not have to be long. However, for a given survey budget, this procedure will necessarily reduce the sample size. Where the same households are reinterviewed, other disadvantages may be respondent fatigue and problems due to changes in household membership, moves and the like. Seasonal effects can also be avoided to some extent by employing a long recall period for items which are considered to be affected by seasonality.

10.27. If the desired results are limited to averages and accumulated data and if each household can be visited only once, it is often recommended to spread the sample over all seasons. To reduce the sampling errors it is sometimes feasible to have larger subsamples in seasons with greater income and expenditure variations. If, however, it is necessary to estimate the income or expenditure of each individual household (for example, to determine income distribution) it is necessary to adjust this procedure by having a portion of the sample households interviewed throughout all seasons. The seasonal variations found in

the data for the latter households can then be used to adjust the data on the other households. Continuous surveys are particularly common in Eastern European countries. In the household budget surveys in Bulgaria, for example, a panel of households is selected and requested to fill in expenditure books. Since 1977 a rotational sample of households has been used, with replacement every four months. This method is intended to limit respondent fatigue while still maintaining continuity.

(b) *Sample size*

10.28. According to statistical theory, the main factors which determine the sample size are the estimated sampling error and the desired degree of precision. Although in practice a number of other factors usually must be taken into account, such as budgetary restrictions and the availability of qualified enumerators and supervisors, it is still important that the estimated precision be acceptable. This is especially true in surveys covering income, consumption and expenditure topics if regional estimates in addition to national ones are envisaged, if separate estimates for special population groups are desired and if a distribution rather than a simple average or total is to be estimated. For estimates of distribution, in particular, the sample will have to be larger the more skew the distribution is, other things being equal.

10.29. Stratification is often used to improve the accuracy of survey results. The socio-economic characteristics used in stratification should directly or indirectly be related to the variables of main interest in the survey. Where these are household income, consumption and expenditure, they should be used for stratification. The indicators do not have to be precise. Rough regional socio-economic distributions may suffice for stratification at the first stage. For stratification at the penultimate stage, various short-cut methods can be used. For example, in French-speaking African countries, the village wise men have been called on to classify the households into three broad income groups.

10.30. It is important to ensure that the sample design provide an adequate representation of households of different sizes, composition and income classes. Through simple random sampling it may be difficult to estimate with sufficient accuracy variables relating to population groups with low frequency in the population. Stratification or other methods may be employed to enable households with unusual characteristics to be selected with higher probability than other households. It is also possible to stratify after the design stage. Several countries, for example Réunion, employ post-stratification, whereby the sample and the population are divided into groups with certain household characteristics. The household weights are then obtained as the ratio between the number of households in the population, estimated through the latest population census, and the number of households in the sample, for each of the groups.

10.31. In a smaller number of countries, among them the Federal Republic of Germany, household income, consumption and expenditure surveys are based on voluntary participation by the households, rather than on statistical sampling. The household weights then have to be calculated through post-stratification as described above.

(c) *Non-sampling errors*

10.32. Income, consumption and expenditure topics are particularly prone to non-sampling errors due to the sensitivity of the subjects. Non-sampling errors can be reduced but not entirely eliminated through careful preparation and organization of the surveys. One way of determining the extent of distortion is to compare the aggregate results of the surveys with other sources of aggregate statistics. This is discussed further in paragraphs 10.132 to 10.135 below on adjustment and evaluation of results. Another method is to match information for individual respondents with that obtained from other sources. This is done in Hungary, where the income data submitted by the respondents are cross-checked by the statistical authorities with their employers.

10.33. Some non-sampling errors may be reduced by paying repeated visits to households to obtain more reliable information. In both the Sudan and Botswana data were collected in 12 rounds, each covering a month. In some surveys non-response errors are introduced because the reference period extends beyond the survey period. It is therefore not recommended to start the survey before the end of the reference period if it can be avoided. Non-sampling errors may also arise from non-response bias. This is further discussed below.

(d) *Non-response*

10.34. Most surveys experience non-response to some degree. It is commonly found that non-response is particularly high among upper-income households and among lower-income households. Also, households in developed countries seem to refuse to co-operate in surveys to a larger extent than households in developing countries. The rate of non-response can be quite extensive. In a survey in New Zealand, 21 per cent of the eligible sampled households refused to co-operate.

10.35. The effects of non-response can be reduced to some extent through over-sampling those population groups which are expected to be particularly affected by non-response (for example, urban, high-income, entrepreneurial households). Even with this method it is, however, impossible to eliminate completely the effects of non-response.

10.36. Many countries compensate for non-response by adjusting the household weights. In the Canadian annual income distribution survey, the household weights are inflated by the inverse of the household response rate. Other countries, for example France, Ireland and Réunion, use post-stratification as described above to compensate for non-response.

### 3. *Data collection*

(a) *Mode of data collection*

10.37. The most common mode of data collection in developing countries is the interview method. This method is used particularly with surveys concerned with income topics, which may be relatively complicated, as close adherence to instructions can be ensured. A disadvantage of the interview method in expenditure surveys is that the recall period for frequently purchased items must be kept short due to the difficulty of recollection. It may therefore

be necessary to carry out successive interviews and to plan for the increased costs which this entails.

10.38. For income and expenditure topics, diaries have the advantage of providing data at low cost, since transportation costs and interviewers' costs can be limited. Under certain conditions this is an appropriate method for gathering information on purchases. However, it can only be used when there is some literate person in the household. Since misinterpretations frequently occur in the use of diaries, it is important that a carefully administered control system be set up. The extent of illiterate households must be assessed at the survey planning stage to avoid a situation where many households have to be excluded from the survey due to illiteracy.

10.39. Careful checks must be made in using diaries, for example, to avoid double counting, which may occur when both individual and common diaries are provided to the households. It may therefore be useful to combine the diary method with frequent visits to the households. In Trinidad and Tobago, the interviewers visited the households every second day to ensure that the daily expenditures were recorded.

10.40. The time period of diary keeping varies considerably from country to country. One-week periods are quite common, but one-year periods are used in the Soviet Union and other centrally planned economies. In Poland "budget notebooks" are filled in by the households for at least a year. Interviewers return to the households and check the books at least once a month.

10.41. In many cases the interview and diary methods are combined. Incomes and infrequent purchases are covered in an interview, whereas frequently occurring expenditures are covered by diaries. The Seychelles used this method in its 1978 Household Expenditure Survey.

#### (b) *Reference period*

10.42. When the interview method is used, it is important that the reference period for each item of income, consumption and expenditure be selected carefully. If too short a reference period is used, fewer purchases will fall in the reference period, resulting in a large sampling error. Too long a reference period, on the other hand, may cause response bias due to memory lapses. It is consequently necessary to consider the normal pattern of income, consumption and expenditure flows in determining reference periods, which may differ from item to item. Different factors are then used in the calculation of the results to obtain comparable figures.

10.43. As a general rule, longer reference periods are employed for large, infrequent expenditures, for example on durable goods, hospital services and tuition, and shorter reference periods (one month, say) for irregular purchases of, for example, clothing, footwear and other smaller non-food expenditures. Variable reference periods or date of last payment can be used for house rent, gas, electricity bills and the like, and short reference periods (such as a week) are preferable for items which are purchased on a more or less daily basis (such as food and transportation).

10.44. In the 1968 urban survey in Malawi, the recall periods were the last seven days for food and beverages, while for clothing and miscellaneous expenses the recall

period was 12 months for low-income households and one month for high-income households. Colombia's 1971 urban and rural survey used recall periods of a week for food and beverages; a month for rent, transportation, recreation, fuel and light and the like; a year for clothing, household equipment, medical care and the like; and variable recall periods for education and culture.

10.45. Similarly, it is possible to use different reference periods for different income items. The following periods are commonly used: a month for salaries and wages, a year for agricultural and business income and a week for certain types of income received by casual or own-account workers.

10.46. Irregular fluctuations in income may also pose problems. In countries with high unemployment, temporary jobs may be common, which creates a fluctuation of income from month to month. In such cases an individual's response in a single interview with a one-year recall period is not likely to be reliable. At the same time, if an individual with fluctuating income is interviewed only once with a one-month recall period, extrapolation of his income to a one-year basis is likely to yield spurious results. It may therefore be helpful to supplement monthly income questions with annual income questions.

10.47. In the Islamic Republic of Iran, both one-month and one-year recall periods were used for both collection and tabulations of data on income. Australia employed a system whereby information about most types of income was obtained on a current basis, whereas certain types of income, including investment income and entrepreneurial income, were obtained for the previous 12 months or financial year.

10.48. In Ireland, the last payment and corresponding pay period are used for wages, salaries, pensions and the like, whereas any recent and convenient 12-month period is used for entrepreneurial income. Brazil used an income reference period of the month preceding the interview in one survey, except for entrepreneurial income and property income, in which cases annual net profits were recorded. The Philippines has used a week's reference period for food, beverages and tobacco and a year for all other expenditure items.

#### (c) *Repeated visits*

10.49. The question of reference period is closely related to the question of whether to make repeated visits to the same household. With repeated visits, reference periods can be kept shorter where appropriate, which improves the reliability of the replies.

10.50. In a Mexican survey, the households were visited three times in a week to check on the recording of household expenditure. In Nepal, the households were visited daily for seven consecutive days. In the 1974/1975 survey in Botswana, 12 monthly interviews were conducted with the sampled households. At each interview, data were collected on one month's income, so that after a year the annual income of the households had been recorded.

#### (d) *Questionnaire design*

10.51. The questionnaire is of crucial importance for a successful survey. It should be kept as simple as possi-

ble to facilitate the work of the interviewers, and its length should be limited to avoid respondent and interviewer fatigue. On the other hand, the questionnaire should be sufficiently detailed to enable the collection of accurate information. Generally speaking, responses to a broad question on income tend to cover only net habitual withdrawals of income. Detailed recording of all income would make it possible to record various income flows separately, including overtime pay, tips, free lunches, and the like, and to record deductions such as taxes and trade union dues separately. A detailed questionnaire can serve two purposes: the inclusion or exclusion of certain items to improve overall accuracy and to obtain detailed breakdowns of items for a wide range of analytical purposes.

10.52. With regard to the measurement of entrepreneurial income, very few surveys, even those specially concerned with family incomes and budgets, inquire in any detail concerning this kind of income. Usually they include only one or two questions on income from business or a profession. One can assume that this kind of broad question receives highly diverse responses but with a marked propensity to record withdrawals made from the respondent's own establishment or independent activity.

10.53. In an effort to simplify the collection of data on income, some countries have used a method whereby the respondents are shown a list of income ranges and asked to indicate into which one their total household income falls. Although this method may be used where the main emphasis of the survey is on another subject and therefore less precise income information is required, there is an obvious risk in this procedure that the respondent will not take care to add up individual income items before selecting a range and therefore will underestimate his income.

(e) *Choice of respondent*

10.54. The choice of respondent can have a substantial effect on the accuracy of survey results. It is possible to select for interviews the head of the household, the spouse, the main earner, each member of the household or some combination of these. In collecting data on income, it may be impossible to obtain information on the whole household income from any single household member. Interviews with all potential income earners, either in a group or individually, are therefore recommended. Where expenditure diaries are used, it is common to supply each adult with a personal diary, in addition to a main diary for common household expenditures to be kept by the household head or spouse. In practice, it may not be possible to gather all household members at the time of the interview. However, in general the main earner should be interviewed for income information and the spouse for data on food expenditure, small housekeeping items and the like. Data on expenditures on durable and semi-durable goods, electricity, rent, hospital bills, tuition, meals and beverages taken outside the home and the like are usually sought from both together.

10.55. In practice it is common that no conscious choice is made of respondents. All responsible members of the household who are in a position to supply the necessary information are accepted as respondents. Even then the information must often be based on the memory of only one person, usually the homemaker.

10.56. The concepts and definitions used in the past in surveys concentrating on household income, consumption and expenditure topics have often been determined separately for each survey. This has resulted in a situation where, on the one hand, it is difficult to make international comparisons of national survey results and, on the other hand, the possibilities of linking and comparing data among various national surveys within one country are limited. As interest in the development of integrated national data bases increases, however, the careful and consistent choice of concepts and definitions is gaining increased attention.

10.57. This section provides information on existing concepts, classifications and definitions and draws attention to some related methodological issues. These mainly concern the selection and definition of statistical units and the definition and classification of expenditures.

1. *Statistical units for data collection and tabulation*

(a) *Elementary units in enumeration*

10.58. The basic statistical or elementary unit used for the purpose of collecting data on income, consumption and expenditure is generally the household. Other concepts, for example, the family within the household, the nuclear family, the spending unit, the individual or the tax unit, are less frequently used. For the purpose of integrating statistics from various surveys it is important that the same elementary units be used in each or alternatively that sufficient information be collected so that similar units can be constructed in preparing tabulations. It may also be of some importance to collect certain information on some individuals separately, for example on servants living in, when these data will be needed to construct other units at the tabulation stage (see the discussion in part one on sampling and elementary statistical units, paras. 4.12-4.16).

10.59. The definitions of the elementary units are of crucial importance and must be clear and precise in order to avoid problems in the field work. Internationally recommended definitions of the household and nuclear family are given in the United Nations population and housing census recommendations (77) and the United Nations provisional guidelines on income and consumption statistics (74, henceforth referred to as the United Nations guidelines). For certain topics, for example earnings of employees, it may be appropriate to use the individual, the earner or the income recipient as the elementary unit in enumeration, as defined in the United Nations guidelines. For collection of statistics on entrepreneurial income, however, individuals are not usually used as elementary units, since in the case of household enterprises the allocation of income among household members who operate the enterprise may not be possible. In the case of expenditures, the individual is generally not the appropriate unit of enumeration, since many outlays relate to the household or family in its entirety. Some countries base their income distribution statistics on tax data. They are thereby often compelled to use the tax unit as the elementary unit in enumeration and tabulation, although this is not desirable

when the definitions of tax unit and household or nuclear family diverge significantly.

(b) *Tabulation unit*

10.60. For many kinds of tabulations, information on income, consumption or expenditure using the household as the unit is not adequate in itself. If, for example, the aim of the survey is to study levels of living it is important to take into account the number of persons in the household. Methods taking into account the age and sex of each household member have also been suggested, in order to calculate the number of adult equivalents in each household. Other approaches have aimed at computing the cost for each individual of basic necessities by age and sex categories and for common household expenditures by household size. Using these methods, income per adult equivalent and a poverty line for each household can be computed. However, these methods have not been standardized or widely applied as yet. A much simpler approach is to divide total income, consumption or expenditure by the number of household members. Although this per capita measure is somewhat crude, it does give an indication of the level of living of the household which is far more informative than total household income or expenditure.

10.61. As a supplementary elementary unit each job may be a useful concept for certain uses, since employees may have more than one job. Likewise, since entrepreneurs may own and operate more than one unincorporated business, the individual enterprise may be used as the elementary unit for entrepreneurial income.

10.62. In the national household expenditure survey of Brazil, living quarters was the sampling unit. Information was collected so that eating units, budget units and "satellite" units could be separately identified as elementary units for tabulations. The satellite unit was defined as a domestic employee or boarder within an eating unit who could decide freely on allocation of his income.

2. *Issues in the choice of statistical units*

10.63. Several conceptual and practical issues commonly arise, whatever the choice of units for enumeration and tabulation may be.

(a) *General*

10.64. While the household concept has not been widely contested as a consumption unit, questions have been raised regarding its meaning as a production unit or income generating unit. The main argument is that persons living in the same housing unit who together make provision for food and other essential items may not necessarily pool their income or make decisions jointly regarding their economic activities. Various situations may arise in different societies. For example, in many African communities an extended family comprising several households may own and cultivate a field together, while cooking and housekeeping arrangements are still made separately by each household level. The consumption unit may also include persons who do not reside with the household although they regularly take their meals in common. The usual concept of household may therefore require consid-

erable adaptation or elaboration in order to be applied consistently in particular societies.

(b) *Link between income and socio-economic characteristics*

10.65. Another issue concerns the problem of linking income characteristics of households with socio-economic characteristics of individuals in multi-earner households. The problem arises because socio-economic characteristics are sometimes ascribed on the basis of characteristics of the head. In multi-earner households this does not provide a reliable measure of the socio-economic situation of the household.

(c) *Persons living in collective living quarters*

10.66. Surveys concerned with income, consumption and expenditure topics are mainly intended for the study of households and persons in households. However, for some purposes, such as compilation of certain income distribution statistics, persons living in collective living quarters may also be included in the survey. Persons living in institutions and camps, where collective provision is made for food and other essentials for living, comprise this population, for example, persons in military barracks and camps, hospitals, homes for the aged, boarding schools, convents, orphanages, prisons and the like (77, paras. 1.229 and 3.73-3.74).

10.67. The United Nations population and housing census recommendations specify that persons living in hotels or rooming houses and the like do not belong in the category of institutional population not living in households "but should be distinguished as members of one-person or multi-person households, on the basis of the arrangements that they make for providing themselves with the essentials for living. Personnel of institutions not living in dormitories or similar accommodations should be treated in the same way" (77, para. 1.230).

(d) *One-person households*

10.68. Several characteristics typical to one-person households make such households different from others. Often they consist of either a young or an old person, the income is often low, the expenditure pattern is unusual and so on. Because of these differences many countries treat one-person households separately. In the family income and expenditure survey in Japan, one-person households are sampled separately from other households. Other countries exclude one-person households altogether from the tables presented in the survey reports. However, this limits the scope and hence the usefulness of the results.

(e) *Lodgers, boarders and domestic employees living in*

10.69. Application of the household concept in a survey covering income, consumption and expenditure topics requires the adoption of agreed conventions for the treatment of lodgers, boarders and domestic employees. For most purposes, it is recommended that the basic criterion of provision for food or other essentials for living be used. Thus, the United Nations income statistics guidelines recommend that boarders, but not lodgers, and domestic em-

ployees living in be included in the household (77, para. 3.9). However, if there are more than five boarders, they are considered as living in collective living quarters (77, para. 3.73). Lodgers are counted as separate households if there is no common provision for food. The treatment of income and expenditure of boarders and domestic employees in the household is discussed in paragraph 10.85 below.

(f) *Stability of the concept over time*

10.70. In defining households according to the house-keeping concept, two principal approaches may be used: the *de facto* approach, which covers all members present at the time of data collection; and the *de jure* approach, which covers all members who are normally resident in the household. There seems to be a general tendency to adopt the *de jure* approach as more appropriate in the case of household income and expenditure surveys. If this approach is used, certain decisions should be made regarding the period of residency required for household membership. A useful working rule is to count as household members those persons who were in the household during more than half of the time period used as the reference period for the main items of data collection. This procedure avoids the risk of classifying a person in more than one household and increases the comparability of the concept of household with the main items of data collection.

10.71. In practice, however, decisions regarding the duration vary. In Spain's family budget survey the household concept requires that members should be present in the household during at least three out of the six months prior to the interview. In a survey in the Dominican Republic a person was counted as a household member if he had been living in the dwelling for at least three months. With the *de facto* approach there is no risk of counting a person as a member of more than one household. However, a problem may arise if the household size or composition is unstable over time. For example, relating household income during the past year with household size at the time of the interview may lead to misleading results if the household size at the time of the survey differs considerably from its average size over the past year. Such changes may be due to births, deaths, persons joining or leaving the household, and other demographic and geographical changes. The *de facto* approach, however, is simpler to implement. Since it classifies non-paying guests and visitors as members of the household, it is suitable when the survey results are to be used for nutritional analysis.

(g) *Households with several housing units*

10.72. In certain countries, it is common that a household occupies more than one housing unit and that the household members are split up among these (77, para. 3.52). For example, in the 1974/1975 Rural Income Distribution Survey in Botswana, households were found to be split up among dwellings in a village, dwellings at agricultural holdings and dwellings at cattle posts. It was decided to treat those present at all dwellings as one household, since frequent movements and exchanges of goods took place during the year of the survey.

### 3. Definition of household income

(a) *Concept*

10.73. The definition of income to be used for household surveys needs to take into account the uses to be made of the survey results. The main criterion for distinguishing household income from other receipts of the household is that household income consists of receipts in cash and in kind which, as a rule, are of a recurring nature accruing to the household or to individual members of the household regularly at annual or at more frequent intervals.

10.74. The United Nations definitions in the income statistics guidelines largely follow the United Nations System of National Accounts (SNA), but with certain minor modifications. In the United Nations guidelines (see table 1 below) two major income concepts are defined: total household income and total available household income. Total household income is defined as the sum of primary income, property income and current transfers and other benefits received. It shows the total current income of the household before direct taxes and before payments of social security and pension fund contributions. Primary income includes compensation of employees (wages and salaries and employers' contributions to social security and similar schemes), income of members from producers' co-operatives and gross entrepreneurial income of unincorporated enterprises. Property income received consists of imputed rents of owner-occupied dwellings, interest, dividends and rent. Current transfers and other benefits received are made up of social security benefits, pension and life insurance annuity benefits and other current benefits.

TABLE 1. INCOME CONCEPTS OF THE UNITED NATIONS GUIDELINES\*

1. Primary income (gross consumption of fixed capital)
  - (a) Compensation of employees
    - (i) Wages and salaries
      - a. In cash
      - b. In kind
    - (ii) Employers' contributions to social security and similar schemes
  - (b) Income of members from producers' co-operatives
  - (c) Gross entrepreneurial income of unincorporated enterprises, including withdrawals from quasi-corporate enterprises
2. Property income received
  - (a) Imputed rents of owner-occupied dwellings
  - (b) Interest
  - (c) Dividends
  - (d) Rent, royalties, patents, copyrights etc.
3. Current transfers and other benefits received
  - (a) Social security benefits
  - (b) Pensions and life insurance annuity benefits
  - (c) Other current transfers
4. 1 + 2 + 3 = total household income
5. Direct taxes paid
6. Social security and pension fund contributions
  - (a) Social security
  - (b) Pension fund
7. 4 - 5 - 6 = total available household income

\* (74, table II.1).

10.75. Total available household income is the amount available to households for final consumption expenditure and other outlays that are generally not obligatory, and for saving. It is derived by deducting direct taxes and social security and pension fund contributions from total household income.

10.76. For computing several of the income items, it is not feasible to obtain all of the necessary information from the households in monetary form. Part of the income may, for example, be received in kind, such as free meals as part of wage income or own consumption of agricultural production as part of entrepreneurial income. In these cases the monetary value will have to be imputed based on data collected on physical quantities. This matter is further discussed below.

#### (b) Correspondence with other bodies of statistics

10.77. For conceptual and practical reasons there are several differences between the concept of household income as defined in the United Nations guidelines and concepts used for other purposes. In relation to the United Nations System of National Accounts, there are two major differences. One is that employers' contributions to funds or reserves relating to pension, family allowance, insurance and similar schemes for employees, except to social security and similar schemes, and the imputed contributions of employers when these schemes are unfunded, are not covered by the income concepts defined in the United Nations guidelines, although they form part of the compensation of employees in SNA. The principal reasons for excluding such items from the concept of household income are that (a) their inclusion would imply double counting in aggregate terms since pensions and other related receipts are considered as part of household income, and (b) their values are usually unknown to the households and therefore cannot be reported in household surveys.

10.78. Another major difference between the two concepts is that in SNA, receipts from private pension funds, life insurance, annuities and the like are treated as reductions in the accumulated savings of households, while they are treated as transfer income in the guidelines. The principal argument here is that households generally regard these receipts as income rather than drawings from savings and, therefore, they should be treated as such.

10.79. Certain items which are treated as income of the household sector in the national accounts are not treated as household income in the guidelines. These items, which include lump-sum payments in respect of industrial injuries or payments by insurance companies or by other sources for damages incurred by fire, earthquake or floods, are essentially capital and not income transfers. These and other minor differences between the United Nations guidelines and SNA are discussed in the guidelines (74, table II.2).

#### 4. Issues in the definition of income

10.80. The concept of income as defined in the United Nations guidelines raises several issues, which are examined below.

#### (a) Regularity of receipts

10.81. As mentioned earlier, one element distinguishing income from other receipts of the household is regularity. As the borderline between regularity and irregularity is not always clear, the question arises as to what constitutes regular receipts. The United Nations guidelines are not comprehensive on the question of how to treat *ad hoc* income, lump-sum income and windfall profits. Consider, for example, the migrant worker who sends remittances to family members living elsewhere. In principle such transfers should be treated as capital transfers if they are only occasional or irregular. However, it may be difficult to devise appropriate practical criteria to make this distinction. Another example is New Year gifts, which in some cultures may be of a substantial nature. One may argue on the basis of the regularity criterion that such gifts should be considered as current transfers while occasional gifts should be considered as capital transfers. However, it can also be argued that whether or not the gifts are regular, their nature is the same and, therefore, they should be treated uniformly in both cases.

#### (b) In-kind receipts

10.82. Other borderline issues may arise in connection with the determination of in-kind receipts. Regarding compensation of employees, the United Nations guidelines state, "Payments of wages and salaries in kind cover goods, housing and other commodities, whether produced in the employer's business or purchased by him from others, that are provided to employees free of charge or at reduced prices . . . In spite of the difficulties of gathering data on income in kind from household surveys, they are of great utility and every effort should be made to obtain them, particularly in developing countries" (74, para. 4.8). However, the guidelines also state that "Only items that may be unambiguously allocated to individual employees in their capacity as consumers should be included in remuneration in kind" (74, para. 4.11). This excludes most health, education and similar services which are provided by the employer on the job or for work-related reasons. Similarly, current transfers of goods and services provided to the households by government agencies, private non-profit institutions and the like should be included in household income under current transfers "if the individuals receiving the goods and services are free to select the producers that are to furnish them and the terms on which they are supplied" (74, para. 4.34).

#### (c) Non-income receipts

10.83. Household expenditure may be financed in part through receipts which are not included among the income concepts mentioned above. Information on such non-income receipts may be of value if the financial flows in the household sector are of interest. Non-income receipts consist of withdrawals from savings, receipts from sales of possessions, net borrowing, loan payments received and capital transfers received. In the guidelines, capital transfers are defined so as to include (a) casualty insurance benefits from life insurance companies except life annuities, (b) receipts of payments to cover damages incurred during war, floods and other calamities, (c) receipts through inheritance and transfers of capital from individ-

uals, and (d) investment subsidies in respect of unincorporated enterprises included in the household sector.

(d) *Consumption of fixed capital*

10.84. It is assumed in the United Nations guidelines that information needed to estimate the consumption of fixed capital in unincorporated enterprises of households is not likely to be available directly from the households. Therefore, it is recommended that income from entrepreneurial activities be taken as gross of consumption of fixed capital. (In SNA this income item is defined net of consumption of fixed capital.)

(e) *Incomes of boarders and domestic employees living in the household*

10.85. According to the United Nations guidelines, the wages of domestic employees and labourers in household enterprises who live with a household and are therefore considered members of it should be included in the household's income. However, some countries consider that this procedure increases household income artificially and so do not add such wages to the household income. In any case, however, the amounts earned outside the household by such persons should be counted as household income.

(f) *Income data from administrative sources*

10.86. Several countries, including Belgium, Norway and Sweden, base their income distribution statistics mainly on data obtained from the taxation authorities. Where this procedure is used, it may still be necessary to obtain supplementary information on tax-free receipts. In Norway's statistics on low-income groups for 1973, information on certain tax-free receipts such as family allowances had to be obtained from other sources, and for Sweden's annual income distribution publications additional information is obtained from government insurance offices, social benefit bureaux and other authorities.

(g) *Household production on own account*

10.87. Occasionally the expression "subsistence production" is used in place of "production on own account". What is referred to is, in both cases, the output of a particular activity which is not exchanged but retained by the producers for their own use. SNA (55) recommends that all production of primary products (that is, the characteristic products of agriculture, fishing, forestry and logging and mining and quarrying) should, in principle, be included in gross output, whether for own-account consumption, for barter or for sale for money. Such production should therefore be included in entrepreneurial income and that portion which is consumed on own account should be included in the final consumption expenditure of households. SNA also recommends that the rent of owner-occupied dwellings (para. 6.22) and the production of fixed assets on own account (para. 6.23) should be included in gross output. As receipts these should be recorded under imputed rents and gross saving and as disbursements under final consumption expenditure and gross capital formation.

10.88. In addition, SNA states, "It is also desirable to include in gross output (i) the output by producers of other commodities which are consumed in their households and

which they also produce for the market and (ii) the processing of primary commodities by the producers of these items in order to make such goods as butter, cheese, flour, wine, oil, cloth or furniture for their own use though they may not sell any of these manufactures" (para. 6.19). Some countries believe that this recommendation is too restrictive and that additional activities might be added, depending on what is found to be significant in any country at any given time. However, it is generally agreed that imputed values for general household duties should not be included in household income. Imputed values for time spent preparing food, watching children, cleaning and the like are thus excluded.

## 5. *Definition of household expenditure*

(a) *Concept*

10.89. As in the case of household income, the complete and consistent definition of household expenditure is an essential component of the design and implementation of a successful survey on this topic. It is important to distinguish between household consumption expenditure, non-consumption expenditure and other disbursements. The United Nations guidelines provide recommended definitions, consistent with SNA.

10.90. The guidelines identify two concepts of final consumption: final consumption expenditure of households and total consumption of the population. Final consumption of households includes all cash expenditure on goods and services intended for consumption, goods produced and consumed on own account, including the imputed rent of owner-occupied housing, and goods and services received in kind. Sales taxes paid on goods and services purchased should be included. The information needed to compute final consumption expenditure of households can usually be obtained directly from the households.

10.91. Final consumption expenditure does not include income taxes and other direct taxes, pension and social security contributions and related insurance premiums, remittances, gifts and other transfers, gambling losses and similar expenditures. Total consumption of the household is defined in the United Nations guidelines as the sum of final consumption expenditure of households, consumer debt interest paid, other current transfers paid, the value of goods and services supplied free or at reduced charges to the households by Government and private non-profit bodies and industries, and subsidies paid by Government which are included in the total consumption of the population. The information needed to compute total consumption of the population cannot be obtained from the individual households, nor can the data, where they are available from administrative records and other sources, be linked to individual households. However, it may be possible, on the basis of information obtained from surveys and other sources, to estimate the distribution of total consumption of the population according to broad socio-economic groups, as recommended in the United Nations guidelines (74, tables 2 and 3).

(b) *Correspondence with other recommendations*

10.92. The definition of final consumption expenditure of households in the United Nations guidelines differs in certain respects from that of the System of National Ac-

counts. For example, expenditures on motor vehicle registration, driving licences, radio licences and the like are considered in SNA as either direct taxes or compulsory fees, fines and penalties, while they are included in the flow "other current transfers paid" in the guidelines. SNA includes, in respect of casualty and life insurance premiums, only service charges among final household consumption expenditure, whereas in the United Nations guidelines insurance premiums are recorded gross.

## 6. *Issues in the definition of expenditure*

10.93. The choice among various approaches in quantifying consumption expenditures, the determination of differences among consumption and non-consumption expenditures and other household disbursements, and the relationship of these concepts with national accounts and other bodies of statistics are issues that require examination in planning household expenditure surveys.

### (a) *Application of the reference period*

10.94. In collecting information on consumption expenditure, there are three different approaches to applying the reference period:

(a) Collecting information on goods and services actually consumed during the reference period;

(b) Collecting information on goods and services delivered during the reference period irrespective of whether or not they were wholly paid for during the period;

(c) Collecting information on the payments made for goods and services during the reference period without regard to whether or not they were delivered during the period.

10.95. The first approach requires that changes in stocks during the reference period be ascertained, that is, the stocks should be measured and valued at the beginning and end of the reference period. For durable items, this could even involve ascertaining the amount of depreciation during that period. The second and third approaches relate to outlays on goods and services for purposes of consumption and may be jointly referred to as the acquisition approach. The difference between these two versions lies mainly in the treatment of items bought on hire purchase or other forms of credit, since payments much in advance of delivery are relatively infrequent.

10.96. The choice of approach largely depends on the nature of the economy or the branch of the economy concerned. Where the consumption of essential items is largely from home produce or from payments in kind received seasonally or even annually, the consumption approach ((a) above) seems to be the most appropriate. However, because of the great difficulty of measurement in the consumption approach, most household expenditure surveys in developed countries and in the urban areas of developing countries are based on the second or third approaches. Regarding durable goods bought on credit, SNA recommends including under total household consumer expenditure the value of the purchases, recording the amounts owed and treating instalment payments as reductions of liabilities.

10.97. Whatever the approach adopted, it is preferable to use the same one for all regions of a country and for all items of consumption expenditure within the same survey

in order to avoid problems in connection with the aggregation of the results.

### (b) *Non-expenditure disbursements*

10.98. Certain household disbursements are not covered in the household consumption expenditure concept. These are direct taxes, social security and pension fund contributions, consumer debt interest, other current transfers paid, gross capital formation and net lending. Gross capital formation covers, for instance, increases in stocks in household enterprises and net purchases of land and intangible assets. Although these items are not included in household consumption expenditure, it may be feasible and useful to collect information on them for use in making estimates for national accounts and for other special purposes.

### (c) *Income and expenditure relationship*

10.99. For every imputed value of income in kind there should be a corresponding consumption expenditure value. Thus, the imputed net rental value of owner-occupied housing, home-produced food and other own-account goods and services are recorded both as household income and as consumption expenditure. Those items of activity on own account which are not recorded as income (see paras. 10.87 and 10.88 above) should not be included as household consumption expenditure.

10.100. One type of discrepancy which can arise between income and expenditure involves the sale and purchase of used items among households. Such purchases are often counted as household consumption expenditure of the purchasing household, but since, in principle, the cost of the original purchase was also recorded as household consumption expenditure of the original owner, total household consumption expenditure at the aggregate level is improperly increased by the amount of the inter-household flows. To avoid this double-counting, the value of sales of used items should, in principle, be recorded as negative consumption expenditure for the selling household and positive consumption expenditure for the purchasing household.

## E. DATA REQUIREMENTS AND CLASSIFICATIONS

10.101. The basic data to be collected on household income, consumption and expenditure in surveys include items of income and other receipts, items of expenditure and other disbursements and information on general characteristics of the household and its members. Certain items of income, consumption and expenditure cannot easily be obtained through a household interview. For others, a range of questions may have to be asked to obtain sufficient information for each item. In the case of income and expenditure in kind special arrangements have to be made for collecting and processing the information.

### 1. *Household and individual characteristics*

10.102. It is important to be able to relate information on income, consumption and expenditure to other information on the household and its members, since this information is needed to prepare tabulations from which a range of meaningful inferences can be drawn. Such infor-

mation can be collected in conjunction with the income and expenditure data, or can be obtained by linking data from various sources (67, 111).

10.103. General household and individual characteristics on which data are collected routinely in household surveys are discussed in chapter IX above and in the United Nations population and housing census recommendations. More detailed information on various topics is included in the other chapters of the *Handbook*. A comprehensive review of social, demographic and related topics, including references and illustrations of international recommendations and national work, was published by the United Nations in 1978 (65, parts two and three). References to all of the applicable international recommendations on statistical concepts, classifications and definitions are also given in part A of the bibliography of the present *Handbook* (31, 69, 77, 109, 118, 124 may be of special interest).

## 2. Household income and other receipts

10.104. As indicated previously, the collection of information on income by detailed items rather than by aggregated groups usually results in more accurate total incomes, since misunderstandings and omissions are less likely to occur. In addition, there is an advantage in obtaining itemized information which can be used for a wide range of special studies. These are substantially facilitated by modern, automated data storage and retrieval facilities, which make it much easier to store and retrieve data in its original disaggregated form and to calculate a variety of aggregates. To obtain accurate information in an interview it is often necessary to subdivide an income item into sub-items, each represented by a question which is clearly defined, so that there can be no doubt as to what information is requested. Certain information may not be known by the households themselves, and if it is considered vital to the survey results it may be decided either to impute it or to obtain it from other sources, for example from employers or administrative records.

10.105. Household income in kind is sometimes a major portion of total income and it may therefore be of crucial importance to cover it in a survey. This is normally best done through instructing the interviewers to describe carefully the goods or services received in terms of quantity, quality and the like, and to assess the value centrally in the statistical office. It is thereby possible to ensure that consistent and logical evaluation methods are used. To facilitate the work of the enumerators it is convenient to allow them to use whatever units of measurement they are familiar with and to convert the measures to standardized units at a later stage. As each income item is recorded, the individual who received it should be noted, whenever possible, so that it can be cross-classified with the individual's other characteristics.

10.106. Data requirements and some classification issues for each of the main income sources are discussed below.

### (a) Wages and salaries

10.107. Information on wages and salaries should be collected gross of taxes and separately for each individual and for each job held. The amounts should include payments such as commissions, tips and bonuses, cost-of-living allowances and paid vacation, holiday and sick leave

and other direct pay by the employer for relatively short absences. Payment by employers of taxes and social security and pension fund contributions should be recorded separately (see below). The salaries and wages of domestic employees and workers paid by the household should be recorded as income even if these persons are household members. Wages and salaries in kind, such as food, housing and other goods and services that are provided to the employee free of charge or at reduced prices, should be carefully described so that their value can be estimated.

10.108. Because employees may not have information about their employer's actual contributions to pension and similar schemes and cannot impute contributions when these schemes are unfunded, these items are not included in wages and salaries as defined in the United Nations guidelines. Employers' contributions to social security and similar schemes are included by the guidelines, but it may be difficult to gather this information as well. Unless the amount can be imputed or obtained from administrative records, it may be necessary to omit this income item.

### (b) Income of members from producers' co-operatives

10.109. The data requirements for this income item do not differ from those for other entrepreneurial activities. These include incomes and distributed profits of the members who participate in the operation and management of the co-operative. The incomes of persons who are employed by the co-operative are treated as wages and salaries. In SNA, income of members from producers' co-operatives is combined with and classified under gross entrepreneurial income.

### (c) Gross entrepreneurial income of unincorporated enterprises

10.110. This income item is one of the most difficult ones on which to collect information and one which is often seriously affected by underreporting. Imprecise questions, fear of taxation and lack of controls together have contributed to this situation. Due to these difficulties it is important to put special emphasis on the collection of information for this item.

10.111. As indicated above, a subdivision into detailed items should be made. In many cases it may be useful to construct the questionnaire in such a way that there are sections of questions on gross output, household consumption and sales, respectively, for each field of activity, such as agriculture, animal husbandry, trade, manufacturing, construction, services, forestry, fishing, hunting and so on. Within each field a further breakdown is required, for example listing various crops, various kinds of animals and the like. National circumstances should determine which products should be specifically noted. As a general principle, only a small number of items should be left in the category "others".

10.112. For each field of activity, it is necessary to inquire about current business expenses in order to provide information for calculating operating surplus. Such expenses may, for example, be for seed, fertilizers and wages paid out in the case of agriculture. It may be difficult to separate current outlays for the household itself from outlays for business purposes. A similar problem exists occasionally in separating capital from current business expenditure. In both cases careful and detailed ques-

tioning is necessary to obtain the desired degree of detail in the information.

10.113. For quasi-corporate enterprises the problem is much less, since enterprises of this type keep regular books and thus separate the economy of the business from the household economy. Since undistributed profits do not enter the household sector they do not have to be covered in a survey of household income. It is thus sufficient in this sector to inquire about withdrawals of income from quasi-corporate enterprises. The United Nations guidelines recommend that entrepreneurial income should be estimated gross of consumption of fixed capital, since information on the latter may be difficult to obtain from the household. If, however, information is collected on assets it may be possible to impute the consumption of fixed capital from the values of those assets which are used in the entrepreneurial activities. Such an imputation is essential if entrepreneurial earnings are to be compared with wages and salaries.

10.114. One conceptual issue which may arise concerns the treatment of changes in livestock holdings. SNA recommends that changes in holdings of livestock raised for slaughter and of all fowl be considered part of entrepreneurial income (55, para. 6.108). In some countries such changes may have a considerable impact on rural incomes and thereby introduce large fluctuations from year to year. In such cases it is desirable to show these data separately wherever possible.

(d) *Imputed rents of owner-occupied dwellings*

10.115. As with income in kind in general, the value of rents for owner-occupied dwellings should be imputed after data collection to ensure a consistent and uniform valuation procedure. It is therefore important that the interviewers record sufficient information on each dwelling's size, number of rooms, building material, equipment, location and the like, to enable an appropriate imputation of the rent to be made.

10.116. The imputed rent should represent the gross rent normally paid for a dwelling of the specified kind minus expenditures on current maintenance and upkeep and minus mortgage interest paid. In the United Nations guidelines imputed net rental income for owner-occupied dwellings is classified as property income. In areas where no dwellings are rented, it may be preferable to estimate the rental value as the value of construction multiplied by a normal interest rate on savings plus depreciation. For example, in an urban survey in Israel in 1975-1976, the imputed housing item was valued as the opportunity cost of capital invested in the dwelling plus the value of depreciation. In Sweden's income distribution statistics the imputed value of owner-occupied housing is taken as the normal interest rate on that portion of the market value of the house which exceeds the loans for it. Where rents are imputed for dwellings provided to employees by their employers free or on a subsidized basis, the imputation is made as an addition to wages and salaries paid in kind, and valued at the cost to the employer.

(e) *Interest, dividends and rent*

10.117. It should be clearly determined through appropriate questions which part of income refers to property income. Rents and royalties received for the use of build-

ings, land, copyrights and patents should be asked about separately and classified under rent. Receipts of ordinary rents may refer to various kinds of property, such as land, buildings or equipment. Interest income may be obtained from financial claims, such as savings deposits, bonds and loans, as well as for credit given to other households or enterprises. Information on expenditure incurred in connection with income from property should be recorded for each income item. Such expenditure may, for example, be for taxes, current maintenance costs and, particularly for rental income, mortgage interest paid.

(f) *Social security benefits*

10.118. This item should include current transfers from public authorities to the household. Examples of such transfers are unemployment insurance benefits and supplements, accident, injury and sickness benefits, old age, disability and survivors' pensions, family allowances and reimbursements for medical and hospital expenses.

(g) *Pensions and life insurance annuity benefits*

10.119. Receipts of pensions which are to be recorded here are those which are not part of a social security scheme. They may either be paid out of an independently organized pension fund which relates to specific groups of employees or be paid by an employer in respect of unfunded pension schemes. Life insurance annuities refer to survivors' current receipts from insurance companies. Lump-sum insurance benefits such as casualty insurance claims (for example, payments for damages by fire) are not to be recorded here since they are considered as capital transfers.

(h) *Other current transfers*

10.120. This item includes transfers to the household which have not been covered in the previous items. They are consequently of a non-contractual nature, including for example social assistance payments from government agencies, fellowships from non-profit institutions, unfunded employee welfare benefits from enterprises and gifts from other households.

### 3. *Household expenditures and other disbursements*

10.121. Depending on the characteristics and objectives of the survey and the resources available, the level of detail requested in data collection may vary considerably. In many developed countries households are asked to record all consumption expenditure by individual items with indications of price, weight, volume and quality in addition to name and description of the item. In countries where, due to illiteracy or other reasons, household expenditure surveys have to be undertaken through interviews rather than through diaries or other written forms completed by the household members themselves, it is often not possible to obtain expenditure data in such detail. However, it is still feasible in the two cases to use the same basic classification of expenditures, since such classifications usually include different levels of detail.

10.122. Even if careful instructions are provided to the households and/or the interviewers, substantial editing has to be done centrally to check classifications and to separate non-expenditure disbursements from household

consumption expenditures. A special problem arises in connection with households engaged in entrepreneurial activities, since it is not always easy to distinguish expenditures related to the business from household consumption expenditure. If, for example, a household runs a small restaurant, purchases of food for the restaurant should be treated as business expenditures, whereas food purchased for the household's own consumption should be classified as household consumption expenditure. In practice, however, the household may not be able to separate the two kinds of expenditure if purchases and stockholdings are joint.

(a) *Classifications*

10.123. The United Nations SNA includes a classification of household goods and services for the classification of consumption expenditures (55, table 6.1), of which the first two levels are shown in table 2 below. The goods and services are classified according to the object of or purpose to be served by the outlay. Items are distinguished as services and non-durable, semi-durable and durable goods. In compiling price and quantity index numbers, developing countries usually apply classifications which correspond broadly to the one-digit level of table 6.1 of SNA. Food, beverages and tobacco, however, are usually classified in further detail, corresponding to the two- or three-digit levels of the SNA classification. Developed market economy countries generally apply a classification which corresponds broadly to the two-digit classification of SNA.

TABLE 2. CLASSIFICATION OF HOUSEHOLD GOODS AND SERVICES\*

1. Food, beverages and tobacco
  - 1.1 Food
  - 1.2 Non-alcoholic beverages
  - 1.3 Alcoholic beverages
  - 1.4 Tobacco
2. Clothing and foot-wear
3. Gross rent, fuel and power
  - 3.1 Gross rent and water charges
  - 3.2 Fuel and power
4. Furniture, furnishing and household equipment and operation
  - 4.1 Furniture, fixtures and floor coverings
  - 4.2 Household textiles, other furnishings and repairs
  - 4.3 Heating and cooking appliances, refrigerators, washing machines and similar major household appliances, including fittings and repairs
  - 4.4 Glassware, table-ware and household utensils, including repairs
  - 4.5 Household operation except domestic service
  - 4.6 Domestic service
5. Medical care and health expenses
6. Transport and communication
  - 6.1 Personal transport equipment
  - 6.2 Operation of personal transport equipment
  - 6.3 Purchased transport
  - 6.4 Communication
7. Recreation, entertainment, education and cultural services
  - 7.1 Equipment and accessories, including repairs
  - 7.2 Entertainment, recreational and cultural services, excluding hotels, restaurants and cafes
  - 7.3 Newspapers and magazines
  - 7.4 Education
8. Miscellaneous goods and services

\* (55, table 6.1). Only the first two levels are shown.

10.124. Countries should ensure that the classification adopted for national accounts purposes is compatible with any classification which may be developed for other purposes, such as compilation of the consumer price index. In this way expenditure and price data can be related, and the data in the national accounts compared to data obtained in income and expenditure surveys.

(b) *Direct taxes*

10.125. Amounts paid by household members for direct taxes may either be deducted by the employer before the wage or salary is paid out or be paid personally by the income earner. It is particularly important in the case where only a net wage or salary is received to make sure that gross income is recorded under the appropriate heading and that the direct tax is recorded separately. Indirect taxes, such as value-added tax, should be recorded under household consumption expenditure as part of the price of each purchased item.

(c) *Social security and pension fund contributions*

10.126. This item refers to contributions paid by the employers themselves. It sometimes occurs that these contributions are deducted together with direct taxes from the wage or salary before it is paid out. It is therefore necessary to determine whether or not the reported wage or salary is gross of social security and pension fund contributions. Some other non-consumption expenditure disbursements are noted in paragraph 10.90 above.

4. *Measurement issues*

10.127. Economic transactions in kind are of considerable importance in many countries, particularly in developing countries. It is not uncommon to find in some cases that household income in kind constitutes more than half of the total household income. In developed countries income in kind usually appears in the form of employment benefits, for example free lunches, and rental value of owner-occupied dwellings. In order to assess the total income of a household it is necessary to impute the values of the non-cash income items. In order to ensure that consistent and correct valuation methods are used it is preferable to impute the values centrally, after data collection, based on information obtained in the field by the interviewers.

10.128. Goods and services which are obtained from own production, as payment for work or as gifts and which are consumed in the household, may be valued either at producers' prices or at retail prices. SNA recommends that production on own account be valued at producers' prices. This furnishes a measure of the income foregone in consuming the commodities rather than selling them.

10.129. The prices to be used for imputation purposes should, according to the United Nations SNA, refer to the same or neighbouring localities (55, para. 6.21). However, many countries have used prices computed as averages for the whole country. Many other approaches to valuation have been considered and used by countries, particularly valuation at local retail prices, taking into account practical problems of data collection and various uses of the information collected. These are discussed fur-

ther in the United Nations guidelines (74, paras. 4.18-4.20).

10.130. Whatever basis of valuation is used, it is important that it be used for both the income and expenditure sides of the household account. If the imputed value is significant, it should be recorded separately from other income and expenditure.

A special measurement problem arises in countries and periods of exceptionally high inflation. In such cases it may not be possible to use the data collected during a period of a year without some adjustments. In Israel a method was introduced in 1975 whereby household incomes are discounted with a quarterly index to obtain comparable incomes over time.

## F. EVALUATION, TABULATION AND PRESENTATION OF RESULTS

10.131. After the data have been collected, it is necessary to make certain adjustments and to evaluate their quality. Only after these adjustments have been made and the quality of the data has been assured is it feasible to tabulate the results and to prepare general and special reports.

### 1. *Adjustment and evaluation of results*

10.132. The raw data collected on income, consumption and expenditure topics have to undergo several important procedures before they are ready for tabulation. For example, transactions in kind must be assigned monetary values as discussed above, and if different reference periods have been used a standard one has to be implemented.

10.133. In order to assess the validity and reliability of the results, it is necessary to carry out checks of the data. In the case of income, consumption and expenditure topics, many logical checks are possible. Examples of illogical responses may be that no schoolchildren are recorded in the household although school fees have been recorded among expenditures, that income from employment appears although no employment has been recorded and the like. Another way of evaluating the data is to compare aggregate income with aggregate expenditure. Due to the difficulties of obtaining reliable income data, it is commonly found that reported expenditure considerably exceeds reported income. Thailand carried out such a check through preparing an account balance sheet for each household, where total money disbursements were compared to total money receipts for the preceding month. If the account was out of balance by more than 15 per cent, a reinterview of the household was undertaken.

10.134. Comparisons of aggregate data obtained from other sources of statistics, whenever available, are also desirable. Often, national accounts data contain useful information for comparisons of household income, consumption and expenditure series. Among countries which have done comparisons with national accounts, it is commonly found that the survey coverage of income from wages and salaries is far better than the coverage of entrepreneurial income. In Turkey the aggregate income reported in the survey was about 85 per cent of the corresponding national accounts figure.

10.135. Another possibility of evaluation is to compare aggregate household expenditure for certain selected items with sales data for the same items. For major commodities, it may be possible to check whether production plus imports and stock changes equals consumption plus exports. Particular care should be taken to evaluate replies on items which are known to produce problems, such as entrepreneurial income, property income, consumption of alcoholic beverages and the like.

### 2. *Tabulations*

10.136. It is extremely important that a realistic but thorough tabulation programme be planned and presented in the survey report. In many countries this may be the most important source of information on the economic conditions of households. The United Nations guidelines contain detailed proposals for tabulations of income, consumption and expenditure statistics, but no internationally accepted standards for tabulation exist at present and national tabulation practices vary considerably. Other suggestions and illustrations for tabulations of income, consumption and expenditure series and indicators have also been issued by the ILO (33) and the United Nations (66, 76). Some of the characteristics which are most commonly recommended for cross-classification in tabulations are socio-economic group, size of household and type of household. Others which may refer to the head and to other individuals are sex, age or age group, urban-rural, level of educational attainment, occupation, type of activity, kind of economic activity, geographical area, national or ethnic origin and main source of income.

10.137. The listed sources for tabulations usually suggest that income-related tables should show the number of households by size groups of total household income per household and per capita and/or number of households by size groups of total available household income per household and per capita. Also, total household income and total available income should be classified by fractile groups of households ordered according to size of total household income and per capita total household income and/or according to size of total available household income and per capita total available household income. For these tabulations the classification variables mentioned in the previous paragraph should be used. Among the suggested expenditure tabulations, average and per capita household expenditure per item or subgroup of items, cross-classified by ranges of household income, is given highest priority. Average and per capita household expenditure by percentile groups of households as well as number of households by expenditure size groups cross-classified by major household characteristics are also of high interest.

10.138. Apart from income and expenditure, tabulating some other variables such as gross capital formation and ownership of selected durables is suggested. They may be cross-classified by income size groups or by percentile groups of households ordered by total household income. For many of the above-mentioned tabulations, it is of great interest to show separately the values of transactions in kind. The estimated expenditure equivalent of income in kind should be shown separately in the expenditure tables for at least the following broad categories of expenditures: (a) housing, (b) food, (c) other goods and

services. The classifications by fractile groups of households and household members noted above are of particular importance for international comparisons, since they do not require any conversion of data expressed in national currency to a common basis.

10.139. A common weakness in some presentations of income data is that distributions and averages are usually done on a per-household basis, whereas a per-household-member basis would adjust for household size. However, occasionally income is classified by size of household.

10.140. Another common disadvantage with some income distribution presentations is that average income of deciles or other fractiles of households is not shown. A fractile presentation including the average in each fractile has definite advantages over the more common tabulation of households by income size groups in that it is easier to get a quick grasp of the distribution and international comparisons are easier. In addition, tabulations of households by income size groups are sometimes undertaken with very few and crude income groups, where a more detailed tabulation would provide much more useful information.

10.141. Usually only one income concept is used in the tabulations. If the impact of direct taxes and the like is negligible, this procedure is sufficient, but if taxes are high, the value of the information is much less. Consumption expenditure is usually presented as average household expenditure by expenditure item or group of items. As with income, per capita figures are rarely computed. Occasionally, average household expenditure is presented cross-classified by income size.

### 3. Analyses

10.142. When the data have been collected, evaluated and tabulated, it is possible to employ them for a range of analyses. Income data may be utilized for analysis of income distribution, poverty or living conditions. By computing household expenditures at the lowest acceptable level of living and comparing this to the actual incomes, the number of households in absolute poverty can be estimated. For income distribution analyses it is common to compute summary distribution measures such as the Gini coefficient, the maximum equalization percentage, the coefficient of variation or the interquartile range. A related field of major importance is the study of the redistributive effects of taxes and government benefits. The data may also be used to study the effect of alternative tax systems and fiscal policies, for example, direct taxation versus indirect taxation. By analysing the household expenditure or the budget share spent on various commodities at different levels of income or total expenditure, estimates of price and income elasticity can be obtained and demand equations can be estimated.

10.143. The distributive effects of economic growth can be estimated through analysing the amount and share of the society's total household income received by different income classes at different points of time. By analysing the income of different occupations and the number of individuals in different trades, useful information may be obtained for manpower planning. In some countries it is felt that however well planned a survey is, the information collected on household income will still be incomplete. The United Kingdom of Great Britain and Northern Ireland and the United States of America have therefore de-

veloped methods whereby data obtained from household surveys are combined with information obtained from other sources, such as taxation records and records on social benefits (67). Among other prerequisites, compatible concepts and classifications are essential for all the surveys and records to be used.

### 4. Presentation

10.144. Income, consumption and expenditure data should be published in as much detail as possible in order to make the results useful to a wide range of users. The results of the survey should be presented together with a description of the methods employed in obtaining them (sample design, field work procedure and so on) so as to assist in the interpretation of the data. An indication of the variances of the sample data should be given for important income and expenditure items. Information should also be provided on the response rates for various strata of the population as well as on the theoretical and original sample and the effective response. Other factors which may have influenced the reliability of the survey data should also be mentioned, together with the results of any evaluation made concerning the significance of non-sampling errors. Information should be given on the definitions applied, classifications used and methods of evaluating transactions in kind.

10.145. For international comparisons of total household consumption of goods and services, it is very useful if the presentation contains complementary information on the total cost and numbers of beneficiaries of various public and other social services received free of charge. Services received free from other households or from voluntary service organizations are also an important contribution to the level of living of some households. If possible, the survey report should draw attention to these services whenever appropriate.

### G. DEVELOPMENT AND MAINTENANCE OF THE DATA BASE

10.146. In recent years the opportunities for making continued use of survey data after the basic tabulations and reports have been prepared have expanded enormously, because of rapid advances in various data processing technologies. To take maximum advantage of these opportunities, a data base, that is, a body of related micro-data based on the original forms, must be built up and maintained in such a way that the data are available for repeated use. With the data base concept, all the unaggregated data are preserved in an accessible form. The data base concept is of particular interest for a wide range of socio-economic studies, since such uses normally require a combination of information from various subject-matter fields such as income, expenditure, employment, health, housing and so on.

10.147. To enable active, flexible and easy use of the data base, a considerable degree of co-ordination and integration is required. Harmonized concepts, classifications and definitions are required for the collection and compilation of statistics across different fields and sources. Important sources to be considered in planning a data base include population censuses and administrative records, among others, as well as sample surveys.

10.148. At the early stages of statistical co-ordination and integration, the important benefits are mainly the increased opportunities for comparing and combining results of different surveys. In more advanced work, various techniques of matching or generating household data can be considered, using data from several sources, such as sample surveys, population censuses and administrative records.

10.149. The United Nations publication on the devel-

opment of integrated data bases (67) discusses techniques of collecting, storing, managing and disseminating data. It points out that the availability of micro-data provides flexibility regarding tabulations since it preserves options for multi-purpose and unforeseen uses. Relative to aggregate data, the importance of reconciliation of survey data with aggregate control totals as well as of consistency in the choice of definitions, concepts, classifications and reporting units is stressed.

## XI. EMPLOYMENT AND WORK\*

11.1. Labour has a dual role in the economic process. It is both an input to production and a source of income. Although initially data collection and analysis emphasized the former to a greater extent, now the two roles are increasingly receiving balanced attention. Partly as a result, data on productive and earning activities, both actual and potential, of the economically active and inactive populations are increasingly sought and used for an ever wider variety of purposes.

11.2. In this chapter, some of the objectives and uses of labour force statistics are reviewed and major sources including survey programmes are examined in section A; the main conceptual approaches for the measurement of the economically active population are discussed in section B. This is followed in section C by a list and description of the primary items for data collection, including a minimum core of labour force items to consider for surveys or survey rounds that concentrate on other topics. In section D, some measurement and practical problems involved in implementation of labour force topics in household surveys are examined, and finally in section E possibilities of tabulation, evaluation and analysis of survey results on labour force topics are mentioned.

### A. OBJECTIVES, USES AND SOURCES OF EMPLOYMENT AND UNEMPLOYMENT STATISTICS

#### 1. Objectives and uses

11.3. Initially, a prime objective of the systematic collection of employment statistics in the industrialized countries was to provide information on the productive work force and its occupational characteristics as a basis for measuring industrial output and its effect on the structure of the economy. Subsequently, following the severe economic crisis of the 1930s which brought about massive unemployment in many countries, especially in the United States of America and other industrialized countries, the objective shifted to the measurement of unemployment and other related characteristics based on newly defined concepts. These data were intended to guide policy-makers primarily in making decisions regarding employment creation programmes to increase production but also

\* This chapter was prepared before the adoption of the new international standards concerning statistics of the economically active population, employment, unemployment and underemployment, by the Thirteenth International Conference of Labour Statisticians, which held sessions in Geneva from 18 to 29 October 1982. This resolution of the Thirteenth Conference supersedes the resolution concerning statistics of the labour force, employment and unemployment adopted by the Eighth Conference in 1954 and paragraphs 4 to 9 of the resolution concerning measurement and analysis of underemployment and underutilization of manpower adopted by the Eleventh Conference in 1966. The ILO is preparing a book-length manual on the subject detailing such aspects as methodology of data collection, tabulation and analysis of statistics of the economically active population, employment, unemployment and underemployment. The report of the Thirteenth Conference, which includes the text of the new resolution, has been issued by the International Labour Office under the symbol ICLS/13/D.11 (final version).

to alleviate the economic hardship and psychological deprivation which were associated with unemployment.

11.4. Although perhaps no country, developed or developing, is presently facing the same type of unemployment crisis as many countries faced in the 1930s, labour force data, including data on employment and unemployment, are still collected or planned in many countries. Certain conceptual issues notwithstanding, one reason for this sustained interest is that the data may serve wider purposes than the particular ones for which they were initially intended.

11.5. Current data on labour, viewed as an input, serve as macro-economic indicators for monitoring the current performance of the economy and the changes occurring in the main components of the labour force in relation to other inputs and outputs. They also serve to evaluate government policies and programmes, for example, to assess the extent to which job creation programmes meet planning and other priority needs. Retrospectively, past data and trends are used, for example, to analyse exogenously the past growth of the economy and the composition of output, or to study endogenously the demographic, economic and other factors affecting the observed size and composition of the labour force. Prospectively, projected data provide information, for example, to map future outputs or to plan future inputs including training and education.

11.6. Data on labour viewed as a source of income help to monitor and to formulate plans to provide productive and remunerative employment for the unemployed and involuntary part-time workers or more productive employment for underemployed workers. They are also used to evaluate government employment policies, in particular in relation to their effects on the income and basic needs and productive assets of the poor. Retrospectively, labour force data serve to explain the observed level and distribution of income among individuals or households and to analyse the effect of income maintenance and income redistribution policies on employment and unemployment levels and their composition. Prospectively, labour force projections provide basic information to estimate or plan future earnings and incomes and to study their implications on future savings and consumption expenditures.

11.7. In addition to the broad objectives and uses mentioned above, labour force data serve a variety of particular purposes. For example, unemployment data in the United States of America are used for determining the amount of federal funds to be allocated to states and local communities for employment and training programmes or for local public works programmes. (See, for example, (231).) Labour force data also provide for many research efforts a subset of explanatory variables to be used in investigations of a wide variety of topics ranging from malnutrition to fertility and migration. They are also used as descriptive statistics or indicators to call attention to un-

desirable economic and social conditions, such as child labour, racial or sex biases in work opportunities and participation and the like.

11.8. Given the variety of uses of labour force data and the different approaches that may be adopted in collecting them, it is necessary in planning a household survey to carefully formulate at the outset, through continuous communication with the main users, a precise statement of priority objectives and to systematically follow these objectives through all stages of survey design and operation. Furthermore, to be useful within an integrated system of statistics, data collected on labour viewed as an input should relate to statistics of other inputs and of outputs. Similarly, labour force data which are to be analysed in connection with generation of income must be related to the income-earning activity, which may sometimes be in terms of a family or household and sometimes an individual. Finally, data on productive and earning activities should be collected such that they can be related to statistics of other activities.

## 2. Sources

11.9. The various sources of labour force data may be essentially grouped into three broad categories according to the method or instrument used in data collection. The three categories are: household surveys and population censuses, establishment surveys, and administrative records, including employment exchange registers and unemployment insurance records. Although there are specific advantages and disadvantages in terms of scope, coverage, cost, flexibility and so on, in using one source rather than the others, it is more useful to regard the different sources as complementary rather than as alternative instruments of data collection. Labour force statistics derived from one can usefully be linked to and exploited in common with those derived with the other instruments. Statistics from different sources can also be compared for evaluation purposes, provided that care has been taken to harmonize, to the extent possible, concepts, definitions and classifications (65).

11.10. In comparing data from household surveys with data from establishment surveys a number of considerations should be taken into account. While household surveys basically measure the activity status of individuals, establishment surveys count the number of occupied jobs as listed in the payrolls. Hence, in establishment surveys persons with a job but temporarily absent without pay are excluded, while multiple-job holders are counted more than once. Household surveys cover in principle the entire population of interest, including the economically inactive, with establishment surveys generally restricted to employees, who form only a segment of the economically active population. The missing segments include the unemployed, family workers in household enterprises and farms, the self-employed and, in general, all non-wage and salary earners. Moreover, establishment surveys are usually limited to establishments larger than a certain minimum size. The fact that the economically inactive can be reached through household surveys gives those surveys a unique advantage for the measurement of the potential labour force and, in general, of the degree of attachment of various groups to labour market activities. In terms of data items to be covered, flexibility is also greater in household

surveys than in establishment surveys. Since in household surveys individuals are reached directly, relevant supplementary information on, for example, demographic, education, skills and migration characteristics may be usefully obtained along with the basic information on labour force characteristics. In establishment surveys, however, the items of information are, in general, limited to those available in the records and payroll lists. Moreover, in the case of sample surveys, due to the possibility of using area sampling for household surveys, the common problem of deficient sampling frames is less serious than for establishment sample surveys.

11.11. On the other hand, establishment surveys can provide more accurate employment data in the organized sector of the economy than household surveys, especially when there is interest in specific industries. This is because access and control of sampling variability in results for specific industries can be achieved more efficiently through establishment surveys than household surveys. Moreover, because in establishment surveys the results are based on records and payroll lists, they are subject to lower degrees of measurement errors than the results of household surveys based on interviews and subject to various kinds of response error. In addition, in establishment surveys information on employment can be related more accurately to earnings and hours or days of work for each job occupied, information which is often difficult to obtain precisely in household surveys. Finally, partly because of the lower number of contacts, establishment surveys are generally less expensive to undertake and provide more timely results than household surveys.

11.12. Turning briefly to administrative records, it should be mentioned that unemployment insurance records and employment service registers are widely used in many developed countries as sources of current data on unemployment. In the developing countries, however, where the labour market is not entirely organized, unemployment insurance or employment exchanges may not exist at all, or may be limited to certain narrowly defined categories of workers. Where available, they are usually tabulated at frequent and regular intervals and, therefore, are useful for timely exploitation and analysis despite certain problems regarding their scope and definitions. Other administrative records such as payrolls and files of the civil service, public service organizations, government enterprises and other public institutions may also be usefully exploited for gathering information on employment in the public sector if certain difficulties regarding scope, definitions and central processing can be surmounted.

11.13. Among the three broad categories of sources of labour force data mentioned above, the remainder of this chapter concentrates only on household surveys. For the purpose of discussion, it is convenient to divide household surveys, in turn, into two categories according to the degree of priority attached to the labour force items in the collection of the data. The first category consists of surveys or survey rounds designed specifically to collect detailed information on the economically active and inactive population. The second category includes inquiries that provide information on labour force characteristics from surveys which concentrate primarily on other topics, such as household income and expenditure, or inquiries which do not particularly emphasize the labour force topics more than the other items of inquiry, such as population cen-

suses. Although the discussion in this chapter concerns both types of surveys, the emphasis is on surveys or survey rounds where the primary interest is labour force information.

### 3. Survey programmes and periodicity

11.14. The overall design of surveys and of survey programmes is discussed in part one of the *Handbook*, chapters I and III. For the purpose of collecting statistics on employment and unemployment, it is useful to distinguish three broad types of surveys: specialized, in-depth surveys, continuous surveys and multi-round integrated surveys.

11.15. Specialized, in-depth surveys are required to provide benchmark and structural information on the economically active and inactive populations. For development planning such surveys are also needed for analysis of initial employment conditions and for fixing targets and goals. Some surveys may include specialized items assigned high priority in addition to the basic items needed to provide a comprehensive picture of the employment conditions. The in-depth labour force surveys of the Islamic Republic of Iran conducted in 1971 and 1972, for example, contained three specialized items relating to migration (migration status, reason for migration and activity status before migration) along with the basic labour force items (170). The migration items were included because the relation of rural-urban migration to employment was a priority topic in the formulation of the subsequent development plan. Other surveys may concentrate on a specific segment of the population, such as the survey on employment generation in selected Bombay slums undertaken with the collaboration of ILO in India in 1979 (168).

11.16. In view of the heavy cost and effort, specialized in-depth surveys can be undertaken only infrequently, say once in three or five years. In addition to resource considerations, the appropriate choice of periodicity may depend on the speed of structural changes in employment conditions and also on the span of the development plans. These considerations should also be taken into account for the timing of these surveys, and as they may be conflicting, special care should be taken to ensure that the timing is as close as possible to the start of the development plan, with proper allowance for the often underestimated processing and tabulation period. The timing should also be set such that the survey does not coincide with abnormal employment conditions. Other related issues regarding the duration of the survey and the distribution of the sample over the survey period are discussed in section D, in connection with the choice of reference period.

11.17. Continuous surveys are needed for monitoring the performance of the economy and the plan programmes. They provide indicators of changes in the current rates of employment and unemployment and in the extent of underemployment, of seasonal variations in these rates and availability for work and so on. Continuous surveys may be monthly, such as the United States of America Current Population Survey (208); quarterly, such as the labour force survey of Israel; or biannually, such as the Labour Force Survey of Jamaica (172). The choice of periodicity depends not only on the budget and other resources and the availability of facilities, but also on data-specific characteristics, such as periodic variations in the phenomena being measured. This is an important consid-

eration because labour force data are subject to considerable seasonal and other irregular variations. To adequately capture these variations, it is usually necessary to carry out at least biannual surveys. If seasonalities are not by themselves a subject of interest, a single annual survey may be carried out spread throughout the year, such that seasonalities are averaged out in the annual estimates.

11.18. In between infrequent specialized surveys and continuous surveys are the labour force surveys which form part of integrated multi-round survey programmes. The boundary lines among the three types of survey are not sharp. In fact, historically, continuous labour force surveys were the starting point of many integrated survey programmes. In the case of the United States of America, the Current Population Survey, initially designed primarily to produce monthly labour force data, is now also a means to collect through periodic supplemental surveys information on personal and family income, migration, educational attainment and other demographic, social and economic topics. The National Sample Survey of India is another major integrated survey programme under which employment and unemployment statistics and a great variety of other information on consumer expenditure, fertility, household enterprise, farm practices and so on are periodically collected in separate or combined survey rounds (165).

11.19. The choice of appropriate cycles for including labour force items is essentially governed by the same considerations as in the case of continuous surveys except that in this case there is a built-in flexibility that can be used to advantage. Because an integrated survey programme implies continuity in survey-taking capability, certain core items on labour force (identified in section C) may be included in every successive round to provide essential current information, and to permit reducing the frequency of specific labour force survey rounds. Detailed information can then be collected on a less frequent basis, say every two, three or five years.

#### B. CONCEPTUAL APPROACHES FOR MEASURING THE ECONOMICALLY ACTIVE POPULATION

11.20. The international recommendations at present in force for measuring the size and characteristics of the economically active population are the results of an evolutionary process which began with the adoption of the "gainful occupation" approach by the Committee of Statistical Experts of the League of Nations in 1938. This was replaced by the labour force, employment and unemployment approach by the Eighth International Conference of Labour Statisticians (ICLS) in 1954 and extended with the introduction of the concept of underemployment by the Eleventh ICLS in 1966 (30).

11.21. More recently, alternative and complementary approaches have been formulated and tested. The principal ones are the labour utilization approach introduced in the early 1970s and the labour time disposition approach, developed in India to supplement the standard labour force classification of population by activity status.<sup>1</sup>

<sup>1</sup> Other notable approaches include the time use approach, which attempts to measure economic activity as part and in the context of the allocation of time to all types of activities; and the so-called ODS-CAMS approach, developed originally by the Organization of Demographic Associates and subsequently taken up by the Council for Asian Manpower Studies in 1971 and others (see, for example, (32), chap. 2).

11.22. The common feature of these approaches is the idea of classifying the population into a number of categories, each category indicating a certain state or degree of economic activity or inactivity. Thus, each approach may be evaluated on the basis of the practical usefulness of its categories in reflecting the reality of the nation's employment structure for formulating appropriate policy guidelines and the operational feasibility of its classification scheme given the prevailing national conditions. The basic concepts involved in these approaches are defined and discussed below.

### 1. *Work and economic activity*

11.23. The core of measurement of the economically active population lies in the concept and meaning of work that constitutes economic activity. The Eighth ICLS defined persons at work as those who performed some work for pay or profit during a specified period (30, p. 29). Subsequently, in 1966, the United Nations Statistical Commission defined participation in economic activity as "the supply of labour for the production of economic goods and services during the time reference period chosen for the investigation" (30, p. 32). The definitions of economic goods and services are the same as those used in the United Nations Systems of National Accounts for integrating economic statistics (55).

11.24. In the centrally planned economies using the material product system, the concept of production is confined to material production, which excludes many services. However, rules have recently been adopted to measure separately employment in material production and employment in the non-productive sphere (1).

11.25. From the above definitions, it follows that for the purpose of determining economic activity, work which leads to an output and which provides an income (in cash or in kind) to those who supplied the labour should be distinguished from other types of work, such as housework, child rearing, voluntary service or schoolwork. There are, however, exceptions and in many cases, especially in developing countries, the boundary line between work and non-work may not be sufficiently clear. In such cases, it may be realistic to broaden the concept of work for measuring economic activity to include work which supplements household income or output, even though it may not be directly remunerative or productive.

11.26. Generally, an activity for which a person is remunerated is considered as work. Hence, persons employed in farms, shops, factories, offices and the like, who are receiving wages and salaries at time or piece rates, or fees or tips, in cash or in kind, are all considered to be working. Also, an activity in which a person is engaged for profit is considered as work, even if no profits are actually made during the specified period. Thus, farmers, traders, craftsmen, doctors and the like who are operating their own businesses with or without employees and with or without sales or clients during the specified period are all considered to be working. However, certain activities which are socially unacceptable and unproductive, such as begging and stealing, are not considered as work in the sense of economic activity even though they may yield an income or a profit.

11.27. In addition to paid work, there are certain activities without pay that may also be considered as work if undertaken in connection with the production of goods

and services. Hence, activities of household members assisting in the operation of a household enterprise or farm are regarded as work even if no direct payments are received for the work done. However, unpaid work at tasks which do not contribute to the operation of the household enterprise, such as housework and child rearing, is not regarded as work for the purpose of measuring economic activity. Another kind of unpaid work which should be regarded as economic activity is exchange work, the practice in some countries of exchanging labour between households for productive purposes, such as the work performed by a farm operator or members of his family on the farm of another farmer on an exchange labour arrangement. However, work contributed without pay or profit by persons for community development, such as construction of village roads and prevention of soil erosion, is not generally treated as economic activity for measurement purposes, although it is recognized that many of these activities are productive. Where the extent and nature of such unpaid community work are substantial, additional information may be collected if feasible and reported separately.

11.28. Although, based on the above definitions and qualifications, most activities can be readily classified into economic or non-economic activities, there remains a substantial number of activities which are not clearly classifiable. Examples that are especially relevant in developing countries are carrying water, taking care of farm animals, scaring away birds to protect crops, tending vegetable gardens which may or may not be part of a farm, processing food which may be partly for sale and partly for home consumption, making improvements of land and tools, repairing own dwellings and so on. In such cases, it may be possible to identify and list the most common of these activities and then make a decision on their inclusion or exclusion as economic activity in the context of the conceptual framework being followed, for example SNA, and the prevailing local conditions. An example of such a procedure is given by the Integrated Survey of Households of the Philippines (80), for which the interviewer's manual contains a list of very specific activities to be considered as work for measurement purposes. Another example shows the SNA recommendations concerning the coverage of a set of principal non-monetary (subsistence) activities based on a review of the national accounts in several developing countries (45).

11.29. As the above definitions and examples indicate, not all kinds of work are considered as economic activity for measurement purposes. It should also be mentioned that, vice versa, not all economic activities are considered as work. As will be discussed in detail below, the activity of searching for paid work is also considered as a component of economic activity, although in everyday parlance such an activity is not regarded as work.

### 2. *The gainful occupation approach*

11.30. Before the adoption of the concept of economic activity as defined in the previous section, international recommendations for census data on the economically active population were based on the concept of gainful occupation. According to this approach, "any occupation for which the person engaged therein is remunerated, directly or indirectly, in cash or in kind—that is, any principal remunerated occupation or any secondary occu-

pation which is the sole remunerated occupation of the person concerned—is to be considered as a gainful occupation” (30, p. 27). Thus, in practice, in the gainful occupation approach, an inquiry was made on every person above a specified age on his or her profession, occupation or trade. If a person reported a profession, occupation or trade, the person was considered a gainfully occupied worker and the aggregate of such persons constituted the gainfully occupied population.

11.31. The gainful occupation approach had certain limitations. Because its classification scheme was based on the usual occupation of a person with no specific reference period, it could not be known whether or not the person was actually working in that occupation at a particular point or interval of time. Thus, under the gainful occupation approach there was no count of the number of employed or unemployed. Moreover, the size of the economically active population obtained under this approach did not include first-time job seekers, because these persons were yet to exercise a gainful occupation. On the other hand, it often included in practice many retired and disabled persons who reported their former occupation, even though they were no longer working or able to work in that or any other occupation.

### 3. *The labour force approach*

11.32. The limitations of the gainful occupation approach and the needs arising from the economic crisis of the 1930s in the western industrialized countries prompted the development of a new conceptual framework and an effort to count not only members of the economically active population but also the employed and the unemployed. This conceptual framework together with its later extension for measuring underemployment has come to be known as the labour force approach.

#### (a) *Definitions*

11.33. In the standard labour force approach, the population above a specified age is classified according to a double dichotomy. The first dichotomy divides the working-age population into the labour force and the not in the labour force or inactive. The second dichotomy divides the labour force into the employed and the unemployed. The definitions of these concepts as adopted by the 1954 ILCS are given below:

##### *“Definition of labour force*

“4. The civilian labour force consists of all civilians who fulfil the requirements of inclusion among the employed or the unemployed, as defined in paragraphs 6 and 7 below.

“5. The total labour force is the sum of the civilian labour force and the armed forces.

##### *“Definition of employment*

“6. (1) Persons in employment consist of all persons above a specified age in the following categories:

“(a) At work; persons who performed some work for pay or profit during a specified brief period, either one week or one day;

“(b) With a job but not at work; persons who, having already worked in their present job, were temporarily absent during the specified period because of illness or injury, industrial dispute, vacation or other leave of

absence, absence without leave, or temporary disorganization of work due to such reasons as bad weather or mechanical breakdown.

“(2) Employers and workers on own account should be included among the employed and may be classified as ‘at work’ or ‘not at work’ on the same basis as other employed persons.

“(3) Unpaid family workers currently assisting in the operation of a business or farm are considered as employed if they worked for at least one-third of the normal working time during the specified period.

“(4) The following categories of persons are not considered as employed:

“(a) Workers who during the specified period were on temporary or indefinite lay-off without pay;

“(b) Persons without jobs or businesses or farms who had arranged to start a new job or business or farm at a date subsequent to the period of reference;

“(c) Unpaid members of the family who worked for less than one-third of the normal working time during the specified period in a family business or farm.

##### *“Definition of unemployment*

“7. (1) Persons in unemployment consist of all persons above a specified age who, on the specified day or for a specified week, were in the following categories:

“(a) Workers available for employment whose contract of employment had been terminated or temporarily suspended and who were without a job and seeking work for pay or profit;

“(b) Persons who were available for work (except for minor illness) during the specified period and were seeking work for pay or profit, who were never previously employed or whose most recent status was other than that of employee (that is, former employers, etc.) or who had been in retirement;

“(c) Persons without a job and currently available for work who had made arrangements to start a new job at a date subsequent to the specified period;

“(d) Persons on temporary or indefinite lay-off without pay.

“(2) The following categories of persons are not considered to be unemployed:

“(a) Persons intending to establish their own business or farm, but who had not yet arranged to do so, who were not seeking work for pay or profit;

“(b) Former unpaid family workers not at work and not seeking work for pay or profit” (30, pp. 28–29).

#### (b) *Distinctive features*

11.34. As is apparent from the above definitions, the labour force framework differs substantially from the gainful occupation approach from both the conceptual and technical points of view. It also raises a number of issues, some of which are dealt with in this section and some others in section D below, where measurement and other problems are discussed in detail.

11.35. While the gainful occupation approach was based on the concept of usual occupation, the underlying concept in the labour force framework is the notion of current activity. Hence, for a person to be classified as a member of the labour force, that is, employed or unem-

ployed, he must be actively working or seeking work for pay or profit. Certain specific exceptions to this rule are allowed, including the case of persons with a job but temporarily absent from work or persons currently available for work but not actively seeking work for certain reasons.

11.36. Another distinctive feature of the new framework is the introduction of a specific and short reference period (one week or one day), a notion which did not exist in the earlier approach. The specification of a reference period focuses on the scope of measurement and avoids some of the limitations of the gainful occupation approach mentioned earlier. The fact that the reference period is short permits sharper measurement of the economically active population at a given time, but, on the other hand, raises other questions regarding seasonality and other types of irregularities in economic activities of some segments of the population. This last issue is taken up in more detail in section D.

11.37. The classification scheme in the labour force approach consists of three categories—the employed, the unemployed and the inactive—with an implicit priority criterion. According to the priority criterion, any work for pay or profit, no matter how short (except for unpaid family workers), takes precedence over the other activities and, in turn, the activity of seeking work takes precedence over inactivity. The role of this priority criterion is to focus the measurement procedure on the fully unemployed persons, the category of persons that was regarded to be of paramount importance when the labour force approach was formulated. The priority criterion also serves to make the three categories mutually exclusive and resolves certain borderline classification problems.

#### (c) *Conceptual issues*

11.38. A number of classification problems remain, however, and their resolution has been the subject of continuing debate in the developing countries and to a lesser extent in the developed countries. In the developed countries, the emergence of a new and substantial demand for part-time work among previously economically inactive segments of the population, especially housewives and students, and the increasing incidence of available persons who are not actively seeking work because of discouragement with job prospects, have called for certain refinements in concepts and measurement procedures. The particular circumstances of the developing countries, however, have raised more fundamental issues.

11.39. The basic issue is the double dichotomy of the labour force. Critics have said that the divisions of the working-age population into those in the labour force and those not in the labour force may be useful in societies where there is a reasonably sharp distinction between the economically active and the inactive. The usefulness of this distinction is, however, questioned for the developing countries, where a great number of persons, especially in the rural areas and the unorganized sectors of the economy, are engaged in various borderline activities. The division of the labour force into the employed and the unemployed is even more controversial. It is said that because the labour force framework was formulated in the developed countries, it was naturally designed to provide information on the issues that were important in those countries, which were at the time unemployment and related economic and social problems. But in developing

countries, underemployment is often a more important problem than unemployment. In these countries, a considerable part of the population, without being strictly employed and yet not being able to afford to be totally unemployed, must create or engage themselves in marginal activities, often with low income and productivity. In rural areas and the informal sectors, where output is largely from self-employment and non-monetary activities, many of the notions related to employment and unemployment, such as job, pay, vacations, lay-off, seeking work or even available for work, are not always meaningful.

#### (d) *Underemployment*

11.40. The juxtaposition of concepts designed for the western industrialized countries with the realities of labour market conditions in the developing countries has resulted in classifying a variety of different types of workers in the single category employed. The mixture found in the employed category ranges from full-time wage and salary earners to persons who happen to work for wages just a few hours during the reference period, from regular self-employed persons to casual and intermittent workers, and includes a variety of other shades of employed persons. To the extent that each group responds differently to labour market changes and policies, to put them together into one category impairs the usefulness and the clarity of the resulting statistics. Although the employed category is also heterogeneous in the developed countries, the degree of heterogeneity is much greater in the developing countries, mainly because regular full-time wage and salary employment is not as widespread in these countries.

11.41. In order to cope with this and related issues, new concepts of underemployment have been proposed and added to the classification scheme of the labour force approach by the Ninth and Eleventh ICLS in 1957 and 1966, respectively. The idea is essentially to permit distinguishing among employed persons those who are adequately employed and those who are not. The main definitions recommended by the Eleventh ICLS are as follows:

##### *“Concepts of underemployment*

“4. Underemployment exists when a person’s employment is inadequate in relation to specified norms or alternative employment, account being taken of his occupational skill (training and working experience). Two principal forms of underemployment may be distinguished: visible and invisible.

“5. (1) Visible underemployment is primarily a statistical concept directly measurable by labour force and other surveys, reflecting an insufficiency in the volume of employment. It occurs when a person is in employment of less than normal duration and is seeking, or would accept, additional work.

“(2) Invisible underemployment is primarily an analytical concept reflecting a misallocation of labour resources or a fundamental imbalance as between labour and other factors of production. Characteristic symptoms might be low income, underutilization of skill, low productivity. Analytical studies of invisible underemployment should be directed to the examination and analysis of a wide variety of data, including income and skill levels (disguised underemployment) and productivity measures (potential underemployment) . . . (30, pp. 33–34).

11.42. The ICLS resolution also gives considerable details on the measurement procedures and methods of analysis and urges countries, where appropriate, to collect and analyse underemployment data. But for a number of reasons, only a few countries have actually adopted such programmes and these mainly for studying visible underemployment of specific segments of the economically active population. One example of a survey in which an attempt to measure both visible and invisible underemployment has been made is the 1970 labour force survey of Panama (179). The underemployment criterion used differs between employees and own-account workers. Among employees, those who reported having worked less than 35 hours during the reference week and who desired to work more were classified as underemployed (visibly underemployed). Also classified as underemployed (invisibly underemployed) were all other employees with incomes less than 25 balboas per week who desired a change of job, except those who reported more than 35 hours of work and had no desire to work more. Among own-account workers, the criteria were slightly simpler. The (visible) underemployed own-account workers were classified the same way as the employees, but the others (invisible underemployed) were classified according to whether they desired a change of job irrespective of income level, number of hours worked and the desire to work more. Further information on the concept and measurement of invisible underemployment is provided in the chapter on Latin America in part three of the present *Handbook*.

11.43. The countries that have attempted to measure underemployment have faced a number of difficulties. Embedded in the definition of underemployment are normative concepts such as normal duration of work, standard levels of income, skill utilization and productivity which are difficult to operationalize; and subjective elements such as "whether the person would accept additional work", which elucidate intentions and not actual behaviour. Moreover, the measurements of income, productivity and skills necessary for the measurement of invisible underemployment have generally been found to be impracticable and imprecise, especially in the traditional or informal sector of the economy. In particular, the use of income as a measure of productivity raises fundamental conceptual problems. Although under ideal conditions, income may be regarded as measuring productivity, because of institutional factors, price fluctuations and other non-ideal conditions, income may not be a satisfactory proxy for productivity. For example, the low income received by full-time domestic help may be due more to institutional factors than to low productivity. Similarly, the variation in income received by a self-employed worker may to a great extent be due to price fluctuations rather than changes of productivity.

#### 4. *The labour utilization approach (343, 232)*

11.44. Like the framework for the measurement of underemployment, the labour utilization approach is based on the recognition that the employed category of the labour force classification is too heterogeneous, mixing in one category adequately and inadequately employed persons. Furthermore, it also assumes that inadequate employment is multi-faceted and involves the inadequate use of time and skills and inadequate income. Accordingly, it

proceeds by classifying, in a particular order, the civilian working-age population into the following functional categories:

1. In the labour force:
  - 1.1 Adequately utilized;
  - 1.2 Inadequately utilized:
    - 1.2.1 by unemployment;
    - 1.2.2 by hours of work;
    - 1.2.3 by income level;
    - 1.2.4 by mismatch of occupation and education.
2. Not in the labour force.

11.45. Operationally, for the purpose of establishing priorities in the functional categories and ensuring that the categories are mutually exclusive, the classification scheme is carried out in a particular order as follows. Initially, the civilian working-age population is separated into those in and those not in the labour force. Then, the unemployed are distinguished. Next, those with less than full-time work are classified as inadequately utilized by hours of work and those below a specified income level are classified as "inadequately utilized by income level". Finally, those with a mismatch of occupation and education or training are classified as "inadequately utilized by mismatch". The remaining persons in the labour force are classified residually as "utilized adequately".

11.46. In practice, certain modifications to this classification scheme may be made, and appropriate cut-off points for hours of work, income level and mismatch must be selected. While the choices of cut-off points must be governed by their purposes, and values cannot be stipulated in advance for all purposes, certain possibilities and guidelines have been proposed. For hours of work, the cut-off may be the same as that which defines part-time status or may be a standard value such as 40 hours per week to achieve international comparability. Regarding the cut-off for income level, possibilities and controversies are greater. It can be set as a function of the minimum wage, the minimal budget, the income distribution, the poverty level or still other indices of economic hardship. For skills mismatch, the cut-off points may be set in terms of a cross-classification of occupation and years of schooling. Thus, workers with education beyond, say, a standard deviation above the mean for completed years of schooling in their occupational groups would be classified as mismatched.

11.47. The labour utilization approach has been tested and applied in several countries, especially the south-eastern Asian countries. An example of surveys specifically designed to test the labour utilization approach is the series of pilot surveys conducted from 1973 to 1975 in Thailand (187). In those surveys, the basic outline described above was followed with certain variations, for example, the use of three different cut-offs for income depending on the location of the worker living in the Bangkok metropolis, other municipal areas or non-municipal areas. In certain other countries, for example, Hong Kong (162), the results of ongoing labour force surveys have been used to classify the working-age population according to the functional categories of the labour utilization approach. This can, in general, be done if supplementary data on duration of work, income and education are collected along with the standard labour force items. The functional categories

of the labour utilization approach are closely linked to those of the labour force approach. Referring to the numerical notation given earlier, the categories 1.1, 1.2.2, 1.2.3 and 1.2.4 together correspond to the employed category in the labour force approach and 1.2.1 corresponds to the unemployed category. Moreover, category 1.2.2, when defined in terms of "less than full-time work and wanting more work", is consistent with visible underemployment, while categories 1.2.3 and 1.2.4 are essentially forms of invisible underemployment.

11.48. The results of these and other experiments with the labour utilization approach have received mixed appraisals. Because it focuses attention on employment adequacy and not merely on unemployment, this approach is regarded as relevant to conditions in developing countries. Also, the fact that it can be used as an extension of the labour force approach constitutes an advantage, as it does not destroy comparability over time and among regions. But the labour utilization approach has been criticized on several grounds. One criticism is that the framework does not rest on a firm economic theory and, therefore, the interpretations of the results are all the more difficult. It is also criticized for having arbitrary and statistically sensitive cut-off points in its classification algorithm, especially in the case of income and occupation-education mismatch. Moreover, variations in cut-off points and definitions impair comparability over time as well as among regions, as was found in the Thai pilot surveys cited earlier. Another problem is the difficulty in applying the approach to workers other than wage and salary earners. In particular, it is difficult to relate income from work to individual workers because work may be done by a group, as in the case of members of household enterprises, or because the measured income may include rents, profits and the like, in addition to the return to the labour input, as in the case of self-employed persons. The mismatch category also contains many problems of definition and interpretation. It concerns essentially persons with at least secondary or vocational training, a segment of the population which is often relatively very small in many developing countries. Also, as education increases over time, the meaning and interpretation of mismatch is especially open to question. Moreover, some persons with high education may voluntarily choose a lesser occupation than their education calls for.<sup>2</sup>

### 5. *The labour time disposition approach*

11.49. Complementary approaches have also been developed in some countries to supplement the labour force classification. The approach incorporated in the Twenty-seventh Round of the National Sample Survey of India (October 1972-September 1973), based on the measurement of labour time disposition, is a notable example (163).

11.50. Labour force surveys in India have for a long time recognized the inadequacy of the labour force approach, which is aimed at classifying individuals as employed and unemployed, and included a block of questions on labour time disposition to supplement the data on activity classification of individuals. Quantitative data on time

spent on various occupations, day by day for a whole week, time not at work due to illness and the like, time not at work but available for work, and time not available for work are recorded in units of a half-day (half the normal working day), with appropriate instructions for rounding up fractions of the working day into the nearest half-day. The breakdown of labour time is thus similar to the classification of the labour force, but the unit of analysis is a unit of labour time instead of an individual. The analysis permits estimation of unemployment as labour time not at work but available for work as a percentage of the total labour time available for economic activity (that is, at work, not at work due to illness and the like and not at work but available for work). Estimates of unemployment worked out in this manner would include not only current unemployment but also current (visible) underemployment in a single measure.

### C. DATA REQUIREMENTS

11.51. In light of the discussion on the various approaches in section B, it should be clear that the measurement of economically active population involves considerable effort and innovation, particularly in the developing countries. It is therefore necessary to give careful thought to the statistical data requirements vis-à-vis the survey programme and objectives, the available resources, the feasibility of obtaining adequate information and the desire to achieve a certain degree of comparability of survey results across nations and over time.

11.52. As explained in the previous section, variations in definitions and approaches can lead to different estimates of employment, unemployment and underemployment or underutilization. In view of this, it is necessary to develop a suitable strategy for collection of the basic data. Within the resource and operational constraints, the framework of data collection should be broad enough to permit to the extent possible use of different definitions and approaches. While it is not easy to provide a single set of definitions of employment-unemployment acceptable to all, the problem may be tackled for statistical data collection purposes by a component and disaggregated approach which can provide a hierarchy of statistical measures. If a particular statistical measure is not fully acceptable for certain uses, the components may be re-grouped to arrive at the statistical measures corresponding to that particular use.

11.53. The data items listed below are based mainly on the international recommendations presently in force, but they offer a certain degree of flexibility in terms of both variations in definitions and coverage of topics. Two sets of data items are distinguished. The core items are for use in survey rounds concerned primarily with topics other than employment and the detailed items are for use in in-depth surveys and specific survey rounds concerned primarily with employment.

#### 1. *Core items*

11.54. The choice of core items on employment for use in integrated surveys and survey rounds that deal primarily with topics other than employment depends on two main considerations. From a descriptive point of view, the basis of selection may be consistency with the correspond-

<sup>2</sup> In response to these and other criticisms, the labour utilization approach has since been somewhat refined and elaborated. See (232).

ing topics in the most recent population censuses, in order to provide up-to-date summary data on economic activity and its characteristics. The United Nations recommendations for topics on economic characteristics to be investigated in population censuses are:

- (a) Activity status;
- (b) Occupation;
- (c) Industry;
- (d) Status in employment;
- (e) Time worked;
- (f) Income;
- (g) Sector of employment.

The first four items are identified as priority items (77).

11.55. From an explanatory point of view, the choice of the core items may be based on their usefulness for explaining the characteristics that are the focus of the survey round. In this case, the choice of the employment core items must depend on the topic under investigation, which could be fertility, malnutrition, migration or the like. For example, if the main topic of the survey round is migration, the employment core items may include in addition to those mentioned earlier items such as employment status at previous residence at time of moving, occupation, industry, income if employed at time of moving and so on. (See, for example, (189).)

11.56. As mentioned earlier in the context of the discussion on survey programmes, due to the time characteristics of employment data and the fact that employment data are used as explanatory variables in relation to many conceivable topics covered in integrated survey programmes, it is appropriate to include the selected employment core items with suitable variations regularly in every survey round, whether monthly, quarterly, biannually or annually.

11.57. Although it should be mentioned at this point that a data item in the sense used here does not necessarily refer to one question in the questionnaire, in the case of the core items, due to space considerations, each item does usually refer to one question in the questionnaire (or one item in the interview schedule). The core items, when used in specialized in-depth surveys or employment survey rounds, may, however, be translated into one or more questions in the questionnaire depending upon the complexity of the item and the scope of the survey. The definitions of the core items are generally the same whether the items are used in survey rounds on topics other than employment or used in in-depth surveys and survey rounds specifically on employment. The classification and the extent of detail in the categories may, however, differ depending on the use of the core items. These are discussed later in this section.

## 2. Detailed items

11.58. By detailed items are meant here those data items which are sought in specialized in-depth surveys and survey rounds which are primarily concerned with labour force, employment and unemployment and other related characteristics of the economically active and inactive population. They include the core items listed earlier, but also other specific items. The main difference between the core items used as such and as detailed items is essentially

the extent of elaboration in questionnaire formulations and the degree of details and variations in classifications and definitions. For example, activity status as a core item in the population censuses is addressed directly in the questionnaire, while as a detailed item in in-depth surveys it is formulated indirectly and more precisely, for example, inquiring as to the activity of the person during the reference period, whether he or she worked at all or was temporarily absent from his employment and whether he received any wages or other remuneration related to that period and so on. Furthermore, while it may not always be possible to consider both current and usual activity or the identification of multi-activity status and multi-occupations when activity status is used as a core item in surveys whose main topic is not employment, in in-depth surveys these variations may be studied in detail, as suggested in the discussion on definitions and classifications of data items below. The choice of the other specific items to be used in in-depth surveys may not be specified in general, as it depends on the particular objectives of the survey and the conceptual approach that has been adopted. For example, if one of the objectives of the survey is the measurement of the potential labour force, detailed items on the desire to work of persons not in the labour force and reasons for not seeking work should be included. Or, if the labour time disposition approach is adopted, considerable details on the intensity of activity during each day of the reference week should be collected.

11.59. The appropriate cycle for collecting data on non-core detailed items, as mentioned earlier in relation to survey programmes, depends on cost and resource availability, the cycle of structural changes in employment characteristics and, where applicable, the span of development plans. These considerations would typically limit the data collection cycle to once every two, three or five years.

11.60. The units chosen for measurement and data collection are usually the individual and the household. The definition of household should be the same or consistent with that used in other survey rounds, household surveys and population censuses. The data items to be collected from each household member should cover, *inter alia*, the following major areas: (a) demographic and general characteristics, (b) activity status, (c) particulars of employment, (d) particulars of unemployment and (e) characteristics of persons not in the labour force.

## 3. Demographic and general characteristics

11.61. Demographic and general characteristics of the household and its members are obtained in almost all household surveys or survey rounds and thus are automatically available for analysis in conjunction with details of their labour force characteristics. The items that are of particular relevance in relation to employment characteristics are sex, age, marital status and relationship to the head of household; educational attainment and level of skill and training; size and type of household; urban-rural, locality and geographical area; national or ethnic origin; migration status; and so on.

11.62. Among these items only age is discussed here and the discussion refers only to the specification of age limits and the classification by age groups for data collection and tabulation of labour force characteristics. The definition and other measurement issues regarding age and

other demographic and general characteristics are not within the scope of this chapter.

11.63. The Eighth ICLS recommended that countries establish a minimum age limit for a person to be included in the labour force but did not specify what the limit should be or how it should be determined. This was because of differences in national legislation concerning employment and compulsory schooling, as well as the differences in stages of economic and social development among countries. It was therefore left to each country to prescribe minimum and if necessary maximum age limits. In national survey programmes, the minimum age limit used varies widely. For example, it is set at 5 years in India, 15 years in Japan, 14 in Jamaica and 10 in the Philippines and Trinidad and Tobago.

11.64. Main considerations for the choice of an appropriate minimum age limit are the extent and intensity of participation of youth in economic activity and the feasibility of measuring youth employment. For example, countries that have a large proportion of their labour force engaged in agriculture, a type of activity in which, normally, many children participate, will need to select a lower minimum age than will highly industrialized countries where employment of children is rare. The fact that in many countries youth employment is widespread, whether in agriculture, services or other branches of economic activity, implies that in order to arrive at an effective understanding of youth employment, legal regulations regarding child labour and compulsory schooling should not be strictly adhered to when selecting the lower age limit. For example, although the Nigerian Labour Code Ordinance restricts the working age to 15 to 55 years, in the labour force survey of 1966-1967 information on the current activity status of all household members aged 12 years and above was collected. The main results were tabulated for 15- to 55-year-old members, but auxiliary tabulations were compiled for children of 12 to 14 years of age (178). These results showed that more than 60 per cent of the male children aged between 12 and 14 years were in employment in various areas of economic activity in 1966-1967.

11.65. The argument for selecting a low minimum age limit should be weighed against the difficulty of obtaining accurate information on very young children. As the nature and type of work of children differ from those of adults, the collection of accurate information on youth employment may require specially designed questions and interviewing techniques, at additional cost. In general, it is useful to consider dual minimum age limits. While a lower minimum age limit may be used for collecting information on employment characteristics, a somewhat higher minimum age may be used for labour force, employment and unemployment tabulations. In addition to the Nigerian examples given above, such a procedure is also applied, for example, in the Current Population Survey of the United States of America, where labour force questions are asked of persons 14 years of age and over although the official tabulations have been restricted since 1967 to data for persons 16 years of age and over. In India, the corresponding lower age limits for questions and tabulations are 5 and 15, respectively.

11.66. Regarding the maximum age limit, few countries explicitly adopt one for measuring economic activity. One notable example is Sweden, where in its labour force

survey the working-age population is considered to be persons between 16 and 74 years of age. In Hong Kong, the labour force survey uses a maximum age limit of 64, but it only applies to the unemployed.

11.67. Whatever age limits are adopted, in order to facilitate international comparisons of data on economically active population, it is useful if countries use a common classification by age groups, so that the resulting tabulations at least distinguish between persons under 15 years of age and those of 15 years of age and over, in line with the United Nations recommendations for census questions on economic activity (77). In addition, a detailed breakdown by single years of age in the lower age group is useful for the analysis of employment characteristics of the very young in different countries. Of course, the usefulness of the breakdown by single years of age should be weighed against the problems of obtaining satisfactory age data for children in the lower age groups.

11.68. Based on a number of considerations, including maximum integration and comparability of data between and among different subject areas and homogeneity of labour force characteristics and behaviour, three levels of age classification for economic activities and the inactive may be considered as follows:

<i>Least detail</i>	<i>Moderate detail</i>	<i>Greatest detail</i>
Under 15	Under 15	Under L*
15-19	15-24 5-year groups	L-24 single year
20-24	25-54 10-year groups	25-54 5-year groups
25-44	55-74 5-year groups	55-74 single year
45-64	75-84	75-84 5-year groups
65 and over	85 and over	85 and over

\* L is the lower age limit. Its value is left open as long as it is set below 15.

#### 4. Activity status

11.69. Activity status is the relationship of each person to economic activity during a specified period of time. It is the cornerstone of any employment inquiry and therefore it is immensely important that the survey questions on this item receive careful attention. The related issues that need to be specified at the conceptual stage of the survey design are essentially the appropriate time reference period or periods for measuring activity status, the determining criterion for multi-status situations, and the possible categories of activity status.

##### (a) Reference period

11.70. The adoption of a specific reference period for the measurement of activity status and other employment characteristics is fundamental to the labour force concept. It is important to use the same specific reference period for all related items except when deviations are necessary. The main choices are between short and long or possibly both short and long reference periods.

11.71. The Eighth ICLS recommended a short reference period of one day or a week for the measurement of economic activity. In practice, most surveys that use a short reference period use the week, referring to the seven days or the calendar week immediately preceding the date of the interview, or to a fixed mid-month week prior to the date of the interview in some monthly surveys.

11.72. The short reference period is intended for measuring the current activity status and the current employment characteristics of the population. Because movements of persons and changes of activities are expected to be insignificant during a brief time period, the resulting data are considered to reflect a precise picture of current employment conditions. When the survey is conducted several times during the year, it permits the measurement of trends and seasonalities. The use of a short reference period also has the advantage of reducing the length of the interview and minimizing the effects of errors due to memory lapse by the respondent and other response errors.

11.73. The short reference period alone may not, however, be appropriate when the survey is conducted only once during a part of the year and where there are substantial seasonalities and irregularities in the employment and unemployment patterns. For example, in many developing countries where agriculture is the major activity, because the work pattern is greatly influenced by climatic cycles the current activities of the population may not reflect the year-round activities. Similarly, in countries where movements in the course of the year from one occupation to another are common or where there are important peak and slack periods for certain activities (for example, construction) during the year, then the measurement of current employment characteristics alone would yield a distorted picture of the structural employment conditions.

11.74. The long reference period, commonly taken to be a year or 12 months prior to the time of interview, is used if data on the usual activity status and employment characteristics of the population are required. The particular advantage of a long reference period is that it can provide information on the economic activity of most consequence to each person. For example, because one year encompasses an entire agricultural and climatic cycle, the use of the one-year reference period would classify a farmer as employed in agriculture even if he had been engaged in non-agricultural activities or had unsuccessfully sought employment elsewhere in the off-season. A one-year reference period is also most suitable for collecting data on income and relating income to employment characteristics.

11.75. Drawbacks of the long reference period are difficulties in determining the relevant activity status in multi-status situations and in linking activity status with other employment characteristics in multi-occupation situations. Although these problems also exist with the short reference period, their importance is much greater with the long reference period because there is greater possibility of movement and changes during a one-year period than there is during a one-week period.

#### (b) *Multi-activity status*

11.76. Apart from the question of whether the reference period should be short or long, there is the related question of whether the criterion for the determination of the activity status in multi-status situations should be the priority criterion or the major activity during the period. The ICLS has recommended use of a short reference period and the priority criterion in combination. Surveys based on the long reference period generally use the major activity criterion for the determination of usual status. The other two possible combinations, namely, major activity

criterion within a short reference period and the priority criterion in relation to a long reference period, are also conceivable. In fact, proposals under consideration for the 1981 Population Census of India provide for the enumeration of the economically active population both by the priority criterion and by the major activity criterion with reference to the preceding 12 months. (See also (163).)

11.77. In relation to the short reference period such as a week, the priority criterion has an advantage in so far as it facilitates a clear-cut enumeration of all the employed population including the underemployed in one group, on the principle that an underemployed person is basically an employed person, however inadequate the quantum of employment may be. Nevertheless, it has attracted criticisms on the grounds that it overstates employment and understates unemployment. If the principle that an underemployed person is basically an employed person is to be extended to the long reference period such as a year, then the priority criterion may have to be extended to the long reference period as well. The conceptual question to be settled in this connection is essentially whether or not seasonal unemployment is to be treated as underemployment in relation to usual status.

11.78. The choice of the short, long or both reference periods and their use with priority or major activity criteria is inevitably interrelated with the type of surveys to be undertaken. For periodic surveys with periodicity less than a year, the use of the short reference period and the priority criterion may be sufficient if a fixed reference period is used. With a moving reference period, which is the typical case, usual status data should also be collected once a year to supplement the current status data. If the survey is carried out on an annual basis with subsamples spread throughout the year, a short reference period with the priority criterion is again suitable. However, if considered necessary, supplementary information based on the long reference period with the major activity criterion may also be collected so that the labour force classified on the basis of each individual's activity during the preceding year can also be tabulated. For surveys covering only part of the year or for population censuses in countries with substantial agricultural employment, seasonalities and mobility, it may be necessary and useful to consider using both the short and long reference periods, where the former is used with the priority criterion and the later with both the priority and major activity criteria.

11.79. Alternatively, a country that uses a short reference period in a survey confined to a part of the year may wish to consider the possibility of obtaining supplementary data on at least some basic topics, such as usual activity status and the corresponding principal occupation, industry and employment status, based on either (a) a long reference period of one year or (b) the position during the last season. For example, if the survey is conducted during the dry/slack season, inquiries may be made about the position during the last wet/peak season. In this connection it should also be mentioned that for surveys covering a part of the year, not only is the choice of length of the reference period and of the determining criterion important but the choice of the period of the year during which the survey is to be taken is also of crucial importance. Certain periods of the year, for example when considerable movement and changes of jobs occur, large numbers of workers

are on vacation, or school leavers enter the employment market, may not be suitable for surveys that cover a part of the year, especially if only the short reference period is used.

(c) *Functional categories*

11.80. The basic functional categories of activity status are the employed, the unemployed and the inactive. But in general more detailed categories are used in surveys and censuses for providing additional information and for making the categories more homogeneous and easier to classify. The categories presented below are essentially those recommended for population censuses. For in-depth surveys and survey rounds on employment, more refined categories may be used. Some indications are given below and examples can be found in (163).

*Economically active population*

11.81. The economically active population comprises all persons of either sex who furnish the supply of labour for the production of economic goods and services during the time reference period chosen for the investigation. It includes persons in the civilian labour force and those serving in the armed forces. In compilations of the data, a separate category, "members of the armed forces", may be used so that it can be deducted from the total labour force whenever desirable. In sample surveys, however, it is in general adequate to restrict the coverage to the civilian labour force. The civilian labour force comprises both persons employed and those unemployed during the time reference period.

11.82. These categories are described below:

(a) *Employed*

- (i) At work. Includes all persons who have actually worked during the reference period. This may involve a number of questions in the questionnaire to ascertain whether the persons who report housekeeping or studying as main activity during the reference period did not in fact also do some work for family gain or pay or profit during the specified period. If unpaid apprentices and community workers are to be classified as employed in separate tabulations, it may also be necessary to consider adding modalities in the question designs in order to identify such workers;
- (ii) With job but not at work. Includes persons who had a job but were temporarily not working during the reference period because of personal or technical reasons, such as being temporarily absent with pay, bad weather, industrial disputes, vacation, illness, family or other reasons. If a long reference period is used, it also includes in particular persons who are usually engaged in agriculture and related activities but not at work during the off-season. Where this category of persons is substantial it should be identified separately;

(b) *Unemployed*. Includes persons who did not work or had no job during the reference period and were available and actively seeking work. In order to test these criteria and also to report separately those who sought work and those who did not seek work but were available for work, it is necessary to inquire about the recent search activity and the current availability of these persons;

(c) *Not economically active population*. The not economically active population comprises the following functional categories:

- (i) *Homemakers*. Persons of either sex, not economically active, who are engaged in household duties in their own home, for example, homemakers and other relatives responsible for the care of the home and children. Note, however, that domestic employees working for pay are classified as employed. To identify those persons in this category who have been engaged in some borderline activities such as collecting and cutting firewood, carrying water, weaving baskets, sewing and the like, and to distinguish them from those who have been engaged strictly in household duties, this category may be split into two or more detailed categories;
- (ii) *Students*. Persons of either sex, not economically active, who attend any regular educational institution, public or private, for systematic instruction at any level of education. If full-time students who worked or sought work during the reference period are to be identified separately, this category should be split accordingly and removed from the not economically active category. With the increasing importance of students in the labour market, it is useful to compile separately data for full-time students in the labour force if this category is significant. Full-time students who combine their study with remunerated work should be considered as employed, and full-time students looking for part-time or full-time employment as unemployed provided that they meet the general criteria of unemployment;
- (iii) *Income recipients*. Persons of either sex, not economically active, who receive income from property or other investment or from royalties or pensions from former activities. This category may also be broken down into those with property income and others;
- (iv) *Others*. Persons of either sex, not economically active, who are receiving public aid or private support, and all other persons not falling into any of the above categories, such as children not attending school.

11.83. Since some individuals may be classifiable in more than one category of the not economically active population (homemakers, students, income recipients, others), the interviewer's instructions should indicate the order of preference for recording persons in one or another of the categories when multi-status is not identified. Consideration might also be given to presenting the categories

on the survey questionnaire in the preferred order because persons tend to answer with the first category that applies to them.

## 5. *Particulars of employment*

11.84. For each person reported as employed, additional information on the characteristics of the employment situation should be collected. The main items described here are occupation, industry, status in employment, sector of employment, time worked, normal duration of work, reasons for part-time work and income from work. Responses to some of these items may also be used to revise the activity status should inconsistencies be discovered between the two parts.

### (a) *Occupation*

11.85. Occupation refers to the type of work, trade or profession performed by the individual during the specified reference period, irrespective of the industry or the status in employment of the individual. For purposes of international comparisons, the data may be compiled in accordance with the latest revision of the International Standard Classification of Occupation (31). ISCO provides the framework and definitions of civilian occupations which may be adapted to fit prevailing national conditions. The occupational structure is framed at four levels of detail: 8 major groups, 83 minor groups, 284 unit groups, and 1,881 occupational categories. If it is not possible to compile the data exactly in accordance with ISCO, provision should be made for the categories of the classification employed to be convertible to ISCO, at least to its minor (two-digit) groups for censuses and its major (one-digit) groups for sample surveys. If the data are not classified in accordance with ISCO, an explanation of the differences should be given along with the published results.

11.86. Where multiple occupations are common, the appropriate treatment of such situations should be determined beforehand and applied uniformly to all persons. Multiple occupations arise either when a person is engaged in more than one occupation at a given point of time, such as a government official who teaches part-time, or when a person has changed occupation during a period of time which falls within the reference period, such as an agricultural worker who works as a construction worker in the off-season. In both cases criteria must be established to determine the principal occupation (in the case of multiple occupations at a given time), or the usual occupation (in the case of multiple occupations during a period of time) and to determine whether data on the corresponding secondary and subsidiary occupations are also to be collected. Among the typical criteria used for distinguishing between principal and secondary occupations or usual and subsidiary occupations, the duration of work in each occupation during the reference period may be the most appropriate. Other criteria, such as remuneration or the respondent's own criterion, are either more difficult to apply or more subjective. The choice of whether or not to include secondary or subsidiary occupation as an item in the questionnaire depends on the incidence of multiple occupations in the country and the degree of details desired to be extracted from the survey results.

### (b) *Industry*

11.87. Industry refers to the activity of the establishment in which the person worked or was employed during the reference period. By establishment is meant an economic unit which essentially engages in predominantly one kind of economic activity at a single physical location, for example, an individual farm, mine, factory, workshop, store or office. For purposes of international comparability, the data may be compiled in accordance with the most recent revision of the International Standard Industrial Classification of All Economic Activities (70), or in a way which is convertible at least to the ISIC major (three-digit) groups in the case of censuses and at least to the ISIC major (one-digit) divisions in the case of sample surveys. If the data are not classified in accordance with ISIC, an explanation of the differences should be given along with the published results.

11.88. Corresponding to each reported occupation, industry should be indicated. If an occupation was performed in more than one industry, criteria for determining which is the main industry may be established in the same way as for determining the principal or usual occupation.

### (c) *Status in employment*

11.89. Status in employment refers to the status of a person with respect to his or her employment during the specified reference period. Information on status in employment should be collected corresponding to each reported occupation. In international recommendations, status in employment is defined as follows:

- “(i) Employer: a person who operates his or her own economic enterprise or engages independently in a profession or trade and hires one or more employees. Some countries may wish to distinguish among employers according to the number of persons they employ;
- “(ii) Own-account worker: a person who operates his or her own economic enterprise or engages independently in a profession or trade and hires no employees;
- “(iii) Employee: a person who works for a public or private employer and receives remuneration in the form of wages, salaries, commissions, tips, piece rates or pay in kind;
- “(iv) Unpaid family worker: a person who works a specified minimum amount of time (at least one-third of normal working hours) without pay in an economic enterprise operated by a related person living in the same household. If there are a significant number of unpaid family workers in enterprises of which the operators are members of a producers' co-operative and who are classified in category (v), these unpaid family workers should be classified in a separate sub-group;
- “(v) Member of producers' co-operative: a person who is an active member of a producers' co-operative, regardless of the industry in which it is established. When this group is not numerically important, it may be excluded from the classification, and members of producers' co-operatives should be classified under other headings as appropriate;

“(vi) Persons not classifiable by status: experienced workers with status unknown or inadequately described and unemployed persons not previously employed” (30, p. 23).

11.90. Certain modifications regarding definitions and disaggregations may be needed to fit national conditions. These may usually be done while maintaining consistency with the above classifications. For example, the criterion of a specified minimum amount of time of work for unpaid family workers may be relaxed for certain tabulations, as described below in section D. Also, where it is customary for young persons in particular to work without pay in an economic enterprise operated by a related or unrelated person who does not live in the same household, the requirements of related person and of living in the same household may be eliminated and the data tabulated separately or in combination under a heading such as “unpaid helper”. Furthermore, if unpaid apprentices and community workers are classified as employed and their numbers are significant, then additional categories may be added to the above classification.

11.91. Certain countries have adopted more disaggregated and different nomenclature for status in employment. For example, in the Trinidad and Tobago internal migration survey referred to earlier, the “own-account worker” category has been broken down into those with and those without unpaid help; the “employee” category is divided into government and non-government categories; and two categories of paid and unpaid learner have been added. A survey in which a very detailed classification is defined is the Brazilian survey, in which different classifications for non-farm and farm occupations are adopted, with particular detailed categories for own-account workers (153).

#### (d) Sector of employment

11.92. This refers to the sector of the economy, in the sense of the institutional set-up, in which the employed person works. The basic distinction is between the public and the private sector. Depending on the structure of the national economy and the possibility of obtaining accurate information on this item from households, the basic sectors may be further subdivided, as suggested in the census recommendations (77). The public sector should be subdivided into (a) general Government and (b) publicly owned and controlled enterprises, and the private sector into (a) privately owned and/or controlled enterprises and (b) household unincorporated enterprises. Co-operative enterprises may be separately identified.<sup>3</sup> In practice, in most surveys only the private-public distinction is considered, and it is incorporated as a subdivision of the “employee” category in the classification of status in employment.

#### (e) Socio-economic groups

11.93. Classification by socio-economic groups is intended to distinguish among population groups which are more or less homogeneous within each group and clearly distinct in socio-economic characteristics from each other. It is often a derived item in the sense that it is not based

on a single explicit item in the questionnaire but derived from other classifications, in particular, status in employment, occupation, industry and occasionally income. A socio-economic group classification may include categories such as farmers, manual workers, office workers, managers and professionals, self-employed persons and unpaid family workers. Although listed here under the heading of particulars of employment, the classification by socio-economic group should also be considered for the unemployed and the inactive. Further information on and examples of socio-economic group classifications may be found in (65), part three, paragraphs 67 to 69 and annex III, subsection III.D.

#### (f) Time worked

11.94. Time worked is the total time worked during the reference period by persons reported as employed. It includes the duration of the period the person was occupied in his work, including overtime but excluding hours paid but not worked. For wage and salary earners, it includes time worked without compensation in connection with their occupations, such as the time a teacher spends at home preparing forthcoming lectures. For own-account workers, it includes the time spent in the shop, business or office, even if no sales or transactions have taken place.

11.95. In principle, corresponding to each reported occupation the amount of time worked should be asked separately. If a person had more than one occupation but the questionnaire allows for reporting only the principal or usual occupation, time worked on all occupations should be added and the total recorded. On the other hand, if secondary occupation is also to be reported, the corresponding time worked should be recorded as well. In practice, however, if the reference period is longer than one week, it may not be possible to relate time worked to a particular occupation for persons who have had several occupations over the period. Hence, in these situations time worked would refer to the total time worked at all occupations.

11.96. If the reference period is short, for example, a week, time worked may be reported in hours, or, if the labour time disposition approach is adopted, in days or half days for each day during the reference period. If the reference period is long and the priority criterion is used, time worked may be reported in days or months, as appropriate. To limit response errors, the item may be broken down into several questions, for example, lost time and overtime, in in-depth surveys and survey rounds on employment. Or, as in the labour time disposition approach, the item may be broken down into retrospective questions for each day of a short reference period (India) or each month of a long reference period (the Philippines). In addition to guiding the recall process and thereby reducing response errors, this procedure enables the compilation of employment and (visible) underemployment series in terms of work-hours, work-days or work-months, as appropriate.

11.97. In classifying the data according to number of hours worked, the classification recommended by the Eleventh ICLS in connection with the measurement of underemployment may be used. It is:

- (a) Less than 15 hours;
- (b) 15 to 34;
- (c) 35 to 39;

<sup>3</sup> See also the sectors and subsectors defined in table 5.1 of *A System of National Accounts* (55).

- (d) 40 to 47;
- (e) 48 and over.

A more detailed classification which allows in particular for employed persons not at work and variations in cut-off points in the minimum amount of time worked for consideration as employed is given as follows:

- (a) 0 hours;
- (b) 1 to 9, in single-hour groups;
- (c) 10 to 44, in five-hour groups;
- (d) 45 to 47;
- (e) 48 and over.

For the classification of data on time worked according to days and months worked, there exist no international guidelines. Two possibilities are: in terms of months, less than 1, 1 to 2, 2 to 4, . . . , 10 to 12, 12; or in terms of days: less than 25, 25 to 49, 50 to 99, . . . , 250 to 299, 300 and over.

(g) *Other classifications*

11.98. Additional classifications, depending on the use of the survey results, may be considered. Examples are type of enterprise (household, non-household or formal, informal), nature and stability of employment (permanent, temporary, seasonal, irregular, casual).

(h) *Normal duration of work*

11.99. The international recommendations on labour statistics refer to normal duration of work in connection with the classification of unpaid family workers and the measurement of visible underemployment: "Unpaid family workers . . . are considered as employed if they worked for at least one-third of the normal working time during the specified period"; and "[Visible underemployment] occurs when a person is in employment of less than normal duration and is seeking, or would accept, additional work." Normal duration of work may also be used for defining part-time employment. Accordingly, each employed person may be asked whether the reported time worked is the normal (or scheduled) duration of work in all occupations combined. If not, information on the normal duration of work in hours or days or months, as appropriate, may be collected. For persons who have started working for the first time during the reference period, the normal duration of work refers to the expected duration of work in the new occupation.

11.100. It should be mentioned, however, that the notion of normal duration of work raises considerable conceptual and measurement problems. In fact, a review of national practices shows that this item has been avoided or altered in many labour force surveys. For example, unpaid family workers are classified as employed according to whether they have worked more than a prescribed number of hours during the week without explicit reference to the normal duration of work. For example, 15 hours was used in the labour force survey of the Republic of Korea and 8 hours in the population census of the Islamic Republic of Iran. Similarly, visible underemployment is measured with reference to a fixed number of hours per week, which was set, for instance, at 35 hours in the labour force survey of Panama cited earlier. A survey in which the notion of normal duration of work is introduced but in somewhat different form is the United States of America Current Population Survey where, for the purpose of the measurement

of part-time employment, persons who report having worked 1 to 34 hours during the reference week are asked whether the person usually works 35 hours or more a week at his or her job.

(i) *Reason for short-time work*

11.101. Of those persons who report working less than the normal duration of work or less than the prescribed limit, the reason for short-time work may be asked. The possibilities may be classified into two broad classes: economic reasons and non-economic reasons. Economic reasons may be "slack season", "material shortage", "equipment breakdown", "unavailability of regular full-time work" etc. Non-economic reasons, which may be in turn divided into two groups, are voluntary reasons, such as "not wanting full-time work", "nature of work not full-time", and other reasons such as "illness", "bad weather" etc. From this classification, those who worked less time due to economic reasons may be considered as visibly underemployed (provided the other criteria for the measurement of visible underemployment are satisfied) and those who did so for voluntary reasons as part-time workers. The rest will be persons working short-time temporarily.

(j) *Income from work*

11.102. The concept of income has been referred to both in connection with the measurement of invisible underemployment and as part of the information base of the labour utilization approach. In principle, the link between employment and income should be made through income from work, both cash and in kind, earned during the reference period used for the inquiry on activity status. Accordingly, for each employed person classified as an employee, information on his or her gross wages and salaries (before deducting taxes, pension contributions and the like) from all occupations during the reference period should be collected. If the person was engaged in more than one occupation and secondary occupation is recorded, wages and salaries should be collected for each occupation separately if feasible. An additional inquiry on in-kind payments in the form of goods and services such as food, meals or lodging should also be made and the data for cash and in-kind income should be recorded separately. If a short reference period is used, for those persons who normally receive wages and salaries on a monthly basis the data should be converted to a weekly or daily basis as appropriate, preferably at the data-processing stage of the survey operation.

11.103. Due to measurement and other operational problems (discussed in section D), the above inquiry may be satisfactorily made only of wage and salary earners. For other categories of workers, the relevant data may be obtained through separate survey rounds on income.

11.104. In addition to income from work, annual income (cash and in kind) of the household from all sources including wages and salaries may be collected in in-depth surveys and survey rounds on employment. This item of inquiry, which should not be restricted to employees, is useful in relating employment to economic hardship and can also, together with the data on income from work, provide an input into statistics of the distribution of income, consumption and accumulation of households (74).

(k) *Other items*

11.105. Depending on the objectives of the survey, additional items may be collected on desire and availability to work more hours per day or more days per year; on level of skill—manual (unskilled, semi-skilled, skilled) and non-manual; and type of training—on the job, vocational, professional, technical, apprenticeship and so on. These items may also be required in connection with the measurement of underemployment and aspects of labour utilization.

6. *Particulars of unemployment*

11.106. For each person reported as unemployed in the activity status item, information on the particulars of unemployment should be collected. The main items discussed below are work experience, last or subsidiary occupation, industry, status in employment, sector of employment, search activity, duration of unemployment, current availability, characteristics of employment sought or available for. Responses to some of these items may also be used to revise the activity status should inconsistencies be discovered.

(a) *Work experience*

11.107. Work experience refers to the past work experience of the person classified as unemployed. It establishes whether the person worked before or is seeking or available for work for the first time. If the person reported prior work experience, it may be useful to ask the date of the last time the person worked. This item of detail can be helpful to verify the accuracy of the response to the activity status item and to assess the labour force attachment of the person.

11.108. If a long reference period in combination with the major activity status is used, work experience may also refer to the usual subsidiary activity of the person, as in this case the person reported to be unemployed may have been engaged in some working activities in addition to having been seeking or being available for work during the reference period.

(b) *Last or subsidiary occupation, industry, status in employment and sector of employment*

11.109. For persons who have reported prior or subsidiary work experience, details on the last or subsidiary occupation, industry, status in employment and sector of employment are to be collected in conjunction with the corresponding items described in connection with the particulars of employment.

(c) *Duration of unemployment*

11.110. Duration of unemployment refers to the duration of the period during which the person recorded as unemployed was seeking or available for work. The reported duration should consist of a continuous period of time up to the reference period. If the priority criterion is used, the duration should not include a period during which the person was also engaged in some employment activities. In computing the duration of unemployment, it may be measured in terms of weeks if the short reference period is used or in terms of months if a long reference period is used. Corresponding classifications may be:

(a) Less than 5 weeks, 5 to 14 weeks, 15 weeks and over; and

(b) Less than 3 months, 3 to 6 months, 6 to 12 months, 12 months and over.

(d) *Search effort*

11.111. This item refers to the type of steps taken in searching for employment or additional work. Various steps could be: registered with employment services; approached prospective employers, relatives or friends; placed or answered advertisements; started own business, professional service or farm; or did nothing.

(e) *Reason for not seeking work*

11.112. Those who reported not having made any effort to seek work may be asked the reason. Possibilities may be: illness, bad weather, awaiting results of previous applications, no suitable vacancy believed to exist or other reason to be specified.

(f) *Current availability for work*

11.113. The purpose of this item is to test the current availability of persons reported as unemployed. It can be formulated negatively in terms of whether there is any reason that the person would not accept a job if offered during the reference week. If the answer is no, the person is currently available for work and if it is yes, the reason for not being currently available may be asked. Possibilities may be: "temporarily ill", "presently no one to take care of children", "finishing school year", and the like.

(g) *Characteristics of employment sought or wanted*

11.114. Of each unemployed person, additional information on the characteristics of employment sought or available for may be collected. These items may include: type of work (manual or non-manual), nature of work (full-time or part-time), occupation, industry, status, the lowest acceptable income. Where appropriate, other information may also be gathered on, for example, the search for or availability for work "within the village or town" or "outside the village or town", the present means of support (parent or guardian, friend, personal savings, other).

7. *Particulars of the inactive*

11.115. As mentioned earlier, one of the advantages of a household survey is that it can reach virtually all segments of the population, including the inactive. Establishment surveys are generally limited to employees, and administrative records such as employment service registers and unemployment insurance records cover only the unemployed. The comparative advantage of household surveys should, therefore, be exploited to collect information on the relevant particulars of the inactive as well as the regular information on the employed and the unemployed examined earlier. Information on the inactive has already been discussed as part of the section on demographic characteristics and the activity status item. In the latter, the functional categories generally distinguish among homemakers, students, income recipients and others. More specific additional information may also be collected, in particular in relation to the measurement of potential labour

force or labour reserve. The measurement of labour force on the basis of current status during the reference period does not provide a measure of potential labour force. Some of those classified as economically inactive by this procedure may very well qualify for inclusion in the labour force in so far as they are willing to work if work were made available.

11.116. Thus, the inactive population may be subdivided into five categories according to the degree of attachment to the labour force, although the boundaries between the categories may not always be sharp. First, there is the category of persons who, while not seeking work, are readily available for work. Similar to this category are the so-called discouraged workers, that is, persons who want a job but are not seeking or have ceased to seek work because they believe that there are no jobs available in the area. These groups of persons, as mentioned earlier, are considered as part of the unemployed in certain country practices. Measurement and classification issues regarding discouraged workers are discussed below. Next, one may consider persons who are currently inactive but may under certain circumstances be willing to accept work, for example, homemakers, if work were made available at home or children were taken care of during working hours. Finally, there is the category of all remaining persons who are physically able to work but are currently inactive.

11.117. The data items required for the above and related classifications may include: work experience; last occupation, industry, status in employment; subsidiary activity; current availability; characteristics of acceptable employment; and conditions that prevent accepting work. The first two sets of items have also been discussed in connection with the data items on the unemployed and the employed. Thus, these items may be collected for every working-age person and, therefore, the questionnaire may be designed accordingly in single sets of questions. Subsidiary activity refers to the activities regularly carried out that are borderline in nature. (See, for example, item 6 of the questionnaire in (163).) Current availability may be tested in the same manner as described in the context of particulars of unemployment. Characteristics of acceptable employment include work "at home" or "away from home"; "regular" or "occasional" work; "part-time" or "full-time" work and so on. Conditions that prevent accepting work may include physical handicap, pregnancy, full-time school attendance, family responsibilities and the like.

#### D. SELECTED MEASUREMENT, CLASSIFICATION AND SAMPLING ISSUES

11.118. The various conceptual approaches and data items described above in sections B and C involve various classification and measurement issues which need to be examined before undertaking any survey operations. Some of these issues have been dealt with in the discussion of data items, but some remain to be discussed in more detail. The selected issues treated below are definition, classification and other issues related to unpaid family workers, discouraged workers and full-time students; the measurement of activities of children; part-time employment; and income from work. In addition, certain particular issues regarding sampling frames and designs which

arise in specialized labour force surveys are singled out and briefly discussed.

##### 1. Unpaid family workers

11.119. One group of persons which may be especially difficult to classify consists of unpaid family workers. The difficulty arises because of the likelihood of significant variations in the definitions of unpaid family workers in various countries and in the interpretation of the definition by interviewers or respondents in a given country. According to the Eighth ICLS, persons are considered employed as unpaid family workers if they worked for at least one third of the normal working time during the specified reference period assisting in the operations of the household enterprise or farm. Since this recommendation is made in the context of a brief reference period (a day or a week), if the concept of usual activity is used, unpaid family workers are to be considered as employed if they usually work at least one third of normal working time during the specified 12-month period.

11.120. In some situations the determination of normal working time may be difficult. For example, in agriculture, economic activity is subject to seasonal variations, and the number of hours of work required during a given week depends on the agricultural operations to be carried out at that particular time of the year. Thus, no normal working time can be meaningfully determined in these situations. For practical purposes, in many countries the normal working time is taken to be the standard number of hours of work in factories or offices and is applied uniformly in urban and rural areas for all activities.

11.121. The choice of one third of the normal work time as the time-limit in determining employment status is rather arbitrary and few countries strictly follow the recommendations. For example, the time-limit in the Republic of Korea survey cited earlier was 15 hours during the reference week, while it was eight hours in the 1976 population census of the Islamic Republic of Iran, although the normal working hours in these cases were generally regarded to be 48 hours per week. In fact, questions may be raised on the necessity of any minimum time requirement on duration of work for unpaid family workers when no such requirement is stipulated for the other classes of workers (employers, own-account workers etc.).

11.122. In view of this issue and the varying time-limits in different surveys, it may be appropriate to collect data on time worked for all unpaid family workers, and to tabulate the data in the form of a frequency distribution by time worked so that any segment can be included or excluded depending on the purposes for which the tabulated data are to be used.

11.123. A careful treatment of unpaid family workers is of particular importance in agriculture since in most cases in both developed and developing countries the agricultural holding is run on a household basis and all or almost all the members of the household take part in the agricultural operations. Since for many of the unpaid family workers, especially women, working and helping in the running of the household enterprise may be only a secondary activity, unless probing questions are asked many of them may not be identified as working at all. Great care should be taken, therefore, to impress upon interviewers

the importance of investigating the economic activity of women.

11.124. Unless interviewers are explicitly instructed to ask about the possible economic activity of women in the household exactly as they do for men, they may tend automatically to record women as homemakers, particularly if the women are married, without asking whether they participate in any other activity. For example, in a rural survey in the Islamic Republic of Iran, in reply to the question, "Are you a family worker?", only 15 per cent of the respondents were identified as unpaid family workers. But when the question in a different survey in the same year was split into whether the person did any agricultural work at all and then whether the work consisted of helping other members of the household, the reported percentage of unpaid family workers increased significantly, to 22 per cent of the employed population.

## 2. Discouraged workers

11.125. According to the Eighth ICLS, except for minor cases persons should be actively seeking work to be classified as unemployed. However, national experience, in particular in developing countries, has shown that there are a significant number of persons without jobs who are available for work even if they are not actively seeking a job. The so-called "discouraged workers" constitute one group of inactive work-seekers. These are persons who, while willing and able to engage in a job, are not seeking work or have ceased to seek work because they believe there are no suitable available jobs. In the international recommendations, inactive work-seekers are regarded as unemployed and, thus, excluded from the labour force although they may have some attachment to it.

11.126. National practices regarding discouraged workers, or inactive work-seekers in general, vary considerably among countries. In the regular labour force surveys of Japan, for example, inactive work-seekers are by definition excluded from the unemployed category, but in the special labour force surveys generally conducted annually, a count is made of persons who would work if a job were available (174). In the Continuous Sample Survey of Population of Trinidad and Tobago, all persons without jobs who sought work at some time during the three-month period preceding enumeration but not during the survey week and who are still available for work are considered as unemployed but classified separately from the unemployed persons who are without jobs and seeking work according to the standard definitions (188). In the labour force survey of Jamaica, persons who indicate that they are willing to accept a job and are in a position to do so are included among the unemployed, irrespective of their past search experiences.

11.127. Since the concept of unemployment, restricted to persons who are actively seeking work during the specified reference period, may be of limited significance in many developing countries where the organized labour market institution may only cover a small part of the population and employment opportunities may be scarce, it is important to identify the inactive work-seekers as objectively as possible and to classify them separately within the unemployed category.

11.128. The objective measurement of the discour-

aged workers, however, is not an easy task. The identification of discouraged workers as discussed above is based on whether the person is available for work, which is not essentially an objective criterion. It is implicitly dependent on the characteristics of the work, the qualifications of the person, the likely remuneration and the distance to work. The accuracy of measurement is also dependent on whether the response is provided by the worker himself or herself or by a proxy respondent if the worker is absent during the interview. Although the effect of proxy response exists for all questions regarding absent persons, it is more important in the case of essentially subjective questions such as the one on current availability.

## 3. Students

11.129. The working student or the full-time student available and seeking part-time or even full-time work is a phenomenon which is tending to grow in many countries, especially in the developed countries, partly because of development of part-time work throughout the year and of the tendency for students to work full time during much of their vacations. The recommendations of the Eighth ICLS do not make any specific reference to the treatment of full-time students. The intent might be to treat these students as any other members of the population, that is, to regard them as employed if they are engaged in any economic activity during the reference period or as unemployed if seeking a job and available to work. Such a treatment conforms to the underlying priority criterion of the labour force approach, which gives precedence to work over other activities.

11.130. In fact, most countries follow basically this procedure with regard to students, although there are exceptions and variations. One exception is the labour force survey in the Islamic Republic of Iran, in which only full-time students who had worked more than half of the normal hours, taken to be 48 hours, during the reference week were classified as employed. Students working less than half of the normal hours were considered as inactive and therefore out of the labour force. Variations occur mostly with regard to the treatment of students seeking work. In Turkey, for example, students seeking part-time employment are classified as unemployed even if studying full time (43). However, in the General Household Survey of the United Kingdom, these students are classified as inactive (191).

11.131. With the increasing importance of students in the labour market, it is useful to compile separately data for full-time students in the labour force if significant. Full-time students who combine their study with remunerated work should be considered as employed, and full-time students seeking part-time or full-time employment as unemployed provided that they meet the general criteria of employment.

## 4. Migrant workers

11.132. In many countries migrant workers constitute a considerable part of the economically active population. As the number of migrant workers fluctuates depending on the employment and economic conditions of the host country and also of the country of origin, and to the extent

that it affects the employment and unemployment statistics, the number of migrant workers and their activity status should be determined and tabulated such that the statistics on them can be studied separately from those on indigenous workers (43). Where feasible the tabulations should be made according to country of origin and number of years since migration.

11.133. In collecting data on migrant workers through household surveys, certain measurement issues should be borne in mind. First, in order to obtain significant results from the survey, the sample size may need to be appropriately adjusted. Second, to the extent that there are migrant workers who are working illegally or with expired permits in the host country, the accuracy of responses may be affected.

### 5. *Children*

11.134. It was mentioned in section C that where child participation in economic activities is significant the minimum age limit for inquiries on employment characteristics should be set accordingly at a lower value than normally adopted for delineating the working-age population. As work done by children has a bearing on fertility and migration decisions, household income and the trade-off with learning activities, measures of youth employment are relevant for social and economic analysis and planning. The main items of inquiry regarding child employment concern activity status, or more simply a measure of whether the child works or not. Additional information on duration and type of work, including occupation and wages and other forms of income earned, may be collected.

11.135. While in some cases data on child employment may be collected with relatively minor adjustments to a questionnaire designed for adults, in other cases there are certain distinctive features which call for special inquiry procedures and possibly separate questionnaires. One such distinctive feature arises because children, particularly younger ones, cannot be readily interviewed and their parents or other respondent may not be able or want to provide accurate responses on the activities of the children, especially where children and parents spend most of the day separately or where laws on compulsory education and minimum legal age for employment are strictly enforced. Another distinctive feature arises from the fact that many types of activities in which children are often engaged (for example, collecting firewood and weaving materials, shepherding lambs and sheep, catching fish and hunting animals in rural areas; and cleaning and looking after cars, shoe-shining, carrying shopping bags and store deliveries in urban areas) are of a borderline nature, and unless special direct questions and probings are introduced they may escape reporting.

### 6. *Part-time employment*

11.136. According to the Eighth ICLS, a person who has performed some work for pay or profit, even if it is for only one hour during the specified reference week or day, is regarded as at work. As mentioned in the earlier section, the only exception is unpaid family workers for whom it is required to have worked at least one third of the normal working hours. Thus, in the employed category persons at work may include a variety of part-time

workers in addition to the regular full-time workers. The increasing numbers of part-time workers and the existence of substantial differences between the characteristics of the part-time labour market and those of the full-time labour market point to the need for a uniform and separate treatment of this category of the population.

11.137. However, there is no international definition of part-time work and the distinction between full-time and part-time work varies considerably among countries where this distinction is made. For example, in the labour force survey of the Philippines, if it is reported that an employed person worked 40 hours or more during the survey week, he is considered as working full time, otherwise he is considered as working part time. In the Israel survey the cut-off point is 35 hours of work during the reference week, and in order to account for persons working at a profession in which a full-time job consists of less than 35 hours per week (for example, physicians, teachers and the like) hours spent in preparation for work are included in the calculation of full-time work. In the Current Population Survey of the United States of America, the cut-off point is also 35 hours, but a distinction is made between persons working part time voluntarily (for example, because of not wanting full-time work) and those working part time for economic reasons, for example, because of slack work or because of having found only part-time work (222). Also, workers employed part time on a second job, whether this is additional to full-time employment or not, are included in the part-time labour force in some countries, but excluded in others.

11.138. Although there exists no international definition of part-time work, the Eleventh ICLS in connection with the measurement of visible underemployment referred to persons working a number of hours below the normal duration for economic reasons. A similar criterion might serve to identify part-time workers as persons usually working less than the normal duration of work for voluntary reasons. At the same time, all persons not having a job but seeking part-time work are to be classified as unemployed provided they meet the general criteria of unemployment. They may be tabulated separately so that the part-time labour force may be studied separately from the full-time labour force.

### 7. *Income from work*

11.139. The concept of income has been mentioned both in connection with the measurement of invisible underemployment and as part of the information base of the labour utilization approach. Because the relevant concept here is that of income derived from work, the well-known problems associated with the collection of income data through household surveys are now compounded with the additional problem of distinguishing income from work from total income and of ascertaining the income of each working individual within the household separately.

11.140. For employees, it is possible in general to obtain satisfactory data on income from paid work. Moreover, the resulting income data can be related to the time unit of work (for example, hours or days of work) since both types of data (income and time worked) can be collected for the same reference period for each wage and salary employee. For other categories of workers, however, the situation is more complex, since the net income de-

rived from the enterprise cannot all be ascribed as compensation for the labour input of its members. For example, in the case of the rural household enterprise, the household usually uses productive assets such as land, implements and tools for the generation of income from the enterprise.

11.141. An equally difficult problem is to meaningfully relate income from work to hours of work in the case of non-wage and salary workers. For example, for most agricultural own-account workers, the bulk of the income is normally received at long intervals such as the end of a crop season, which makes it difficult to ascertain the portion of the measured income that corresponds to the reported hours of work.

11.142. In the case of unpaid family workers and own-account workers who are engaged in household enterprises, there is the added problem of apportioning the income from the work of each worker within the household. Because income is often derived as a result of the joint effort of the entire household and is to be utilized jointly for the welfare of all members of the household irrespective of the amount of effort put in by each member, it has been argued that the household rather than the individual should be treated as the unit of analysis. Treating the household as the unit of analysis, however, raises questions on the interpretation of the results, as households vary in size, and this treatment conflicts with the unit of analysis for employment, which is the individual. Thus, except for wage income of employees, satisfactory data on income from work cannot be obtained unless a separate survey or module is envisaged along with the employment survey.

11.143. National practices regarding the collection of income data in connection with labour force surveys vary among countries. For example, in the Republic of Korea survey no inquiry on income is made. In the Islamic Republic of Iran, only earnings (cash and in kind) data are collected from employees in the labour force survey. In Hong Kong, the labour force survey includes inquiries on employment earnings from all employment and also on household income from all sources. In Israel, an income survey is conducted separately but within the frame of the labour force survey, on the basis of which the data on gross income from wage and salary of employed persons are linked to the labour force data.

## 8. *Sampling issues*

11.144. While a detailed discussion on sampling issues is beyond the scope of this chapter,<sup>4</sup> it is appropriate to mention here certain particular aspects of sampling in connection with household employment surveys, namely, sampling frames and sample designs.

11.145. Because the frame for drawing samples for surveys concentrating on employment topics is commonly derived from the most recent population census, any undercoverage or imperfection of the census is likely to be reflected in the ultimate selected sample. Although this issue concerns household surveys in general, there are certain aspects which more particularly affect household em-

ployment surveys. For example, where detailed studies on the characteristics of the population missed in the census have been made, the results tend to indicate that the unenumerated population differs from the enumerated population with respect to the main labour force characteristics. In particular, the unenumerated population includes relatively more unemployed persons and relatively fewer persons not in the labour force than the enumerated population. Thus, unless proper adjustments are made, the results of household sample surveys on employment are likely to underestimate both the unemployment rate and the labour force participation rate. Also, if the census on which the sampling frame has been based is old and has not been updated, the selected sample may not be adequately representative, especially where geographical mobility and rural-urban migration are substantial. As many of these movements are the results of job opportunity and other employment considerations, their likely impact on the representativeness of the sample and ultimately on the survey results on employment, unemployment and other related characteristics may be important.

11.146. Apart from issues concerning sampling frames, the sample design should be adapted to certain features of labour force characteristics. A typical sample design for household surveys uses cluster sampling, which in its simplest form involves a complete enumeration of the sampled area units. While this design has certain practical advantages, in particular with respect to household identification and listing, it is inefficient when there is a positive intra-class (or intra-cluster) correlation for the main items of inquiry. This is in fact likely to be the case for labour force items, as employment and unemployment are not likely to be distributed within sampled areas the same as they are overall. As an extreme example, consider an area in which a mine has just closed down and no other major economic activity has replaced it. In such an area, one would expect to find few employed and many unemployed persons. Thus, asking the activity status of every working-age person would not likely provide much more information on the labour force composition than asking the question from just a subsample. Accordingly, for household employment surveys, cluster sampling may yield less precise estimates of employment and unemployment than two-stage random sampling with the same sample size.

## E. TABULATION, EVALUATION AND ANALYSIS OF SURVEY RESULTS

### 1. *Tabulation*

11.147. Data collected on sex, age, marital status, education status, activity status, employment status, occupation, industry, time worked, income from employment (where feasible), particulars of unemployment and so on permit preparation of a wide range of cross-classifications and tabulations. Employed persons can be distributed according to different characteristics: age group, time worked, educational level, occupation, industry and status in employment for the country as a whole, geographical regions and urban and rural areas. It is also possible to make tabulations of data for socio-economic groups, occupational groups or target groups, for example, women who combine household duties with economic activities.

<sup>4</sup> Sampling is discussed in part one of the present *Handbook* and in many textbooks on the subject.

11.148. In deciding on the choice of tabulations and the degree of detail of the cross-classifications, the size of the sample should be taken into account, because too detailed cross-classifications may result in tables with many empty or small cells for which the sample data may be unreliable. Also, tables in which many items, say four or more, are cross-classified should also be avoided, because such tables are often difficult to interpret readily. Cross-classifications of items that are known to be independent or weakly correlated should also be avoided, because the cross-classified data do not provide much more information than that contained in the margins.

11.149. The following list contains some common and general tabulations of labour force data:<sup>5</sup>

- (a) Number of persons above the specified age limit, by age group and by sex;
- (b) Number of persons above the specified age limit, by activity status, by marital status and by sex;
- (c) Employed population by occupation, by age group and by sex;
- (d) Employed population by industry, by age group and by sex;
- (e) Employed population by status in employment, by age group and by sex;
- (f) Employed population by occupation, by industry and by sex;
- (g) Employed population by occupation, by time worked and by sex;
- (h) Employed population by industry, by time worked and by sex;
- (i) Employed population by occupation, by educational level and by sex;
- (j) Employed population by industry, by education level and by sex;
- (k) Employed population (only employees) by occupation, by income group and by sex;
- (l) Employed population (only employees) by income group, by time worked and by sex;
- (m) Unemployed population by age group and by sex;
- (n) Unemployed population by last occupation and by sex;
- (o) Unemployed population by last industry and by sex;
- (p) Unemployed population by duration of unemployment, by age group and by sex;
- (q) Unemployed population by seekers and non-seekers, by age group and by sex;
- (r) Unemployed population by education level, by age and by sex;
- (s) Unemployed population by duration of unemployment, by education and by sex;
- (t) Population not in the labour force by activity status category, by age and by sex;
- (u) Population not in the labour force by work experience, by current availability and by sex;
- (v) Population not in the labour force by reasons for not seeking work, by age and by sex.

11.150. In addition to the cross-classification and tabulations normally needed, the primary data at the level of individual observations can be used for other purposes. With the expansion of computer capabilities it is now possible to retain a traditional tabulation programme for survey data and also to preserve the primary micro-data base in its entirety at the level of individual observations.

## 2. Evaluation

11.151. Like any other set of survey data, results obtained from labour force surveys are subject to errors. A careful interpretation of the results requires some knowledge about their quality. An evaluation of data quality is also necessary to improve data collection, processing and estimation procedures in subsequent survey rounds. A general discussion of various potential sources of errors in household surveys and ways to control, evaluate and adjust for them is included in part one. The purpose of this section is to examine certain particular aspects of error evaluation for labour force topics. The following sources of errors are considered: coverage, response, non-response and coding.

### (a) Coverage

11.152. Coverage errors occur whenever the frame or subframe of the sample scheme of the survey does not fully represent the target population at the time of the survey. Although, in general, coverage errors result in undercoverage of the target population, overcoverage could sometimes also occur, for example, by double counting of new structures that have replaced previously recorded structures at the same location or by accidental duplication of units in the sampling frame. Undercoverage is a more common occurrence, however, and arises when sampling units are missed or when persons within households that should have been listed are not listed at the listing stage.

11.153. Labour force and related aggregates are affected by coverage errors. A study based on the United States of America Current Population Survey of March 1973 indicates, for example, that the measured labour force before any adjustment for coverage may have been understated by 2.6 to 5.6 million persons (213, p. 567). Coverage errors affect relatively more males and young persons than females and adults. Because sex and age are correlated to labour force characteristics and movements, the coverage errors affect the ratios and the rates of change of labour force and related statistics as well as their levels.

11.154. There are several general evaluation methods that can be used to assess coverage errors in labour force surveys. In the continuous Spanish labour force survey, for example, every week the updated listings of the selected sampling units (census enumeration districts) are checked for new dwellings by highly trained staff, thus providing an estimate of the omissions (184, pp. 37-38). Another relatively quick and cheap method of assessing coverage errors consists of making macro-level comparisons with data from an external source. This method assumes that the external data do not themselves suffer from undercoverage and are sufficiently correlated with the labour force data to be evaluated. Population census data disaggregated by sex and age or other relevant categories, after appropriate demographic adjustments, are occasion-

<sup>5</sup> See also cross-classifications shown by the United Nations in (66) and those recommended by the United Nations for population censuses (77).

ally used as the external source for evaluation purposes (157). Other methods of evaluation of coverage errors use micro-level matching procedures. One example is the use of an independent list of the target population to be matched against the listing of the original sample frame (156, pp. 7-9). Another example is the use of reinterviews for assessing coverage errors of persons within households (184, p. 38).

(b) *Response*

11.155. A response error occurs when incorrect information is recorded for a respondent. Response errors may occur in many ways: misconception about a subject, misunderstanding of a question, failure of memory, deliberate or accidental misreporting, lack of knowledge about a characteristic, impulse error or clerical error. Most of these situations may arise in practice in a single interview and may interact with each other and between the respondent and the interviewer. Some may be systematic, thus introducing response bias in the final survey estimates, and some may cancel each other without introducing bias but interjecting response variability. Three interrelated sources of response errors that have particular significance for labour force topics are discussed below: sex-based stereotypes and sex biases, proxy response and sensitive topics.

(i) *Sex-based stereotypes (115)*

11.156. For various social, economic or religious reasons, what constitutes work and economic activity for measurement purposes is often unclear to the respondent and sometimes to the interviewer as well. This phenomenon is especially true in the case of female activities. Given such misconceptions, a male respondent may, deliberately or otherwise, fail to report the economic activity of his spouse who assists in the operation of the household enterprise, thus resulting in underestimation of employment. Unemployment may also be underestimated, for example, because certain women seeking and available for work may find it easier to declare themselves as "housewives". Also, an interviewer seeing a woman at home may automatically classify her as economically inactive, without probing possible part-time or home-based activities, thus contributing to the underestimation of female employment.

11.157. One way to measure the effects on labour force statistics of such sex-based biases is to compare the corresponding survey and census data. In the Islamic Republic of Iran, for example, the female labour force participation rate is 5.4 per cent according to the 1976 Census of Population but more than 13.0 per cent according to the 1972 labour force survey (169, p. 52, 170, p. 14). Most of the difference is accounted for by the fact that determination of economic activity is based on only one question in the census, while the survey incorporates a number of probes. Similar results have also been obtained in other countries (100).

11.158. In surveys, response errors due to sex-based misconceptions may be evaluated by analysing a sample of cases for inconsistencies and rare combinations of reported values. In-depth reinterviews or independent reinterviews under the same conditions, if carefully designed and conducted, can provide more formal and accurate estimates of the response bias or variance.

(ii) *Proxy response*

11.159. In the majority of cases, the data recorded on labour force topics are obtained by proxy response, that is, by a respondent other than the household member in question. To the extent that some characteristics of the household member may not be fully known to the respondent, for example, number of hours actually worked, or may be subjective in nature, for example, availability for work, the proxy response may be subject to errors.

11.160. A recent methodological study by the United States of America Bureau of the Census examines the effect of various types of proxy response on labour force data (202). (Two other issues—mode of interview and interviewer assignment—are also examined.) Preliminary results indicate that proxy response, in the sense of the "household rule", that is, choosing a responsible adult, generally the person who answers the door, as respondent, leads to underestimation of the unemployment rate (7.38 per cent) in comparison with self-response (8.4 per cent). According to a similar and earlier study, employment is also underestimated by proxy response (household rule) in comparison with self-response (213, pp. 17-18). The effect seems to be greater on female employment than on male employment.

11.161. In general, errors due to proxy response are difficult to evaluate, as they are often confounded with other effects. Therefore, their evaluation, in isolation or in combination with other aspects of survey operations, re-

SOME ORDERS OF MAGNITUDE OF NUMBERS OF CLANDESTINE WORKERS IN SELECTED WESTERN COUNTRIES

Country	Type of clandestine worker	Estimated number of workers (thousands)
Belgium .....	Clandestine worker	300
France .....	Regularly engaged in clandestine work	800 to 1 500
Germany (Federal Republic of) .....	"Moonlighters" Illegal migrant workers	2 000
Italy .....	Female clandestine workers, 1971 (of which under 14 years of age) with non-institutional work, 1975 (of which "moonlighters")	200 to 300 1 877 187 2 213 1 068
	Clandestine workers, 1977	4 000
	Illegal home-workers	900
Sweden .....	With jobs in underground sector	750 to 4 500
United Kingdom of Great Britain and Northern Ireland	Clandestine workers	3 per cent of labour force
United States of America .....	Clandestine workers Clandestine immigrant labour force	20 000 4 000 to 6 000
European Economic Community .....	Clandestine immigrant workers, 1975	500 to 600

Sources: "Clandestine employment: A problem of our times", by R. de Grazia, *International Labour Review*, vol. 119, No. 5 (Geneva, ILO, 1980), pp. 549-563; "Measuring the volume of unrecorded employment", MAS/WP.7(80)3, document prepared for the Working Party on Employment and Unemployment Statistics (Paris, OECD, March 1980).

quires a carefully planned design of experiment, preferably to be conducted separately from the main survey.

(iii) *Sensitive topics*

11.162. Apart from errors introduced by sex-based misconceptions and proxy response, response errors may occur in other ways, in particular when the respondent purposely wants to distort the correct answer on some sensitive topics. Sensitive topics in labour force surveys include work without permit, undeclared second job, illegal and socially unacceptable activities and child labour. Also, persons registered for unemployment insurance may omit declaring some occasional economic activities for fear of losing their unemployment benefits. The table on p. 131, compiled on the basis of two secondary sources on clandestine employment in certain western industrialized countries, gives estimates of the order of magnitude of the number of persons involved.

11.163. Employment and unemployment statistics are affected by particular types of clandestine employment. Unreported work of persons engaged in clandestine work as their sole occupation will have the effect of reducing the level of employment (and in certain cases inflating the level of unemployment). Other types of clandestine work, however, will affect mostly statistics of duration of work, income from work and related data.

11.164. Methods to evaluate data quality with respect to sensitive topics are difficult to formulate and even harder to administer. Italy is experimenting with the collection of time use data as a means to pinpoint clandestine work that may have gone undetected using standard labour force questionnaires.<sup>6</sup> Another method design to deal with sensitive questions is the randomized response technique.

(c) *Non-response*

11.165. Non-response occurs when information on a reporting unit is missing. For a given reporting unit, the degree of non-response may be partial or total, depending on whether the missing information pertains to some or all of the required items of the questionnaire. Non-response, in a broad sense, may occur at all stages of survey operations, for example, when a designated survey unit cannot be contacted or refuses to co-operate or when the filled-in questionnaire is discarded or lost. Data quality is affected by non-response because of both bias and variability. Bias is introduced when the probability of non-response is correlated with the characteristics to be measured. Variability is affected because of the reduced effective sample size due to non-response.

11.166. Non-response is a concern in labour force surveys, though the typical non-response rate in labour force surveys is generally lower than in other types of surveys involving sensitive topics and lengthy questionnaires, such as household income and expenditure surveys. This is of concern in labour force surveys because the labour force characteristics of non-respondents tend to be different from the characteristics of respondents. Everything else equal, small households are more likely to be temporarily away or have no one at home to answer the door at the time of the survey than large households, and small households tend to consist of adult members, away working or

seeking work. In the March 1980 labour force survey of Hong Kong, in which all non-response cases were revisited by special officers and further mail follow-ups were made in the case of continued absent households, the results indicate that the labour force participation rate among the non-respondents (65.7 per cent) was significantly higher than the corresponding rate among the respondents (61.2 per cent). By contrast, the unemployment rate was lower for the non-respondents (2.8 per cent) than for the respondents (3.2 per cent).<sup>7</sup> Similar results were obtained in earlier surveys.

11.167. In addition to call-backs or follow-ups, the impact of non-response may be controlled in the field by substitution of non-respondent units with carefully chosen similar units or at the processing stage by various explicit or implicit imputation methods. Since both substitution and imputation methods are based on assumptions about the similarity of the substituted or imputed units and the non-respondent units with respect to labour force characteristics, it is necessary to assess in turn the effect of these assumptions if the objective is to evaluate the quality of the final outgoing data.

(d) *Coding*

11.168. Coding errors are of concern in labour force surveys in particular in connection with occupation and industry coding. In the context of the present discussion, by coding error is meant the error introduced in transforming a written description of occupation or industry into a code number of the occupation or industry classifications. Thus, response errors due to erroneous reporting or recording of the description of the occupation or industry of respondents are considered only to the extent that they affect the quality of the coding transformation.

11.169. Wherever studies have been made of occupation and industry coding in labour force surveys or population censuses, the results have shown that the errors may be substantial. For example, in the 1970 Swedish census of population, the estimated error rates were 13.5 per cent in coding occupation (at the three-digit level) and 9.9 per cent in coding industry (at the four-digit level) (185, p. 28). In the 1970 United States of America population census the corresponding estimated error rates were 13.3 per cent (with standard error equal to 0.4 per cent) and 9.1 per cent (with standard error equal to 0.34 per cent), respectively (197, p. 10). In labour force sample surveys the data on occupation and industry are generally reported at the major group or division level and, therefore, to some extent the coding errors cancel each other in the process of aggregation. But it should be borne in mind that this process reduces only by less than half the individual coding errors, according to empirical results. Also, it should be noted that the coding errors are compounded in joint tabulations, for example, joint occupation and industry, joint primary and secondary occupation or occupational mobility tables.

11.170. Given the magnitude of the error rates, control and evaluation procedures should be incorporated in large-scale coding operations. To prevent coding errors clear coding instructions should be given and production coders and verifiers should be carefully selected and trained. In addition to preventive control, the actual code

<sup>6</sup> Organisation for Economic Co-operation and Development, Working Party on Employment and Unemployment Statistics, "Recent ISTAT experience concerning the monitoring of unrecorded employment", by Grazia Giacomini Arangio-Ruiz (Paris, March 1980).

<sup>7</sup> See (162), issue for March 1980 results, pp. 119-121.

production should also be controlled so that the error rate does not exceed a threshold level. The production control is generally performed by replicating the coding process or making verifications or both. The dependent verification system, according to which the verifier has access to the production code, however, has proved to be less reliable than the independent verification system, where verifiers repeat the coding operation independently of each other and of the production coder. Alternative schemes may be devised for controlling the coding operation with independent verification.<sup>8</sup> In the United States of America Current Population Survey, for example, a three-way scheme is used for controlling occupation and industry coding (208, pp. 51 and 52). A sample of coded questionnaires is selected and coded independently by two additional coders. The majority rule is used to determine the correct code. When all three codes differ from one another, an expert coder determines the correct code. The scheme allows estimation of both the coding bias and the coding variance. Simpler and less costly control and evaluation schemes involving, for example, subsample reinspection or error-planting, may be used when independent verification is not feasible.

### 3. Analysis

11.171. The general tabulations of labour force data indicated earlier permit a wide range of analysis. Basic analysis includes the computation of labour force participation rates, unemployment rates and employment-population ratios by sex, age groups and other relevant geographic, demographic and economic characteristics. The basic rates or ratios may thus be linked to characteristics such as marital status, educational level and migration status to study the factors influencing the level, structure and trend of the labour force, employment and in certain cases unemployment as well. In a different direction, the basic rates may be used as explanatory variables in studies linking employment and output, thus providing measures of labour productivity, analyses of factor shares in produc-

<sup>8</sup> See (185). This document also covers recent developments in automatic coding of occupation and industry.

tion and projections of future outputs. When labour force data are obtained with a frequency of less than a year, seasonality in unemployment and working patterns may be studied, and with sufficiently long time series models may be fitted to estimate the trend-cycle and seasonal movements separately.

11.172. Based on data on duration of work, income and skill, various studies on underemployment and labour utilization may be made. Data on duration of work, reasons for short-time work and type of employment sought may also permit calculation of measures of labour slack, labour force time lost and full-time equivalent unemployment rates. Analysis of data on unemployment duration provides indications of the welfare aspect of unemployment and the functioning of the labour market. Job-search models may be fitted and certain hypotheses on short-term changes of unemployment may be tested. Data on income from work may be used to estimate earnings functions and to analyse the relationships between schooling, work experience and earnings.

11.173. When the labour force statistics are enriched by family-based data, various additional measures of the social aspects of employment and unemployment may be computed, for example, the number and characteristics of households with unemployed members, the family or household relationship of unemployed or employed persons. Data linking employment status, income from work and household income could be analysed to estimate the incidence and particulars of the working poor population and, in general, to measure the various dimensions of hardship associated with the labour market.

11.174. These are just a few examples of some types of studies that may be made with labour force statistics. Many more examples could be given, ranging from descriptive analyses, such as computation of working life tables, making labour force and industry employment and occupation projections, planning manpower requirements and studying occupational mobility and work experience, to the testing of various assumptions on the functioning of the labour market, such as segmentation theories, voluntary unemployment and "added worker" and "discouraged worker" hypotheses.

## XII. FOOD CONSUMPTION AND NUTRITION

### A. SCOPE, PURPOSE AND USES OF THE DATA

12.1. The use of multi-subject surveys combining food consumption and nutrition topics with household income, consumption and expenditure topics has been found to be the best means of providing data on levels of living of households, including their food consumption patterns and nutritional status, suitable for a wide variety of uses in policy formulation and programme planning.

12.2. In general, two approaches have been used in measuring households' levels of living and related factors. The first approach, adopted by nutritionists, has been concerned mainly with the evaluation of nutritional levels of households and individuals, using survey techniques centred on the measurement of food actually consumed. The second approach, which is usually adopted by economists and statisticians, has sought ways of improving the accuracy of the measurement of household income, consumption and expenditure in surveys centred on the measurement of food purchased or acquired. Both these approaches, which have tended to be undertaken in the narrow perspective of their respective disciplines, have encountered several limitations in meeting their objectives.

12.3. Specifically, most nutritional surveys have tended to cover limited segments of the population. Because of their small sample size and the lack of adequate information on household income, consumption and expenditure, the data furnished have been of only limited value in explaining the food consumption behaviour of households. Thus, while the approach adopted in such surveys makes it possible to obtain reliable information on food consumption and dietary standards, the extended scope of a multi-subject survey covering household budgets allows for the investigation of a wider range of socio-economic aspects of households' levels of living. In the case of household income, consumption and expenditure surveys using the concept of food acquired, it has been found difficult to obtain reliable estimates of quantities of food consumed in countries where staple foods are purchased and stored over a long period or where home-produced foods and the food gathered from the field and home gardens constitute the major portion of the diet. Here again, extending the scope of these surveys to cover food consumed has been found to be the best means of overcoming these types of deficiencies.

12.4. A few national household surveys combining the two types of surveys mentioned above have shown that extension of the scope of the investigations as indicated above, through a multi-disciplinary approach and with multiple objectives, enables a fuller assessment of the population's levels of living against a wide range of explanatory variables, as well as the study of corrective factors on which policies and programmes can be based. Multi-subject surveys of the type indicated are, therefore, one of the best means of providing integrated information on levels of living of households, including food con-

sumption and nutrition. They provide more useful information for cross-analysis purposes than a collection of specialized inquiries conducted to serve the needs of their individual disciplines. It is in the context of such integrated surveys that the purposes and uses of food consumption surveys, as well as the scope and methods to be used, will be discussed.

#### 1. *Some general uses of food consumption survey results<sup>1</sup>*

##### (a) *Estimating the consumption and production of certain foods*

12.5. Food consumption surveys provide in the majority of countries where they have been conducted the only usable information on consumption of food from non-commercial sources. Examples are the consumption of milk from a goat or cow, consumption of food from home gardens, of family poultry, and of game and fish caught by family members or bartered. In certain cases, these surveys may be the only available source of information on the output of root crops such as cassava and yams, whose production cannot easily be estimated through the classical methods of measuring crop areas and yield. They are also an invaluable source of production data for food items that are grown wild.

##### (b) *Providing weights for cost of living indices and estimates of private consumption expenditure*

12.6. Food consumption survey results are also useful for the derivation and updating of the weighting systems used in cost of living and related price indices. Since food constitutes a high percentage of the total private consumption expenditure in the developing countries, the data on expenditures on food need to be provided with greater detail in order to determine the changes in the relative weights of various food groups and in weights of food and non-food items. Food consumption and expenditure survey data also provide estimates of private expenditure for national accounts and balances.

##### (c) *Market research and development of the food industry*

12.7. Food consumption survey data contribute useful benchmark data for market research to deal with problems arising from the wider use of imported, commercially produced or marketed foodstuffs. They enable the study of characteristics of various users and non-users of particular food products and of potential buyers for commercially marketed foodstuffs. Since market researchers often focus their efforts on a few products, food consumption data permit the study of how other foods are interrelated with

<sup>1</sup> Parts of this section are adapted from (13).

these. Such information is highly relevant to expanding the market for existing products and assessing the potential market for new products. Producers, manufacturers and distributors are constantly concerned with appraising the future demand for their products. Such research is particularly important in developing countries because the modern food industry requires heavy investment in manufacturing and distribution facilities which they can only establish using scarce foreign exchange.

(d) *In agriculture, food and nutrition planning and programming*

12.8. Food consumption surveys are the only source of data for the measurement of variations in consumption of all food and of particular foods by source, by season according to consumer characteristics and among geographical areas. In addition, they provide the only data available for measuring the relationships among the variations in patterns of foods consumed and nutrient supplies, on the one hand, and between variations in food consumption, food intake, nutritional intake and demographic, socio-economic, cultural, environmental and institutional factors and conditions, on the other. The results of such measurements constitute an important component of the data base for agricultural nutrition and health planning, public programme administration and, as already indicated, food market research.

12.9. Food consumption survey results contribute directly to the specification of what the nutritional problems are, who they affect and why they exist. Such assessments are required for realistic and effective programme planning, administration and evaluation—both in relation to a particular point in time and over periods of time. The results of such measurements are also used in studying the processes related to food marketing and family food use, the aggregate patterns of food choice and use, family characteristics and their aggregation of income, marketing activities and consumer activities, and the systems of which these processes and structures are a part.

12.10. Information on the patterns of relationships between kinds and amounts of particular nutrients provided by the combination of foods for particular diets is essential for nutritional research on certain types of deficiency problems. Still another type of research on income and poverty-related problems makes extensive use of food survey data. Because human needs for food are more easily estimated than other basic needs, the identification and measurement of poverty begin with survey data on dietary adequacy among various income groups. Information on the incidence of poverty and associated factors is basic to national planning strategies aimed at the reduction of poverty and the attainment of basic needs.

(e) *Estimating demand for food*

12.11. Since food consumption surveys integrated into a general household survey or survey programme allow quantification of interrelationships between food consumption and other variables, such as size of households, income, and the like, the results of such surveys can be used to forecast the effects of factors such as changing economic and social policies on future food consumption. Population increases, which are accompanied by structural changes in the population itself, will lead to increases in demand for food which can be forecast on the basis of

food consumption survey results. Income changes and industrialization and urbanization may cause similar effects and these may entail changes in food production and foreign trade policy of a country. Food consumption surveys provide the data required for study of all these changes.

(f) *Determining the effects of subsidy programmes*

12.12. Food consumption surveys can be used to determine the impact of food subsidy programmes on food consumption patterns and the nutritional status of the population. The analysis of both time-series and cross-sectional data obtained from food consumption surveys is required for these purposes. Such analysis can determine the direct and indirect effects of subsidy programmes, for example, the contribution of food rations to food intakes and nutritional status of various socio-economic groups, the effects of rations on non-market prices, the substitution of rations purchased for commercial purchasing and the effects of subsidy programmes on income and demand for food.

2. *Survey needs, scope and objectives*

12.13. Wherever possible, and in order to meet the objectives and uses of data discussed above, food consumption surveys should be carried out on a national scale and be representative of the country as a whole and smaller geographical areas. Such surveys provide the information required for overall planning purposes and at territorial decision-making levels. However, there is a case for surveys covering special population groups or geographical areas whose results may serve adequately the special problems of these groups or areas, provided adequate samples are covered, devised preferably as subsamples of an overall national integrated survey programme. Food consumption surveys should normally be representative of the non-institutional population not living in collective living quarters. However, hostels, boarding and lodging houses, institutions, camps, and the like, may also need to be covered in such surveys. Special concepts and methodology must be developed for the coverage of these categories of the population.

12.14. The economic and nutritional objectives of most household food consumption surveys make it desirable that the overall period of the survey should cover at least 12 months. Surveys which represent a shorter period than a year may give results which are not typical of the year as a whole. They can be affected, for example, by the observance of religious festivals and customs, as well as by seasonal factors. In most countries, the consumption of food is very much dependent on the items of food available during a particular season and perishable foods are available only in the season of their harvest. All these factors can affect the validity of the survey results if they are not accorded their correct representation over a full year.

12.15. The usefulness of the results of food consumption surveys does not lie only in determining the present consumption patterns of the population of a country. It is equally important to note their changes over time. For the majority of the developing countries, excepting periods of natural disaster from drought, floods, and the like and certain areas that may be subject to rapid changes in consumption behaviour, food consumption patterns are not likely to exhibit abrupt changes in a country as a whole

over a short period of time. Since the action programmes to be adopted would normally be implemented as part of a development plan, the data derived from a food consumption survey are not only useful for preparing the plan document but also in evaluating the achievements of an earlier plan. Food consumption surveys should therefore be synchronized as closely as possible with the timing of national development plans, which are generally at five-year intervals.

12.16. The conduct of a comprehensive survey covering household budgets and food consumption may be, under certain situations, an expensive and difficult operation which some countries cannot easily afford. In countries where statistical systems are not yet fully developed and where food consumption patterns are not likely to change drastically over a short period of time, it is useful to repeat food consumption surveys after 10 years or so. In such cases, it is advisable to set up some small-scale, low-cost surveys between comprehensive food consumption surveys, in order to update the data at shorter intervals.

### 3. *Nature, uses and limitations of types of surveys providing data on food consumption and nutrition*

12.17. The purpose and uses of the various kinds of food consumption and nutrition statistics and their general limitations depend largely on the type of survey from which they are obtained and the conditions which prevail in the country carrying out the survey. To some extent different types of household surveys can be classified according to the degree of complexity with which they measure food consumption, and this degree of complexity is frequently correlated with resource cost per unit of information required. Depending on a country's needs for data and the uses to which they should be put, such a classification might suggest an order in which successive surveys can be undertaken at various stages of development of a household survey capability.

12.18. There are four main types of specialized surveys which provide statistics of food consumption and nutrition in countries, and these sources will be reviewed from the point of view of their nature and the uses, limitations and improvements that can be made to the type of data furnished. These sources are:

- (a) Household budget surveys;
- (b) Household food consumption surveys;
- (c) Individual dietary surveys;
- (d) Nutritional status surveys.

#### (a) *Household budget surveys*

12.19. The household budget or expenditure survey, which is often undertaken in developing countries, is an important source of information on food consumption and expenditure, but the food record is less detailed as compared with that of specialized food consumption surveys. These surveys normally provide information on the amount of money spent on food and other articles purchased. However, they sometimes do not cover the consumption of own-produced food, which is an important part of food consumption, particularly in rural areas of developing countries. As far as the food expenditure part of the record is concerned, the requirements of the survey may be met by a less detailed classification of foods than is required for a specialized food consumption survey. In-

deed, the whole of the food part of the record may be much simpler than that in a food consumption survey.

12.20. There are, however, some household budget surveys providing full tabulations of data on quantities of food acquired or consumed. Data on quantities of food acquired or food consumed are often collected in the developing countries, but not always processed or presented in the final survey results. In the case of own-produced and bartered food, it is necessary to collect information on quantity prior to arriving at consumption in monetary terms. Because of the wide range of purposes which they serve, there is much to be said in favour of a country initiating a household budget survey, particularly if home-produced food is recorded, before it extends its survey capability to include more specialized surveys on food consumption.

12.21. Household budget surveys, as already indicated, provide information on food expenditure in relation to expenditure on all other items in the household budget and in relation to income. Moreover, they usually provide this information not only at the national level but also for each of the socio-economic or other population groups identified in the survey. If the surveys are conducted throughout the year they give information on seasonal changes, and if they are also from year to year or at regular intervals, they enable longer-term trends to be detected and analysed. The surveys thus provide a factual basis for policy-making in connection with the social and economic aspects of food and agricultural planning, and for monitoring the effects of changes in such policies. They enable the relationships between family size or structure, income and levels and patterns of food and other expenditure to be determined, and thus make it possible to assess, on the assumption of unchanged prices, the expected growth in value terms of market demand for agricultural products as levels of living rise. For the construction of more refined econometric models which take into account price changes and enable forecasts of market size to be made both in value and in quantitative terms, adequate data on quantities of food purchased or consumed by households are required.

#### (b) *Household food consumption surveys*

12.22. Household food consumption surveys, which are more specialized than household budget surveys, can be undertaken in various forms which, nevertheless, have a number of essential features in common. Their main characteristic is that they are sample surveys which collect information at the household level on quantities of food consumed (or acquired for consumption).

12.23. In their most comprehensive form they cover all sections of the household population, all regions of the country, and all seasons of the year. Moreover, when they are carried out on a continuous basis, they enable changes and trends over time to be determined and analysed. They record not only expenditure on each type of food but also quantities of food purchased and food consumed in sufficient detail to enable estimates of nutritional intake to be derived. They may also obtain information on age, sex, weight, height, and occupation of individual members of the household (together with similar information on any visitors taking their meals within the household) and information on family members who have taken meals away from the household. In this way nutritional requirements can be calculated in accordance with suitable national or

international recommendations and the nutrient intake of the households compared with the estimate of their requirements. In addition, such surveys obtain information on incomes and other household characteristics for purposes of analysis and classification of the survey data.

12.24. In their less complex forms, these surveys may omit some of the above features. Thus, they may be confined to specific sectors of the population or to restricted periods of the year; the recording of quantities of foods may be simplified considerably by recording only food acquired during the recording period as distinct from food actually consumed; the recording of particulars of people present at each meal may be omitted and so on. Such simplifications restrict the uses which might be made of the data, but in countries with more limited statistical capabilities, the more complex types of survey can be deferred.

12.25. The inclusion of information on quantities of foods in a household survey immediately opens up a wide range of statistical and policy uses which a survey can serve. It produces in the first instance a data bank of detailed information in quantitative terms that may be used to determine the patterns of food consumption in different socio-economic, cultural and geographical groups and that may be sufficient to identify and measure the extent of problem areas. It may also enable relationships between household characteristics and levels of food consumption to be determined which can then be drawn upon in the formulation of policies to alleviate the problems this information has brought to light. Quantitative information on food consumption can also be used to evaluate it in terms of its energy and nutrient content, and then related to nationally or internationally recommended levels of intake. This process delineates important nutritional problems and provides a basis upon which the policies likely to be most effective in the solution of those problems can be formulated.

12.26. The collection of information on quantities of food purchased and the expenditure thereon implies that average food prices for different products by different groups of households can be derived. These prices are in fact more representative of the composition of food items than average consumer prices obtained separately. Such average prices may, under certain conditions, be more apposite to studies of levels of living and differences in levels than are the average prices of "indicator" items from a sample selection of shops on a specified day. A further advantage of having quantity data and price data which are perfectly matched because they are from a common source is that they are particularly suitable for the determination of price elasticities of demand. These, in conjunction with income elasticities and other demand parameters, enable econometric models to be constructed for use in making demand projections and for forecasting the effects of changing economic and social conditions and policies on the patterns and levels of consumption of food. Caution must be exercised, however, in interpreting the effect on food demand of changes in food acquisition from home-produced to purchases in the market.

12.27. In all the above aspects, the availability of the data both at national level and for various population groups means that they will serve as an aid to the formulation not only of national policies but also of policies which differentiate among social groups. Although the consumption data which are used for the above-mentioned purposes relate to consumption by the households as a

whole and not to that of individual members of the household, they do enable equivalent consumer scales to be estimated by the use of appropriate statistical techniques. Such estimates, though likely to be different from scales obtained by direct measurements of individual consumption, may be sufficiently accurate to guide policy, and in such cases their use can eliminate the need to carry out more costly individual dietary surveys of the type discussed below.

#### (c) *Individual dietary surveys*

12.28. The main characteristic of individual dietary surveys is, as the name implies, that they measure the food intake of individuals and not simply consumption by the family as a whole. They may cover all members of a family separately or only a specific category of persons in the family, depending on the objectives of the survey, for example, pre-school children, children of school age, pregnant women, and so on. They therefore entail compiling for each individual in the sample a complete record of the amount and description of every item of food eaten during the inquiry. The object may be to obtain a clear picture of the type of diet and its defects prior to initiating a supplementary feeding programme or some other measure for improving nutrition, or it may be the scientific investigation of the relation of diet and health or of problems relating to food intake and physiological requirements. The methods used are exacting, as they may require that foods be measured or weighed on the plate or at the time of serving, thus leading to a high degree of response error.

12.29. These surveys are costly to undertake, and for that reason alone they usually have limited coverage geographically and over time and they tend to be confined to selected socio-economic or other population groups. Indeed, they are used mainly as follow-up surveys on vulnerable groups which have been highlighted or identified by the type of food consumption survey discussed above, and for which additional information is required relating to the distribution of the household food supply within the family. In this way, specific types of person at risk can be precisely identified and enumerated and their levels of nutrient intake measured. When individual dietary surveys are thus linked to, or combined with, household food consumption surveys, they enable the various social, economic and cultural factors which contribute to dietary inadequacies to be identified.

#### (d) *Nutritional status surveys*

12.30. Individual dietary surveys do not in themselves permit nutritional status to be assessed since they only obtain information on an individual's food consumption and its energy and nutrient content. To obtain comparative information about an individual's energy and nutrient requirements, and also to assess nutritional status, it is necessary to make clinical and anthropometric measurements. Such information on nutrition is required for introducing nutrition considerations into national policy-making and planning and for monitoring consequent changes in nutrition. Essentially two forms of information are relevant. First, to identify population groups—in geographical and socio-economic terms—affected by malnutrition, and to determine the extent to which they are affected. For this purpose, data on nutritional status and related indicators—notably morbidity and mortality—are required in disaggregated form in order to describe the nutrition conditions of

different groups. This enables priorities to be set up and changes monitored. Secondly, information on food consumption, food expenditure, income, and the like is required. This provides more detailed knowledge of causal factors, enables projections of changes in nutritional conditions to be made, and again provides information for monitoring and evaluation.

## B. PRINCIPAL ITEMS OF INFORMATION

12.31. Depending on the objectives in view and the type and scope of the food consumption survey to be undertaken, the items of information which may be collected on food consumption and nutrition and related characteristics of households and members of their families are shown in the table below. The scope of the items to be included will depend to a large extent on the purpose for which the survey is undertaken. For convenience, the items are grouped under three main headings: items on food consumed or acquired, items on household characteristics and items on characteristics of individuals. No distinction is made between the items of primary data as presented in the questionnaire and those relating to derived topics. Items on food consumed or acquired are discussed below. Items on household and individual characteristics are discussed in other chapters of this part of the *Handbook*.

### LIST OF ITEMS FOR FOOD CONSUMPTION SURVEYS

1. *Items on food consumed or acquired*
  - (a) List of items of food consumed or acquired in terms of quantities and expenditure
  - (b) Sources of food
    - (i) Purchased
    - (ii) Home-produced
    - (iii) Otherwise obtained
  - (c) Other information needed to complete food consumption data
    - (i) Information on factors affecting the nutritive value of food consumed
    - (ii) Information on food habits, preferences and restrictions
2. *Items on household characteristics*
  - (a) Household size (number of persons in the household)
  - (b) Area of land in possession of the household
  - (c) Income or other measures of financial status of household, for example, per capita consumer expenditure, or household assets and amenities
  - (d) Farm/non-farm status and rural/urban
  - (e) Household means of livelihood
  - (f) Household social/ethnic group
3. *Items on characteristics of individuals*
  - (a) Characteristics of household members
    - (i) Sex
    - (ii) Age
    - (iii) Relationship to head of household
    - (iv) Physiological status (pregnant or lactating women 15 years and above)
    - (v) Marital status
    - (vi) Occupation
    - (vii) Educational status
    - (viii) Residential status
    - (ix) Number of meals taken in given days (reference period)
      - a. At home
      - b. Out of home
        - i. Casual
        - ii. Regular:
          - Free of cost
          - At subsidized rate
          - At market rate
  - (b) Anthropometric measurements of household members
    - (i) Body weight
    - (ii) Height
    - (iii) Mid-arm circumference
    - (iv) Skin-fold measurement

## 1. *List of food consumed or acquired in terms of quantities and expenditure*

### (a) *List of food items*

12.32. Information on both quantity and money value of food consumed or acquired should be collected in food consumption surveys, wherever feasible. Food is generally supplied to the members from a common source in a household. Over and above this, some food is either received or purchased and consumed outside by the household members. Ideally, information should be collected on consumption of all food items, irrespective of whether consumed at home or outside.

12.33. The type and amount of detail required for this purpose is indicated in the table at the end of this chapter. The food items shown in each group are given only by way of illustration. In a particular country some of these items may not be consumed at all and some other items not listed may be commonly consumed. It is neither possible nor necessary to give here a full list of important foods of all countries.

### (b) *Food from common supply and food eaten away from home*

12.34. Food from the common supply and purchased food eaten away from home should be classified separately. Thus, the money values per household of all foods (including beverages) used at home by source are generally supplemented by estimated expenditures for food (meals and snacks) purchased and consumed away from home by family members. In areas where family members receive meals as pay or in school at no cost, their value should also be measured.

### (c) *Categories of food consumed according to stage of processing*

12.35. Consumed items of food may be classified into two different categories. The first category of items usually includes basic items which are either consumed directly or after slight processing or cooking. The second category includes prepared foods like cake, ice cream, candy, certain beverages, cooked meals, snacks, and the like. Direct assessment of their nutrient content is rather difficult. The quality and price of such food vary according to the quality and proportions of ingredients used for preparing them.

12.36. The kinds of processed foods, prepared dishes and wholly or partially prepared mixtures of food available on the market in many countries have been increasing in recent years. Thus, for purposes of market analysis as well as for nutritional analysis, it is not only necessary to obtain, for example, data on the consumption of various types of fruit and vegetables, but also on whether they were purchased in fresh form, or canned, frozen, dried, or strained or chopped as baby food.

### (d) *List of nutrients*

12.37. Most of the essential nutrients required for a healthy life are obtained from the food consumed. Insufficient intake of particular nutrients may result from the quantitative deficiency of a particular variety of food in the food basket. For determining the intake level of nutrients, not only an account of the items of food consumed is necessary but also precise estimates of the nutrient con-

tents of each item of food consumed. Estimations of nutrient content of individual food items are based on food composition tables. The nutrients for which average intakes should be calculated include the following:

- (a) Energy value
- (b) Fat
- (c) Protein
- (d) Carbohydrate
- (e) Calcium
- (f) Iron
- (g) Thiamin
- (h) Riboflavin
- (i) Nicotinic acid equivalent
- (j) Vitamin A (retinol equivalent)
- (k) Vitamin C

## 2. Sources of food

12.38. It has already been indicated that food consumption surveys collect data on consumption of individual food items either separately or in combination. The data should include quantity measures of actual use, usually identification as to source—purchased, home-produced and otherwise obtained—and prices paid and/or money paid. This information is of particular value in formulating food and nutrition policies and for economic and social analysis. It also facilitates the estimation of food production on the basis of food consumption surveys.

### 3. Other information needed to complete food consumption data

12.39. In addition to information on food consumption in terms of quantities and expenditure, other relevant information on factors affecting the nutritive value should be obtained, for example, on moisture content, local food preparation practices, recipes of composite foods, and so on. For interpretation and general policy purposes, qualitative information on food habits such as preferences and restrictions is of great importance and should be collected wherever feasible, especially in food consumption surveys undertaken in developing countries. However, such information can be better collected by means of a village or community-level questionnaire. Some additional requirements are items on breast-feeding and weaning practices that can be incorporated into a food consumption survey.

## C. CONCEPTUAL ISSUES

12.40. This section will cover the concepts and definitions and characteristics of reporting units and their composition as related to food consumption and nutrition surveys. It will consider the concepts relating to food consumption and food intake measured in different survey approaches and the definitions and explanations of the main items for which data are collected and analysed in these surveys.

### 1. Choice of enumeration units

12.41. The enumeration unit to be used depends on the objectives and the type of survey being undertaken. The household is commonly the sampling and enumeration unit in household surveys. This is convenient where

the household corresponds to the eating and budget units, but where this is not the case, as in some rural parts of some developing countries, the enumeration unit may have to be adapted to the eating unit in the case of food consumption surveys and to the budget unit in the case of household budget surveys. The individual is the enumeration unit in the case of individual dietary surveys. In some cases, for example, for the recording of consumption of meals outside the home or prepared meals, it might also be necessary to turn to catering establishments or food industries as the enumeration units.

### (a) Concept of household

12.42. In international recommendations for population censuses, the concept of household is based on the arrangements made by persons, individually or in groups, for providing themselves with food or other essentials for living. A household may be either: (a) a one person household, that is, a person who makes provision for his own food or other essentials for living without combining with any other person to form part of a multi-person household, or (b) a multi-person household, that is, a group of two or more persons who make common provision for food or other essentials for living. The persons in the group may pool their incomes and have a common budget to a greater or lesser extent. They may be related or unrelated persons, or a combination of both. Households usually occupy the whole, part of, or more than one housing unit but they may also be found living in camps, in boarding houses or hotels, or as administrative personnel in institutions, or they may be homeless. Households consisting of extended families which make common provision for food, or of potentially separate households with a common head, resulting from polygamous unions, may occupy more than one housing unit (77, paras. 1.223 and 1.226).

12.43. The concept of household commonly used in surveys combines three criteria: common housing, common budget and sharing of meals from the same kitchen. The attainment of the objectives of a food consumption survey presents no theoretical difficulties where the demographic household, the budgetary unit household and the food consumption unit are the same. However, in survey practice, the units may not be the same and it becomes necessary to establish a consistent framework for reporting unit.

12.44. A typical example is that of the compound found in certain countries, which may contain several housing units (77, para. 1.235). It is possible in this situation to identify households by linking the recognized head of the household with the resident members. Generally, each housing unit within the household compound has its own kitchen or fireplace for preparing meals, but meals are either taken in common or in small groups at the compound level. In this case, the compound can be regarded as the basic eating unit. The eating unit corresponds in this case to various housing units, identified separately in terms of the dwelling criterion.

### (b) Concept of eating unit

12.45. The eating unit is generally defined as a group of people, whether related by kinship ties or not, who share meals eaten in an independent household and which come from a common stock. By extension in the case of more complicated situations, it is the "group of people

habitually sharing together or in small groups meals prepared in the same kitchen or in several common kitchens".

(c) *Concept of budgetary unit*

12.46. A budgetary unit is a group of people who habitually reside in the same housing unit, share meals, pool earnings and participate in their expenditure under the authority of a unit head. In certain situations, women or other earners within the budget unit may keep and operate their own incomes separately. Their financial resources are usually small as compared with the budget of the unit as a whole. In this case, the concept of a secondary budgetary unit representing a subset of the main budgetary unit has sometimes been used in national household surveys.

12.47. Among persons living in the same housing unit, the nature of the relationship between the residents enables the identification of persons who are not members of the corresponding budgetary unit. A satellite budgetary unit has been defined as a person or group of persons residing in a housing unit associated with a budgetary unit and meeting the following conditions: they share the meals of the budgetary unit and have a contractual relationship to it either through their remuneration for work done (household employees) or through payment for services received (boarders).<sup>2</sup> The case most generally found in survey practice is that the eating unit coincides with the budgetary unit and resides in a single housing unit. In this situation, the sampling unit is the housing unit and this also corresponds to the reporting unit. In the complex cases, the budgetary unit is usually chosen as the sampling unit, and then the eating unit is identified relative to it. As a result, two reporting units, namely, the budget and the eating units, have to be covered in the collection of data. At the stage of compilation and tabulation it is necessary to adopt procedures that enable the collation of consumption data with data on the household budget.

2. *Characteristics of individuals within the reporting units*

12.48. The collection of data on members of the reporting unit has two objectives, first to identify the members of the reporting unit and secondly to procure data required for analysis of the results.

(a) *Members of the reporting units*

12.49. The first criterion for determining the members of the reporting unit is based on the notion of presence or residence in the housing unit. Temporary visitors who happen to sleep in the housing unit and short-term guests are not usually considered as permanent or usual residents. However, guests who have been staying over longer periods are generally considered as residents. An absent member of the family may be included as resident in the housing unit if his or her absence is only temporary, for example, at school, university, travelling, or the like. However, to be so classified, the absence of these people should not exceed a certain period, for example, six months.

<sup>2</sup> It is recommended that where the number of boarders or lodgers exceeds five, they be classified and treated separately as households living in collective living quarters (77, para. 3.73).

12.50. When the group of residents has been established, it is possible, according to the definition given before, to identify members of the budgetary unit. Resident boarders and household employees constitute one or more satellite budgetary units. However, when servants or boarders who are residents share the household food supply and accommodation without receiving remuneration for their work or providing any payment for services received, they should be included as full members of the budgetary unit. If there are several budgetary units in the same housing unit, the tie of dependency vis-à-vis one or another budgetary unit comprises the household members, usually centering on a budgetary unit, plus boarders, household employees who are not residents, temporary visitors who sleep in the household and guests who are present at one or several meals. From such a classification of the members of the reporting unit, one can derive the size of the housing unit, the size of the budget unit and the number of participants at meals.

(b) *Daily dietary units*

12.51. A study of the flow of participants at meals shows that the size of the eating unit is not constant. Participants do not necessarily have the same eating rhythms every day. Within the rhythm of their daily consumption, they may be present or absent at one or more meals within the eating unit. Moreover, visitors may be present at a meal and numerous guests may also participate, especially on occasions of religious festivals and family celebrations.

12.52. All daily meals are not equivalent in nutritive value and their share, in terms of nutritive value, depends on the number of meals taken in a day. A study of the daily food intake record by meal provides the basis for rating meals. An individual present at every meal according to his or her own eating rhythm is counted as a full-time consumer and valued at 100 units (9). For the number of days in a survey period, each individual may be converted into fractions of this unit in order to obtain his or her total daily index of attendance at meals for the reporting period. This index is usually used to calculate the individual nutritional requirements.

12.53. The sum of the individual indices at the eating unit level constitutes the daily dietary units of the eating group. These daily dietary units are the figures used in calculating the per capita consumption of foods, calories and nutrients, as well as the per capita monetary value of the diet used for nutritional purposes. For calculating the index of attendance and the daily dietary units, it is necessary to record day by day the eating rhythm of every participant. Mention of meals taken outside the home is also important not only for evaluating the individual eating rhythm but also to identify the meals taken at restaurants, school, work place, and the like, or with other families in order to estimate the total consumption of individual households in the country.

(c) *Anthropometric measurements and nutrition units*

12.54. Individual energy and protein requirements are calculated on the basis of body weight. However, the data on height should also be recorded in order to obtain suitable adjustments of nutritional requirements taking into consideration the normal weight-for-height of individuals of given sex and age as derived from large-scale food consumption surveys (5). As has already been indicated, data

on weights and heights are also used as indicators of the nutritional status of individuals within the family.

12.55. Reference to the median weight for median height by age and sex as derived from the survey allows for the estimation of the average energy requirements per day by age and sex. These figures are used to prepare scales of nutrition units, taking a male adult of 25 years of age with moderate activity as a standard. Such a scaling system permits the standardization of food consumption and nutritional data for use in comparisons made between different sets of results. The main fluctuations that result from differences in the age composition and size of households disappear once the data for individuals have been expressed in terms of their adult equivalents.

12.56. Applied directly to the members of the budget unit, this scaling system usually provides a good measure of consumer units suitable for use in the econometric analysis of the results of food consumption surveys. When the index of attendance at meals is weighed by the adult equivalent units and summed up at the eating unit level, one obtains an adequate divisor for calculating average food and nutritional intake, as well as the nutritional needs at the adult equivalent level.

#### (d) *Socio-economic items*

12.57. These items are usually common to the different types of household surveys. They include sex (with specific reference to the physiological status of women: pregnant above six months and lactating), age, relationship to head of household, present or absent member, related reporting units if any, marital status, educational status, occupation, including principal and secondary occupation, industry, employment activity status and status in employment (a more detailed module on employment, including security welfare and the like, can also be applied). Data on migration may also be desired covering items such as date of arrival at the present place, duration of stay in the previous place, birthplace, and so on. Other data on ethnic group may be useful. Some food consumption surveys also record information on the daily physical activities of residents of the housing unit for the better determination of energy requirements. This approach is often valuable for avoiding underestimation of the nutritional needs of women, especially in rural areas.

### 3. *Concepts and definitions relating to food consumption and food intake*

#### (a) *Concept of food expenditure and money value*

12.58. When data are collected through a household expenditure survey, the concept usually applied is that of food acquired during the reference period either from purchases, own production or otherwise obtained, whether or not fully consumed. On the assumption of no significant change in household stocks, consumption is viewed as being equal to current purchases of food from market sources, plus home-produced supplies, plus food received as gift or pay. In countries where staple foods are purchased in bulk for consumption over a long period, the concept of food acquired is inappropriate if one wants to derive quantities from expenditure data, because of the difficulties encountered in determining the right period of consumption.

12.59. The most accurate approach used in food con-

sumption surveys is to record simultaneously the food acquired from the market during the reference period and the food actually consumed during that period, as was done in the survey of income, consumption and nutrition in Brazil. In other words, the kinds, quantities, and as far as possible the weights and the value of foods purchased are recorded each day and at the same time. The quantities consumed, as observed in the kitchen, are also recorded by weighing or other approximate methods, with an indication of their origin, for example, purchased, home production, and so on. Then the food expenditure data are obtained by applying at the household level a system of prices derived from the purchases as recorded to the quantities bought and actually consumed. The price system is hence derived from the household food purchases. The valuation of consumption of own produce is made on the basis of this price system either for the same household or more frequently for a small geographical area using average recorded prices within this area.

12.60. This approach, which was used with success in the Brazilian survey already referred to, has the great advantage of imputing a value to food consumption corresponding to what was actually paid by the households, plus the monetary equivalent of the home production actually consumed.

12.61. It is well known that food prices can vary tremendously from one time to another within the same local market and from place to place in different seasons of the year and during the survey period. The approach described above reflects as far as possible the reality of the price variation mechanism and it is preferable to the use of retail prices obtained from neighbouring markets that are often based on price collection surveys conducted parallel to ongoing household surveys. For estimates of total food expenditure based on quantities of food actually consumed, valuation in terms of household expenditures and the associated imputations is not only the most accurate approach, but also the most flexible for use in analysing the seasonality of prices and their local variations and the subsequent calculation of food expenditure deflators. In addition, the data on food actually consumed enable the use of other price systems, such as those based on producer prices, depending on specific needs for tabulation and analysis.

12.62. The collection of information on quantities and/or weight of food purchased as well as the food actually consumed is much preferable to the use of average prices obtained from samples of shops as it is more appropriate to studies of levels of living and the compilation of price elasticities of demand. When the survey is designed to combine the expenditure approach with the measurement of food actually consumed, the best indicator of consumption from own production as a percentage of total food consumption will be based on the caloric content. In such a case, the results are independent of the price system used.

#### (b) *Concepts of food consumption in terms of quantities, and energy and nutrient content*

12.63. In economic terms, the concept of household consumption refers to the foods consumed by household members during a specified period, at home and outside the home, for example, at restaurants, bars, the work place, school, and so on. Usually, food consumption sur-

veys only record quantities consumed at home, and the total food consumption of the household is then derived from these results by using information on meal attendance to construct suitable overall estimates.

12.64. Food consumption in the home is measured from the actual consumption of food from all sources, as weighed in the kitchen, within a limited period of time. Foods purchased or brought into the kitchen from the garden or farm are normally recorded in terms of gross or "as purchased" weight. If certain data have only been recorded in the form of edible portion, it is necessary to convert them into quantities as purchased. For the economic analysis of survey results, quantities of food consumed are always measured on a gross weight basis.

12.65. Food consumption expressed in terms of energy and nutrient content derives directly from the food consumption quantities, using the same concept. However, in order to apply food composition tables, the data must be converted to net weights (edible portion), using suitable deductions to allow for inedible matter. Precise data on the amount of inedible portions of food (refuse) must be collected in the kitchen or nearby. Food items as purchased minus the refuse give the edible portion of food, which is then transformed into calories and nutrient content. When comparing these intakes of energy and nutrients with recommended allowances, further deductions should be made to allow for losses in cooking and plate and kitchen wastage.

(c) *Leftover food*

12.66. This concept is usually concerned with the edible portion of food. Leftovers are foods that are not consumed after preparation. The leftovers that are not consumed by a household within the survey period should always be deducted in calculating the amount of food intake. This relates to leftover food that is subsequently given away, fed to animals or allowed to spoil and the food left over on the last survey day. On the other hand, food from preceding meals, encountered on the first day of survey, should be included.

(d) *Food intakes*

12.67. Ideally, the concept of food intakes relates to that part of the food consumption which has actually been ingested, that is, food consumption in quantities converted into edible portions minus the leftovers that are not consumed during the reference period. This concept is exclusively used for the nutritional analysis of data on food consumed. Generally, the edible portion and leftovers are expressed in terms of calories and nutrients in order to calculate food intakes. Using the characteristics of individuals, such as sex, age, anthropometric measurements, occupation or physical activity, and the index of presence at meals, the scales of nutritional requirements are calculated. The sum of each of these nutritional requirements at the household or a more aggregated level is then compared with intakes expressed in the same unit and at the same level in order to determine the nutritional adequacy of the diet.

4. *Per capita food consumption, food intakes and requirements*

12.68. Estimates of food consumed expressed in terms of quantities and value, divided by the size of the house-

hold, give estimates of the apparent per capita food consumption and the per capita food expenditures, respectively. These per capita figures are used for economic analysis, and can be derived by using as a divisor the consumption units corresponding to the usual residents and calculated as discussed in subsection 2 above.

12.69. For nutritional analysis purposes, food consumption quantities divided by the daily dietary units at the eating unit level provide estimates of daily per capita food consumption. From food intakes and requirements, using the same divisor, one can calculate the daily per capita intakes and requirements. These results give a per capita average within the eating unit which is quite different from individual figures. In order to standardize the data for comparative purposes, one can use as divisor the daily dietary units converted into their equivalent adult units. In such a case, the results are expressed in terms of daily per capita amounts for a male adult of 25 years of age with moderate activity.

12.70. The provision of data on individual food consumption and intakes requires the conduct of a special nutritional survey on individuals within the household, as discussed in subsection 3 above.

5. *Household characteristics*

12.71. One major category of data for the analysis of food consumption consists of household characteristics, conditions and activities that are known or believed to have a bearing on food consumption practices and nutritional status. Some household characteristics are determined on the basis of the characteristics of its usual members or a selection of adult members, such as age and sex of head of the household, occupation, employment, education, ethnic group, and the like. Other characteristics are derived from survey data, such as information on family size, composition, staple foods, foods, food pattern, buying practices, nutritional indicators, family income or total expenditures (in monetary and/or non-monetary terms), expenditures pattern, and so on.

12.72. Broader environmental characteristics can be taken from the sampling frame, such as geographical location, rural and urban location, and the like. Additional data on household conditions can also be collected on items such as availability and use of water and sanitation facilities, firewood or other fuel for the kitchen, food storage facilities, food markets, school and health centres, household equipment, and so on.

D. SPECIAL SAMPLING, MEASUREMENT AND OPERATIONAL ISSUES

1. *Planning food consumption survey programmes*

12.73. Perhaps the most important decision to be taken at the early planning stage concerns the type of food consumption survey to be undertaken. Some of the considerations which will affect this decision are: the existence or not of an ongoing household expenditure survey in the country concerned; the degree of priority to be given to data on food consumption, taking into account specific needs for such data; the need for special techniques to measure food consumption; other data requirements of the country; the plans for data collection and their priorities

and phasing in the light of the overall needs of the country; the need to analyse food consumption data in relation to demographic, social, health, economic, agricultural, ethnic and environmental factors.

12.74. Bearing in mind considerations of cost, objectives and practicality, it may be found that in a country with an on-going household expenditure survey the choice is not so much between a separate household food consumption survey and one which forms part of the household expenditure survey, as between a household food consumption survey to be carried out for only a limited period and one which will be permanently incorporated in the household expenditure survey carried out continuously or at regular intervals. There are very substantial *prima facie* advantages to the latter approach, other things remaining equal, since this makes it possible to determine trends in food consumption and to use time-series analysis to determine the factors behind those trends, thus providing tools for building predictive models and for evaluating the effects of changes in policies.

12.75. However, the choice will rarely be as simple as this. For example, it may be doubted that the information on food consumption collected in the course of a household expenditure survey can be as extensive or as detailed as that collected in a specialized food consumption survey. The household expenditure survey may already be fully loaded with a variety of questions related to its main economic and social purposes. To place further emphasis on its coverage of food information by additional questions or weighing of foods may tend to overload the survey questionnaire and enumerators, and lead to non-response in addition to increasing the data processing load and affecting the quality of the data.

## 2. *Integration of food consumption surveys with household expenditure surveys*

12.76. Despite the possible disadvantages, which depend largely on the type of questionnaires used and the length of the reporting period, there are a number of advantages to be gained from a food consumption survey which is carried out in conjunction with a household expenditure survey. The food consumption data can be analysed in relation to data concerning the remainder of the household budget at the household level, thus providing more detailed and precise information on the relationship than would be possible if it had to be studied through averages for groups of households taken from different surveys and samples. Moreover, the quality of the data on incomes and on total expenditure on food may be better than from a household expenditure survey. In addition, the collection of data on food actually consumed by source (that is, whether purchased, own-produced, barter, and so on) provides an accurate record of consumption of own produce and the integration of the two types of surveys further enables the detailed analysis of the interrelation between subsistence and monetary consumption, which is of great importance for social and economic studies.

12.77. It has also been found useful to relate data on food consumption to data on production that may be available from a general household survey. A further advantage is that more funds and other resources may be made available for a household expenditure survey which also covers food consumption than for a food consumption survey alone.

### (a) *Integration of items on food consumption in a household expenditure survey*

12.78. The integration of a food consumption survey in a general household expenditure survey can be envisioned in various degrees depending upon the urgency of needs for food consumption and nutrition statistics and the stages of economic and statistical development reached by the country.

12.79. On the one hand, requirements for food consumption data may entail simple adaptation of the household expenditure survey to yield data on quantities of food commodities acquired or bought in sufficient detail so as to permit their conversion to nutritional equivalents. This has been the procedure adopted in several European countries, and in fact the role of household expenditure surveys in meeting the requirements of food consumption statistics has sometimes been seen in this light. For this purpose there is a need to cover consumption of own produce, which is sometimes omitted in such surveys. Under these conditions, the results of such surveys will in fact provide valid averages of quantities of food consumed and their nutrient content in terms of aggregates for broad socio-economic groups and for large areas of the country. However, for countries where there are great variations in food stocks and where their periods of consumption cannot be adequately determined, the results in terms of the distribution of food consumption and nutrition among the various households can be very deceptive.

12.80. On the other hand, the food consumption survey may be fully integrated with a household expenditure survey so as to provide detailed data on food actually consumed along with that on food acquired. This has been the approach adopted by several developing countries and the survey already mentioned in Brazil provides ample experience with the inclusion of questions dealing with food consumption and nutrition in the questionnaires for all households.<sup>3</sup> Since this approach may tend to overload the survey operations and reduce the number of households each enumerator can cover, consideration can be given to obtaining the more detailed information on food consumption by means of an adequate subsample of the main sample used for the household expenditure survey.

### (b) *Integration of samples on food consumption with those of household expenditure surveys*

12.81. When the food consumption survey is not fully incorporated with the household expenditure survey, linking of the two surveys can be achieved by an arrangement whereby both share the same sample design, the same geographical coverage and the same set of definitions, classifications, and so on. A common sample can be selected for the questions relating to household characteristics and two subsamples from this sample can be chosen, one to provide information on the overall household expenditures and the other to provide information for the detailed food consumption survey. In this way data linkage can be achieved at level of group averages between the two surveys, but not at individual household level. Thus, there is no possibility of cross-analysing food consumption and family expenditure items. An alternative scheme which does have the advantage of data linkage at the individual household level is for households which take part

<sup>3</sup> Further information in the Brazilian survey will be presented in volume II of the present *Handbook*.

in a household expenditure survey, or for a subsample of them, also to participate, either simultaneously or subsequently (provided the time difference is not too large) in a food consumption survey. For example, in the household budget and food consumption survey undertaken in Tunisia in 1979-1980, a set of three linked surveys was used as follows: a nation-wide survey on employment and household characteristics of 60,000 households; a household expenditure survey covering 6,000 of those households and a food consumption survey using the weighing method of half of the sample.

12.82. Generally speaking, and as a first step towards building their statistical systems, the developing countries have implemented household expenditure surveys. As these countries developed their planning systems, they have encountered more needs for detailed and comprehensive information on the household and especially for accurate data on food consumption. An integrated approach has been adopted in household surveys undertaken in Madagascar (1962), the Ivory Coast (1979), Peru (1971), Brazil (1975) and Tunisia (1975). These surveys have comprised an inventory survey on household expenditure and food consumption, along the lines discussed above, and including information on demographic, anthropometric, sociological and employment aspects. These surveys have been carried out nation-wide to provide benchmark data and are to be repeated at medium-term intervals.

12.83. It can be concluded from the above that the integration of food consumption surveys with household expenditure surveys serves the broad needs of providing information on the levels and patterns of food consumption and their interrelationships with other socio-economic characteristics of the households. However, from the experience gained in countries which have carried out surveys which have incorporated the weighing of food consumed, it has been found necessary to design the field work operations in such a way as to avoid their becoming overloaded. Essentially, it is a question of suitable organization and adequate training of enumerators and the adoption of an effective approach to secure the participation of households in the survey.

(c) *Food consumption surveys conducted separately from household expenditure surveys*

12.84. Some considerations relating to independent food consumption surveys can briefly be indicated. The integrated household survey of the type discussed above is usually nation-wide, but there may be occasions when a country has a need for a food consumption survey confined to a particular sector of the population. This is the case, for example, for food consumption surveys carried out for the planning and evaluation of development programmes in certain geographical areas, or aimed to cover certain groups of the population only. Otherwise, food consumption surveys should be carried out as part of a general household survey programme. Advantages often cited of a separate food consumption survey, such as those relating to concentration on one subject, are far outweighed by the advantages and usefulness of an integrated survey programme.

12.85. In the few developed countries that carry out their food consumption surveys as separate entities (for example, Canada, France, the United Kingdom of Great Britain and Northern Ireland and the United States of

America), efforts have been made to adopt concepts, definitions and classifications which are compatible with those used in other types of surveys so that the interrelationships between food consumption and other factors can be investigated. In the United Kingdom, for example, consideration is being given to incorporating the National Food Survey with the Family Expenditure Survey to achieve maximum integration of these data.

12.86. It is recommended that where food consumption surveys are conducted separately in developing countries, they should include adequate items on household characteristics and that, depending on conditions in particular countries, the scope of the surveys should be enlarged to cover at least the items on non-food expenditure. These data provide good background information for different economic levels of the population on which a fair appraisal of consumption patterns can be based.

3. *Relationship between food consumption surveys and other inquiries*

12.87. The primary objectives of a food consumption survey are to gain knowledge of the levels, patterns and habits of food consumption of the various population groups in a country. For a fuller understanding of the food consumption behaviour of a population, it is equally important to find out the relationships between food consumption, on the one hand, and the occupations, incomes, expenditures, education, culture, customs, health and general well-being of the members of the household, on the other.

12.88. In general, it may be desirable to link household food consumption surveys with other kinds of level of living surveys. Information on the size and composition of households, income and expenditure, occupation, and so on, is required for studies of the social and economic factors influencing food consumption. In addition, studies concerning the consistency of data collected in a food consumption survey may be carried out more easily if other components of the level of living are covered in the same survey. The levels of food consumption are also related to habits, opinions and beliefs of populations. It is important, therefore, to combine as far as possible quantitative food consumption surveys with surveys of these psychological, social, cultural and anthropological factors. A knowledge of such factors is of primary importance for nutrition programmes such as nutrition education campaigns.

12.89. In view of the close relationship between food consumption, nutrition and health, it is desirable to coordinate, as far as practicable, household food consumption surveys with other specialized surveys, including health surveys and surveys of nutritional status. In fact, an integrated survey of all these items may be necessary in connection with action-oriented programmes aimed at providing remedial measures for improving the health of persons suffering from malnutrition or other nutritional deficiency diseases.

12.90. Food consumption surveys also have specific relationships with population and agricultural censuses. Knowledge of the population to be represented is important in designing a food consumption survey. Such information can be provided by population censuses, which supply information on the number of households, their age and sex composition, occupation of members and other

relevant data. If the population census has been taken not long before the food consumption survey, it may be used as a frame for selecting the area units and households to be included in the survey. In certain developed countries, micro-censuses have been used for this purpose with good results. In these cases, the results of the survey can also be analysed in relation to the population census data.

12.91. An agricultural census or survey may also supply useful information for designing a food consumption survey and for the analysis of its results. A survey in rural areas may use, for instance, information on the number of agricultural holdings in different size classes or on different types of farms. The agricultural census or survey can also be used in preparing the frame for a subsequent food consumption survey and the data on food consumption can be analysed in relation to characteristics of the holding. Where information on productivity of holdings is available, it can be studied in conjunction with levels of food intakes and nutritional status of farm families to determine the extent to which improved nutrition results in high productivity of household farms and vice versa.

#### 4. Sampling methods

12.92. As has been indicated in the previous section, households are generally adopted as sampling units in household food consumption and nutrition surveys and, depending on the scope and type of surveys undertaken, the reporting units comprise budget units and eating units in the case of household expenditure and food consumption surveys respectively, and individuals in the case of individual dietary surveys. In many cases these other units correspond to households or can be approached through the household.

12.93. Since an up-to-date and complete list of households is not always available for use as a frame in such surveys, the use of a two-stage sample design greatly reduces the magnitude and cost of compiling such a list. It is also particularly appropriate for food consumption and nutrition surveys, where the method of enumeration entails the use of highly trained interviewers and where the geographical area to be represented by the survey is extensive. The clustering which a two-stage sample design gives ensures that interviewers can be fewer in number than would be the case with single-stage random sampling design, and they can be more efficiently deployed so as to spend a greater time with each reporting unit and less time in travelling from one reporting unit to another. Such clustering reduces the efficiency of the sample because of the higher degree of correlation among household units within the same area. This disadvantage may be reduced to some extent by suitable stratification.

12.94. The general requirements for the preparation of a stratified multi-stage sampling design in household surveys are discussed in part one of the present *Handbook*, and these are also relevant to food consumption surveys. It will suffice here to draw attention to particular aspects of these sampling designs as they affect the conduct of food consumption surveys in developing countries. Where possible, the whole country should be divided into a number of geographical strata which are homogeneous with regard to items that are correlated with food consumption and nutrition, such as population density, topography, agro-ecological features, cropping patterns, and the like. Rural areas should be treated separately from urban areas

and each may have its own system of geographical stratification. Within each stratum, area units such as villages, enumeration districts, parishes, communes, wards, and so on, should be selected as first-stage sampling units. The further clustering of households within selected first-stage units is particularly helpful in food consumption surveys in order to increase the number of households each interviewer can visit in one day, to enable him to operate within a restricted locality, and to facilitate the control of field work operations, thus increasing the overall accuracy of the results.

12.95. So far, it has been assumed that the food consumption survey will be conducted as an *ad hoc* survey or will be carried out infrequently, say every 5 to 10 years. However, as discussed above, there are advantages in incorporating a food consumption inquiry in more frequent surveys of consumer expenditure in order to obtain time-series of consumption data. The decision as to whether the sample should be completely replaced each time, partially replaced or completely retained depends largely on the objectives and frequency of the survey. Since in many cases interest is focused on the measurement of annual changes and yearly average values of household food consumption and expenditure, a rotational sampling scheme with partial replacement of the sample every year can be adopted with great advantage. Although the actual scheme would depend on the extent of correlation found between the consumption data obtained at successive occasions, as well as on practical considerations, a scheme with about 50 per cent matching between two successive years and 25 per cent matching between the first and third year, and so on, is likely to yield useful results in a large number of cases.

#### 5. Methods of measurement for food consumption topics

12.96. In household food consumption surveys, the method of enumeration to be adopted is determined by the type of respondent and the kind of information to be collected from the survey. Also, the choice of a particular method of enumeration is closely related to other aspects of the survey, such as the sample design, the reference and reporting periods, the plan of field work and data processing.

##### (a) Some conceptual approaches

###### (i) Enumeration units and respondents

12.97. The enumeration unit which is defined as a group of persons sharing a common food supply may also form a budget unit. In both cases, it may be possible for one member to be appointed to act as an informant on behalf of the whole unit. In certain cases, the budget unit can be divided into two or more subunits. These are composed of people who were wholly or partly independent in the use of their earnings. Although households are often reluctant to use separate booklets for recording expenditure of these subunits, such separate booklets have been found to be useful in improving the reliability of the data. Where the enumeration unit coincides with the household or the family, reliance may be placed upon one member, usually the homemaker, to provide the information.

###### (ii) Food acquired versus food consumed

12.98. An important aspect of the kind of information required, which will affect the method of enumeration, is

whether information is sought on food acquired during the reference period or on food actually consumed during that period. If the aim is to compile averages for groups of enumeration units and provided there is no significant change in the overall level of household stocks of food over the time period to which such averages relate, the former should be adequate. If, however, the aim is to obtain data on the food consumed and nutritional intake of individual enumeration units, then the latter is to be preferred because the reference period can be shorter.

(iii) *Recording of stocks*

12.99. In a household food consumption inquiry which forms part of a household expenditure survey, it is possible to measure both the food acquired and the food consumed provided the operation will not lead to unacceptable levels of non-response and inaccuracy of reporting. It is preferable, in this case, to measure the latter directly rather than indirectly, for example, food stocks measured at the beginning of the reference period plus food acquired during the period, minus food stocks measured at the end of the period. However, this process is laborious and time-consuming and it may therefore lead to non-response or to distortion of respondents' consumption and purchasing behaviour during the reporting period.

(b) *Methods of collecting data*

12.100. The three main methods of collecting data on food consumption are interviews, account books, and actual measurement.

(i) *Use of interviews*

12.101. In the interview method, the respondent is asked to recollect the quantities and expenditures on food consumed during the reference period. The main disadvantage of this method is that it may be inaccurate because of memory lapses on the part of the respondents. These memory lapses are particularly likely to occur when the reference period is long or in some rural areas where farmers largely feed themselves from their own produce. To facilitate the recall of all foods consumed, the interviewers are usually supplied with a list of foods to use as a prompt list. Visual aids may also be used by the interviewers to assist the informant in recalling the quantity or volume of food consumed. The interview method is the most simple, and response is generally better than with the other methods.

(ii) *Use of account books (diaries)*

12.102. In the account book method, the respondent keeps an account of the quantity and the money value of all food items purchased or otherwise obtained during the reporting period. Food stocks are sometimes measured at the beginning and at the end of the reference period. A standard account book or diary is provided to the household by the survey organization. In specialized food consumption surveys, there is usually a day by day record book or diary provided. With this method, the accuracy of the data is less dependent on memory. The disadvantages of the technique are that it demands more effort from the respondent and co-operation is therefore likely to be less than with the interview method. The technique may be particularly difficult to apply in some developing countries since it requires a certain level of literacy on the part of

the respondent. It is also feasible only where respondents are responsible and willing to co-operate with the survey.

(iii) *Use of the weighing method*

12.103. In the weighing method, the food is actually weighed before it is eaten or used for the preparation of a meal or dish. Food wastage and refuse are also weighed in the kitchen and after meals so that net consumption, that is, intakes, can be computed.

12.104. The method of actual weighing of food is the most accurate of the three methods, because the data are collected by objective procedures which are independent of memory bias. The accuracy of the data will depend on many factors, such as the co-operation of the respondent, the skill of the investigator and the sensitivity of the weighing scales or balances used. With this technique, the respondents are particularly aware of being under observation. They may, therefore, change to some extent their normal eating habits, and their food consumption may assume a pattern somewhat different from their normal one. This method is the most tedious and costly of the three, especially in cases where there are many items to be measured. Moreover, the interviewer cannot be present all the time during the period of the survey, so the weighing method has to be supplemented by information obtained by interview, especially for food eaten between meals. Although there may be a certain degree of non-response due to refusal of the informant to co-operate with this method, experience gained from large-scale integrated surveys (for example, Madagascar: 5,000 households, Tunisia: 3,000, Peru: 8,000, Brazil: 55,000) shows a very low percentage of non-response in surveys using this method. For example, in the Brazilian survey, 2 per cent of the selected households refused to be surveyed, and the range varied from 0.3 per cent in rural areas to 18 per cent in the largest cities (Rio de Janeiro and Sao Paulo).

12.105. When the eating cycle is adopted as the reporting period, it has been found that at the beginning of the inquiry respondents have a tendency to overestimate their consumption in the case of the interview method and to consume more food than normally in the case of the weighing method. As a result, some surveys, including those using the food account and weighing methods, have excluded from tabulation records obtained during the first two or three days, on the grounds that they were not representative of the normal household food consumption pattern. For example, in the National Food Survey of the United Kingdom, evidence was found that households purchased greater quantities of food during the first three shopping days. It was therefore decided to omit the first two days' records of data in the final compilation of the results.

12.106. Where the weighing method is used, it is essential that investigators be adequately trained so that they can secure the co-operation of the respondents in living and eating normally during the period of the survey, without exaggerating their food consumption habits to give a good impression to the investigator. In large-scale food consumption surveys where such training has been effective, the biases resulting from distortion of food habits as mentioned above have generally been found to be negligible. A reporting period of one week, usually adopted in food consumption surveys, is long enough to minimize the effects of shifts in consumption habits during the first few days of the survey.

(c) *Other measurements required*

(i) *Use of local units of measurement*

12.107. In both the interview and the account book techniques, it may be found that not all respondents can express in standard units the quantities of food that are consumed. In such cases the local units will have to be compared with standard units and then converted. The conversion of such local units, which should be undertaken as a supportive activity to an on-going survey, is fairly easy where households use standard containers such as cigarette tins, preserved vegetable tins, and the like, but may be somewhat difficult where local containers such as calabashes, local baskets, and the like, or where quantities in heaps, are commonly used. Under the latter conditions, some surveys have distributed standard containers for use by households for preparing or serving meals. These procedures should be adopted with caution as they may influence the households' food consumption behaviour and may also lead to a certain degree of non-co-operation.

(ii) *Measurement of wastage and losses*

12.108. In food consumption surveys using the weighing method, the estimation of food wastage and losses in the final consumption of food is usually incorporated into the survey. Generally, the data concerning food refuse and the edible portion of food are recorded by the weighing method in the kitchen. This latter portion is broken down into effective consumption or intake, edible waste which is thrown away, the part given to pets and other animals, portions given away to other households and the portion of food prepared, which is not consumed during the reference period. The edible waste thrown away or given to animals is generally expressed as a proportion of the total calories in the total household food supply. From the evidence available in developing countries, these amounts have been found to be very low. Results from the Madagascar and Brazil surveys showed an average percentage range of 1 per cent to 3 per cent for this wastage.

12.109. The factors associated with variations in wastage of the edible portion of food are urban/rural/metropolitan location, income class, family size, period of feast, harvest on food scarcity, storage facilities, for example, the availability of refrigeration, and so on. It may also be useful to analyse the magnitude of wastage of edible portions in terms of major staple foods. For example, the proportion of cooked maize fed to animals has been estimated at 5.6 per cent in Madagascar and 7 per cent in Guatemala. In some other cases, parallel empirical investigations have been undertaken outside surveys to arrive at estimates of food wastage which have then been applied to the results of food consumption surveys.

(iii) *Quantification of meals taken outside the home*

12.110. Food consumption surveys generally measure the quantities of food consumed inside the home. However, in order to determine total quantities of food consumed by members of the household, information on meals consumed outside the home by members of the household and on those consumed by visitors from the household food supply is normally required. It may also be necessary to calculate at the national level the total human consumption of food, including that consumed in collective living quarters such as hospitals, barracks, camps, and the like.

12.111. A meal attendance questionnaire such as the one used in Brazil, which also lists the number of meals taken outside the home (for example, in restaurants, canteens, at work or school, with other families, and the like), is normally provided for this purpose, and this information is used to arrive at estimates of each household's food consumption. In addition, the information on expenditure on meals taken outside the home is also normally included in such surveys.

12.112. Another procedure that can be adopted in conjunction with the survey is to obtain information on the type of rations and ingredients of various meals served in various catering establishments for use in determining the quantities and value of meals taken outside the home. This procedure has been adopted successfully in Hungary and tried in the Brazil survey (1975) but is rather difficult to implement in large-scale food consumption surveys. Where such a procedure is used, it is important to record such meals separately in the case of restaurants, cafes and hotels, hospitals and other medical and educational institutions, as suggested in the System of National Accounts, so as to enable the collation of household expenditure data obtained from food consumption surveys with that in the national accounts and balances.

12.113. A simpler approach, which yields reliable results at an aggregate level, is based on transformation of data on the meal attendance record in terms of daily dietary units.

6. *Methods of enumeration in individual dietary surveys<sup>4</sup>*

12.114. Individual dietary surveys are undertaken to obtain qualitative and quantitative data on the diet of individuals or special groups, for example, preschool children, school children, pregnant or lactating women, and the like, and also, when combined with household surveys, to determine how food is used or allocated within the household. Various techniques have been developed for investigating individual diets, and the main procedures discussed briefly below consist of (a) the dietary history method, (b) the recall of past food intake and (c) the records of current food intake.

(a) *Dietary history method*

12.115. This method is carried out by interviewing individuals or through questionnaires requesting information on what food they usually eat and their approximate amounts. This qualitative type of inquiry is used to obtain information on the usual food consumption of an individual over a recent or past period of time. It reveals major dietary problems, for example, low consumption of nutrients in the diet, and can be used as a basis for subsequent improvement in the food consumption patterns of the individual. The method places a low burden on the respondent but is liable to overestimate intakes if the objective is to obtain quantitative data.

(b) *Recall of past food intake*

12.116. This method is used to obtain information of food consumed over the past 24 or 48 hours by an individual. The interviewer should be a trained nutritionist or

<sup>4</sup> For further details, see (11).

dietitian, or at least familiar with local methods of food preparation. Aids such as food models, measuring cups and spoons or glasses and bowls may be used to help respondents estimate portions consumed. Studies of this method indicate that food consumed may be underestimated due to greater concentration on main meals than on in-between snacks, which may be of great importance in certain countries. The advantages of the method include low respondent burden, decreased time and expense in interviewing, inclusion of food eaten away from home and less influence on eating pattern. The method is reasonably accurate in obtaining information on average amounts of various food groups consumed by individuals, but not individual intake of each separate food. In some cases, the method cannot be used as a basis for obtaining food consumption or dietary patterns because of its short recall period.

(c) *Records of current food intake*

12.117. This method involves accurate weighing of foods by the investigator prior to their consumption by the individuals. The investigator may also have to provide estimated records of the food consumed. The method of weighing can be used by the individuals themselves after explanation by the investigator and can also make use of household measures, for example, cupfuls, spoonfuls, counts, and the like, instead of actual weighing. The weighing of food must be very accurate and care must be taken to weigh only that food which is to be eaten. Also, all amounts, including small portions that may be of considerable nutrient value, must be weighed in order to give an accurate picture of food consumed.

12.118. The advantages of this method are that it results in a very high degree of accuracy when carried out correctly. However, it is tedious and likely to affect the eating pattern of those investigated. Responsiveness and co-operation are required from the individuals under investigation. It is cumbersome to apply, especially in communities whose individuals eat from the same pot, and it can be subject to error from inaccurate weighing or dishonesty on the part of the individual. Further inaccuracies and errors occur when household measures are used instead of standard weighing measures. The method is also costly, and since only a few individuals can be covered at a time, sample sizes are restricted, which may especially affect estimates for the critical age groups of the population.

12.119. Another consideration relates to individual versus household consumption in food consumption surveys. Individual dietary surveys provide data on dietary intakes of individuals of given age and sex which cannot be obtained from a household food consumption survey. They provide data that may reveal wide variations in intakes of individuals within the same household, and these intakes may not be in proportion to recommended intakes, especially for vulnerable groups comprising children, lactating and pregnant women and the elderly. Differences in nutritional requirements, food preferences, family and community customs, daily routines and activities of family members affect the dietary intakes of individuals in the households. Such data are useful for nutrition programmes aimed at at-risk individuals, and for intervention programmes requiring knowledge of the distribution of food within the family.

12.120. Comparisons of average recommendations for nutrient intake with averages for household food consumption are based on the assumption that family distributions of nutrients are in proportion to recommendations. Also critical is the allocation on a per person basis of the nutrient content of the household food supply for each nutrient independently, regardless of its source. It may happen that some foods are largely consumed by certain members of the household, while the rest consume them very rarely. Collection of information on both individual food intake and household food intake thus provides clearer insights into how food is consumed and allocated within households.

7. *Methods of measurement in nutritional status surveys (anthropometry)*

12.121. Cross-sectional anthropometric data collected on a large-scale basis give a good and quickly obtained picture of the nutritional status of individuals in a population. For children, reliance should be placed on weight for height as an indication of the present state of nutrition and on height for age as an indicator of past nutrition.<sup>5</sup> Height for age is a particularly useful and valid indicator for the measurement of the nutritional status of children under one year of age.

12.122. The methods used are relatively simple and can easily be adopted as part of an on-going household survey.<sup>6</sup> Precautions necessary include the suitable training of field personnel, adjustment of scales before each measuring cycle, checking for observer error and the rotation of field workers among groups of subjects to be measured. The methods described in (141) are specifically meant for children of school-going age, but they can also be used to obtain heights and weights of adults for the determination of scales of nutritional requirements and the study of malnutrition.

(a) *Age*

12.123. Age data are critical in this field. Various precautions and procedures must be observed to obtain accurate age data. These are discussed in other portions of the present *Handbook*.

(b) *Weight*

12.124. The types of measuring instruments are the following:

(a) For children below six years, a Salter spring balance (model 233 PBW) with a scale measuring up to a maximum of 25 kilograms in increments of 100 grams is recommended. With this type of balance, the child hangs in a specially designed "bag". This model is sturdy, compact and can easily be transported;

(b) For children six through nine years and adults, a bathroom scale on which the person stands. The apparatus usually reads to a maximum of 100 kilograms in increments of 100 grams. In both these age groups the readings are taken to the nearest 100 grams;

<sup>5</sup> The presentation and use of height and weight data for comparing the nutritional status of groups of children under the age of 10 years is discussed in (144).

<sup>6</sup> For details, see (141).

(c) For older children two years and above and adults, a vertical measuring rod can be employed. For infants and pre-school children below two years, recumbent length (crown-heel length) has to be measured. This is usually done with a wooden length-board or infotometer.

12.125. For international comparability of the data, indicators on weight for age, weight for height and height for age are compared with those obtained from an international reference population. The Boston Standard has generally been accepted as a suitable yardstick for comparison with local measurements. For national use and in countries where local references are not available, it is useful to define suitable targets or yardsticks for the local population, based on the weights and heights of healthy and well-nourished children in the same country, for use in interpreting the results.

#### 8. *Time coverage of the survey*

12.126. There are three aspects of time coverage to be considered in a food consumption survey, namely: (a) the period to be represented by the survey and for which results will be presented, usually called the period of the survey; (b) the period of time to which the records provided by an individual household relate, usually called the reference period; and (c) the period over which a reporting unit is actually engaged in providing the information required for the survey, usually called the reporting period.

##### (a) *Period of the survey*

12.127. The economic and nutritional concerns of most household food consumption surveys make it desirable that the overall period of the survey should cover at least a 12-month period. Surveys which represent a period shorter than a year may give results which are not typical of the year as a whole. Ideally, the survey should be carried out continuously throughout the year and separate results for each season should be tabulated to show the extent of seasonal variation. In such a case the choice is between completely rotated samples and a survey with repeated visits to households throughout the year or some combination of the two approaches.

12.128. In the case of rotating samples, the year is normally divided into a number of shorter periods, and in each period or cycle only a part of the total sample is surveyed, usually with each household having reference and enumeration periods of shorter duration. More generally, the year can be split into short periods corresponding to the enumeration period and the same number of households surveyed in each short period. In this case, it is essential to divide the universe into homogeneous ecological zones in which subsamples of households are selected for random distribution throughout the different periods of the year. The rotation of the sample should also be done at random on a geographical basis within each operational area. Some examples of country practices in recent food consumption surveys are the division of the year into 24 periods of two weeks' duration in Sweden, 12 periods of one month in Canada, the German Democratic Republic and Greece, and eight periods of six weeks' duration in France.

12.129. Alternatively, use can be made of repeated samples (the panel method) whereby the panel consists of

a sample of households which is normally fixed, with all households participating in the survey in each cycle or season, subject to some rotation after participation for a certain length of time. For example, panels were revisited two or three times in household budget food consumption surveys adopting this approach in Burundi, Togo, Chad and Colombia.

12.130. There are various trade-offs in terms of the value of data furnished, possible co-operation of households, non-response, sample size, cost, and the like, between a food consumption survey using completely rotated samples and a survey adopting repeated samples.

12.131. The repeated sample approach is generally used to minimize memory lapses on expenditure items and to obtain precise measures of trends or variations in food consumption and nutritional status of individual households throughout the year. Attempts to overcome by repeated visits the disadvantages of recall and of partial knowledge of the food consumption level of particular households resulting from rotated samples are usually at the expense of reduction in sample size, either because of the cost factor or some fall-off in response, or both.

12.132. With the use of completely rotated samples, it is not possible to derive meaningful annual figures of the percentage of households using a particular item of food or group of foods by combining seasonal percentages because different households are surveyed in different seasons. With the panel method, on the other hand, meaningful percentages can be computed. Moreover, since estimates of the annual income and consumption of individual households can be computed, valid frequency distributions of households by levels of food intake can also be provided. Such data are particularly useful in studies undertaken on income distribution and the estimation of numbers undernourished.

12.133. The panel method may introduce some bias in the results obtained and also lead to non-response as compared to methods using completely rotated samples. However, since discontinuity in time-series must also be avoided, partial replacement, say after six months, is often used. A more elaborate procedure was adopted in the Household Consumption Expenditure Survey of four cities in Colombia in 1967/1968. In order to have trimestrial subsamples to facilitate the collection of data and to study seasonal variation in the consumption of district products, the sample of 2,103 was divided into eight groups, of which the first was surveyed in all trimesters, three were interviewed twice but in different trimesters and four interviewed only once each in different trimesters.

##### (b) *Reference period*

12.134. In an integrated household expenditure and food consumption survey, where food actually consumed is recorded, the reference period for which data is collected should be long enough to cover a complete "eating cycle", which generally might be as short as a week. As far as food expenditure is concerned, a "buying cycle" of one month is usually adopted. This usually corresponds to the periodicity of wage payments, especially in the urban areas. The period may even be longer than a month if the households possess the facilities for long-term storage of food and have to buy, and hold substantial stocks. For other expenditure items, the reference period depends on

the frequency of purchases in relation to the memory of informants in recalling them. Thus, in integrated surveys various reference periods are often adopted for various items of expenditure and linked to the period fixed for the food record part of the survey.

(c) *Periods of enumeration*

12.135. The methods and periods adopted for collecting data will vary depending on particular items and the ability of households to recollect them. In the case of food consumption surveys a continuous recording period is usually adopted, using the weighing method, with daily visits of enumerators to the households. In this case the enumeration period coincides with the reference period. For items of food expenditure or food acquired, an enumeration period of one month is usually adopted, but with recording periods every day, every two or three days, or once a week, and so on, depending on the types of information collected and conditions prevailing in a particular area. For example, in rural areas, consumption of own produce may have to be recorded at least daily or at intervals of not less than once a week. This requirement is often overlooked by survey planners. On the other hand, items of food expenditure in the rural areas may be recorded only once a week, while in the urban areas they should preferably be recorded every day, or at least twice or three times per week. Enumerators may also be instructed to return to households outside the period of their continuous investigation to ask retrospective questions on expenditures during the intervening period. A wide range of procedures has been used in different surveys and countries need to experiment to determine the most suitable reference and enumeration periods for food and non-food items included in their surveys.

12.136. In the 1975 Tunisia Household Budget and Food Consumption Survey, the weighing of food was carried out over a week's period with daily visits by enumerators to the household. Records on expenditure on food were also taken covering a one-week period, together with some other items of consumption expenditure such as petrol, hairdresser expenses and tobacco. The above items were again recorded at 10-day intervals for expenses incurred during the week, including consumption of own produce, for comparison with daily records. Other general information on household expenditure on items such as dwellings, durables, transport and travel relating to 2, 3 or 11 preceding months, as well as data on employment and income, were recorded during the periods of enumerators' visits to households.

12.137. Another example summarizes the procedure adopted in a household expenditure and food consumption survey conducted in Louga-Zinquere in Senegal in 1978. The food consumption part of the survey was carried out over a period of five days using weighing methods. The household expenditure survey was undertaken by interviewing families on their income and by recall of their expenditures for groups of expenditure items, during 10 days with daily recording of expenditure, and during 20 days with two recall interviews relating to the preceding 10 days.

12.138. On the basis of this scheme, six households were covered in both the expenditure and food consumption surveys by one enumerator in one month, as follows:

$C + B_j \cdot B_j$	$BI$	$BI$	First household
$B_j \cdot C + B_j$	$BI$	$BI$	Second household
$BI$	$C + B_j \cdot B_j$	$BI$	Third household
$BI$	$B_j \cdot C + B_j$	$BI$	Fourth household
$BI$	$BI$	$C + B_j \cdot B_j$	Fifth household
$BI$	$BI$	$B_j \cdot C + B_j$	Sixth household

$C$  = recording of food consumption by weighing

$B_j$  = recording of daily total expenditure

$BI$  = recording by recall method over the preceding 10 days.

9. *Some operational considerations*

12.139. The above discussion shows that the collection of data on food consumption and household expenditure requires the careful planning of field operations. It further shows that for these types of surveys the enumerators must often work in restricted localities or villages in order to carry out daily visits to selected households. Only a few of these households (about four as a maximum, half of which are normally investigated for food consumption) can be covered by each enumerator in one day. In sparsely populated areas, the number of households each enumerator can cover in one day is severely limited due to the time required for travel. As a result, household budget and food consumption surveys of this nature undertaken in developing countries have covered limited samples in the case of repeated samples. However, sample sizes have been fairly large in surveys adopting rotated samples (Brazil: 55,000, Madagascar: 5,073, Peru: 7,933, Tunisia: 4,962).<sup>7</sup> These samples generally worked out at sampling fractions ranging from 1/200 to 1/380 and at estimated costs ranging from \$US 80 to \$US 120 per household. Experience in the integrated surveys noted above also shows that in general the enumeration periods cover seven days, plus two days for travelling and rest. This amounts to about 40 working periods per enumerator per year. Empirical study is required to determine the optimum reference and enumeration periods, frequency of enumerators' visits to households and workloads for enumerators in integrated household survey programmes in developing countries.

E. POSSIBILITIES FOR TABULATION AND ANALYSIS

12.140. The analysis and tabulation of the data obtained from a food consumption survey depend in the first instance on national requirements and capabilities. Each country must decide on the analyses, tabulations and studies which are necessary to satisfy its own requirements. Over and above such internal needs, however, there is mutual benefit to be gained by comparing the survey findings in one's own country with those in others. Common problems are thereby identified or highlighted and ideas as to their solution may be shared. In addition, work at the international level for encouraging, co-ordinating and evaluating world programmes for improvements in food production and distribution is facilitated if world-wide data on food consumption and requirements are available. Such work requires common standards of data presentation and a common channel through which the survey results can be disseminated. However, such international needs for

<sup>7</sup> For details of sample size and other relevant aspects of survey design, see (17).

data should not be achieved at the expense of national requirements.

### 1. Nutritional evaluation

12.141. The derivation of estimates of energy and nutrient intake from food consumption data and their comparison with scales of nutritional requirements can take up an appreciable part of the data processing capacity available to a food consumption survey, and this imposes a number of constraints in terms of data elaboration. The first essential relates to data on food quantities. For economic analysis, it is essential that food consumption be expressed in terms of food as purchased. In order to ensure uniformity in the results, it may be necessary to convert the food items to a common scale, for example, data recorded in terms of edible portions or of registered food preparations which have to be broken down into various ingredients as purchased.

#### (a) Food composition tables

12.142. The final list of individual food items must be sufficiently detailed for them to be classified according to a system which is sensible for both nutritionists and economists. To determine the nutritional content of food, it is also necessary to provide food composition tables based on whatever description and classification of food is used.<sup>8</sup> These tables give the nutritional composition of food in terms of 100 grams of edible portion. Therefore, as far as possible, various factors derived from the survey are used to convert food consumption into edible portion and to calculate from the food composition tables the energy and nutrient content of that consumption. By deducting from the previous results the leftovers recorded during the survey and then transforming these results into nutritional values, the energy and nutrient intake of food consumed can be established.

#### (b) Scale of nutritional requirements and allowances

12.143. From the individual data on age, sex, height and body weight and occupation, and using available scales of nutritional requirements, the individual requirements of each person in the household who took part in the survey can be calculated. National scales of nutritional requirements are sometimes available. However, the recommendations prepared by the Food and Agriculture Organization of the United Nations (FAO) and The World Health Organization (WHO) are being increasingly used (5). These scales of requirements for energy and protein are regularly revised in order to take into consideration new developments in the state of knowledge in this field. Besides the recommendations on nutritional allowances, other scales of minimum nutritional requirements are currently under consideration for use in identifying groups of the population at great risk of malnutrition.

12.144. The tendency in the near future may be to analyse the results of food consumption surveys in terms of two scales based on nutritional recommendations and minimum requirements. The first scale will be used to determine the level of well-being of the population and the sec-

<sup>8</sup> Food composition tables for regional and international applications are available in (8, 21, 22, 23).

ond scale will be used as an indicator of severe deprivation. Experimental work on the use of these two standards has been undertaken on the results of food consumption surveys conducted in Brazil and Tunisia.

#### (c) Scaling systems and nutrition units

12.145. Mention has already been made of the use of data on the median weight for median height by age and sex for the estimation of average energy requirements per day, by age and sex of the population. These figures are used to prepare scales of nutrition units, taking a male of 25 years of age with moderate activity as a standard.

12.146. For instance, in the Brazilian survey the scaling system based on average energy requirements per day by age and sex and according to the median weight for median height gave the following figures: (9)

	Age (years)	Coefficients	Coefficients	
			Males	Females
0-1		0.30	14	0.85 0.80
1		0.39	15	0.90 0.80
2		0.43	16	0.95 0.80
3		0.48	17	0.97 0.80
4		0.52	18	0.99 0.80
5		0.54	19	0.99 0.80
6		0.57	20-29	1.00 0.80
7		0.60	30-49	1.00 0.80
8		0.63	50-59	1.00 0.80
9		0.67	60-69	0.90 0.70
10		0.70	70-79	0.90 0.70
11		0.74	Over 79	0.90 0.70
12		0.76		
13		0.78		

12.147. For specific purposes, such as comparing the distribution of nutrients, that is, protein, vitamins and minerals, among households, other scaling systems can also be established. However, such scales are not as general as scales constructed on the basis of energy requirements.

#### (d) Allowance for meals taken outside the home

12.148. It is generally impracticable to collect data on quantities of food eaten outside the home, that is, food not provided from the common household food supply. Therefore, the data on nutrient intakes from a survey are based only on quantities of food eaten from the common household food supply, whereas the scales of nutritional requirements are with respect to total daily needs. As a result, it is necessary to make some adjustments to requirements so that they are comparable with the intakes recorded. On the basis of the number of types of meals obtained inside and outside the home by each member of the eating unit, and using a meal weighing system derived from the food intake results, one can determine the individual daily index of attendance at home meals. The daily requirements, weighed by this index, give the daily adjusted requirements which, after summing up at the eating unit level, can then be compared with information on intake. For discussion of the formulae used in arriving at this result, see paragraphs 12.110 to 12.113 above.

#### (e) Uses and interpretation of results

12.149. It follows from the foregoing discussion that the comparison of the estimates of nutrient intake with es-

timates of requirements or some other standard are of a very rudimentary nature, and caution must be exercised in the interpretation of the results of such comparisons, especially when the differences are of relatively minor magnitude, since they are subject to varying degrees of uncertainty.

12.150. National average figures may conceal vital differences among different sections of the population arising both from unevenness in the distribution of available supplies as well as differences in requirements. Although further analysis of the survey data will enable intake to be compared with requirements separately in each population group, the value of the between-group comparisons of the resulting ratios will depend very much on the extent to which they have been affected by sampling and other errors, including those due to the use of estimation. At best, they will pinpoint those population groups which might need special attention regarding food and nutrition, and to which further full-scale individual dietary surveys combined with physiological and clinical measurements might be directed so as to assess their true nutritional status and thus form a basis for selective food and nutrition policies.

12.151. The whole process of using the data obtained from food consumption surveys to provide estimates of nutrient intake in relation to requirements or other standards is thus seen to be beset with problems for which no simple and precise solutions are available. Assumptions and approximations have to be introduced. Some of the problems are all the more acute if the food consumption survey is incorporated in and becomes part of a household expenditure survey. To this extent they reinforce the argument in favour of linking food consumption surveys to expenditure surveys in preference to incorporating them directly in the normal expenditure survey procedures.

## 2. Data processing requirements

12.152. The use of electronic computers is now widespread for processing survey data and this provides opportunities following field checking for logical checks and other correction procedures to be carried out which formerly would have fallen to editing and coding staff or would not have been done at all. It should be borne in mind that, in a food consumption survey, each household's record provides a long string of data, that a large number of household records is usually obtained during the course of a year, and that this may give rise to problems of access to the data which have been read into the computer and of its linkage to files of food composition tables of nutrient requirements or recommended intakes, and similar reference material. It is therefore important at the outset to consider a system which will have the capacity to perform all the tasks that will be required, and it is prudent to ensure that sufficient additional capacity is available to allow for some future expansion.

12.153. The returns on survey costs, including costs of subsequent storage, are the benefit resulting from maximization of data use. This means rapid and constant access to information without additional cost for the reprocessing of derived variables. Moreover, data have different uses in the short term and in the long term, that is, in time-series. This should be taken into account in the preparation of a system directed to the optimization of data use.

12.154. Food consumption surveys with a variety of objectives should be subjected to integrated analysis using a hierarchy of reporting units, such as household, budget unit, eating unit and individuals, for various items of information such as daily food consumption per meal and per product, and so on. After the release of the initial tabulations and report of survey results, the data base should always be kept in a form suitable for continuing access and analysis of the data. Such a data base, when organized in the form of a structured collection of record files, provides an integrated data processing and calculating system for use in analysis of the data, purposes of interest to users. Such a system increases the possibilities of in-depth analytical studies using the survey results, such as a study of household economic and nutritional profiles or the quantification of malnutrition.

## 3. Possibilities for tabulation of data on food consumption and nutrition

12.155. Although the tabulation of the data and their presentation in summary form are among the last operational phases of a survey, a draft tabulation programme should be prepared at the questionnaire design stage so as to ensure that the data to be collected will be in conformity with data requirements. In addition, an expanded tabulation plan should be prepared at an early stage taking into consideration the quality of data, the details of breakdowns that can be provided within acceptable limits of accuracy, the capabilities for further calculations and the priority needs of the different users. A list of illustrative tabulations divided into minimum and extended tabulation plans is given below. This list is illustrative and should not be taken as representing a formal recommendation.

### (a) A minimum tabulation plan

12.156. The population groups for which consumption patterns should be shown may be derived from the following:

- (a) All households;
- (b) Urban/rural;
- (c) Farm/non-farm;
- (d) Socio-economic groups;
- (e) Households by size.

Breakdowns according to urban/rural, farm/non-farm, socio-economic groups and household size should be made on the basis of local conditions. When information on income or total consumption expenditure is available, the data can be classified either on a per capita basis or on a per household basis. Per capita estimates provide a better indicator of the economic status of households, but if used for making comparisons between groups, it should be remembered that they mask differences, due to differences in age, sex and other characteristics of persons in the different groups. The classification according to household size can usefully incorporate some discrimination among families of different composition.

12.157. The statistics shown for each population group should present the food consumption pattern of the group in terms of the following:

(a) Average quantities of different foods eaten at home (and away from home if such information is available), with separate averages, where important, for food

purchased and for home-produced food and food otherwise obtained per person (or household) per week (or other specified time period);

(b) Average money value of different foods (and the total for all foods) used at home per person (or per household) per week (or other time period), with separate averages, where important, for food purchased and for food otherwise obtained (including home-produced food). Expenditure on food purchased and eaten away from home should also be shown;

(c) Average energy value and nutrient content of food used per person. The contribution of each food group to the total of each nutrient should also be shown.

12.158. The descriptive information for households in each population group should include:

(a) The number of responding households in the sample;

(b) The average household size;

(c) The average income or other measure of economic status used for classifying the household.

#### (b) *Expanded tabulation plan*

12.159. The first three of the four types of data specified under the minimum tabulation plan may warrant further detailed analysis and tabulations. The expanded programme here described should therefore be considered in connection with more elaborate surveys, to supply information on the levels and patterns of food consumption and for other analytical purposes, such as demand analysis, and for use in conjunction with the results of other surveys on levels of living and basic needs.

12.160. The statistics to be shown for each population group might be expanded, in comparison with those shown for the minimum plan, to include:

(a) Comparison of the nutritive value of the diet with requirements or recommended allowances;

(b) Distributions of households according to levels of nutrient intake or according to intake relative to requirements or allowances;

(c) Percentage of households in each population group using (or purchasing) specified foods;

(d) Distributions of households by amount of food expenditure;

(e) Average prices paid for different foods by different population groups;

(f) Various derived statistics, such as demand parameters, indices of food prices, food expenditure and food quantities, and costs per calorie from the various foods.

Further tabulations in the expanded plan should also present material concerning the quality of the data which is being presented, as discussed in the next section, below.

## F. METHODS OF EVALUATION OF DATA QUALITY

12.161. The previous sections of this chapter discussed some general requirements for reducing or controlling the magnitude of sampling and non-sampling errors and biases in food consumption surveys. The present section presents some of the methods that can be used in evaluating the quality of survey results. As the experience in food consumption surveys undertaken in developing countries is still very limited, reference will also be made

to a few procedures that have been adopted in developed countries.

### 1. *Calculation of sampling errors*

12.162. The extended tabulation plan discussed above should include provision for calculating and presenting sampling errors relative to all the total averages in the tabulations prepared on the results of food consumption and nutrition surveys. Since such computations may present a formidable task for countries without adequate data processing facilities, the minimum requirement is to present such errors for total energy and protein intakes, for totals of staple foods consumed and for the major groups of items on expenditure. The minimum tabulation plan presented in section D could serve as a useful basis for selecting a short list of items for which to calculate sampling errors.

### 2. *Treatment of non-response*

12.163. The magnitude of overall non-response due to all causes (for example, outright refusals, untraceable families, families with incomplete records, and so on) is very small in food consumption surveys conducted in developing countries. Survey results available show that non-response hardly reaches 10 per cent in those countries. (Examples are Brazil, 2 per cent, Tunisia, 5 per cent, Trinidad and Tobago, 7 per cent.) Analysis of these results shows that the great proportion of the overall non-response is usually due to families that could not be contacted due to changes in their address, prolonged absence from dwellings and unavailability for participation in the survey for social or cultural reasons.

12.164. On the other hand, in the developed countries the degree of non-response in food consumption surveys is usually high and may reach levels around 50 per cent. (Examples available range from 14 per cent in Cyprus to 50 per cent in the United Kingdom.) Despite the generally good experience with non-response in developing countries, it is essential that survey planning take every precaution to ensure that any problems which arise can be properly dealt with.

12.165. Most food consumption surveys conducted in both developing and developed countries have emphasized certain procedures for reducing non-response and other related non-sampling errors and potential sources of bias encountered at various stages of these surveys. These have comprised measures such as the suitable planning of field operations and timetables, the arranging of publicity campaigns to promote the co-operation of respondents in the survey, planning of field operations, including the proper selection, training and motivation of interviewers, strict checking and editing of completed schedules, and so on. All of these procedures are discussed in more detail in part one of the present *Handbook*.

### 3. *Use of internal consistency checks*

12.166. Several internal consistency checks have sometimes been applied to the results of food consumption surveys at the data processing stages, and a few of these will be mentioned here, without attempting to present a comprehensive picture.

12.167. The average per capita consumption of the

staple foods which constitute the bulk of the household diet in developing countries can be used as an indicator of the accuracy of the results of food consumption surveys. Since it could hardly be expected that an adult would consume more than one kilogram of cereals a day, any household records showing per capita consumption of staple foods for adults in excess of one kilogram per day are likely to be erroneous. Similarly, records of per capita consumption of energy by adults much in excess of 5,000 calories per day are likely to be suspect, and the error may be traced to figures on quantities consumed or to the omission of certain household members, guests or visitors who may have participated in meals served on that day.

12.168. Another method of evaluating the quality of food consumption survey results is based on the computation of scatter diagrams of households' per capita energy intakes against requirements, which can be encircled by an ellipse determined in such a way that the probability of any household falling outside its boundaries is less than 5 per cent. All households whose positions fall outside this curve can then be re-examined on the basis of the original records for purposes of finding the error and making suitable corrections in the original data. Usually, such errors are found to have resulted from the quantity or type of commodities consumed, the estimation of wastage, and the conversion factors used in translating quantities into their energy content.

12.169. A similar scatter diagram can also be prepared by computer on relationships between weight and height of children in the case of anthropometric data. Again, the units falling outside a predetermined threshold can be retrieved for fuller evaluation and adjustment.

12.170. One way in which the accuracy of the quantity and expenditure records has been assessed is by dividing expenditure data of certain important food commodities by their quantities and comparing the results with the known unit prices of these commodities at the time of the survey. Other internal consistency checks which have been used in the process of collecting records on household budgets and food consumption consist of the control of expenditure data through comparison with figures of disposable or other related forms of family income.

#### 4. Use of external consistency checks

12.171. The comparison of survey results with other statistics on quantities and expenditure on food may also serve as an excellent means of evaluating the quality of data obtained from food consumption surveys.

12.172. Food consumption survey results at the aggregate level can be compared with the results of food balance sheets. The latter measure per capita food supply or apparent consumption as obtained from the total of food-stuffs produced in the country plus imports, after making adjustments to allow for changes in stocks, subtracting quantities put to non-food uses (including use for seed and feed and manufacture) and losses to arrive at domestic food supplies in quantities and nutrient value, which are then divided by estimates of the total population. Such comparisons should ensure that the quantities entering into the above aggregates are reliable. However, it is necessary to check on the commodity coverage, especially the coverage of home-produced food that may not always be covered in food balance sheets. Other possibilities concern comparison of two estimates at the same level, for exam-

ple, the retail level. In any case, allowance must be made for food consumed at institutions and similar catering establishments.

12.173. Data on food expenditure obtained from food consumption surveys can also be compared with estimates of private expenditure on food available in national accounts and balances. Care should be taken to ensure that the commodity coverage is compatible, allowance is made for food taken at restaurants or other catering institutions and that valuation of items is based on farm-gate or producer prices. Where countries conduct separate household expenditure surveys, the results of their aggregate food expenditures can be compared with similar data obtained from a food consumption survey. The former data should be carefully reviewed for population and commodity coverage, especially the coverage of own-produced food. This is because consumer expenditure surveys are often restricted in these respects, since their primary purpose may be to obtain weights for consumer or retail price indices.

## ANNEX

### Illustrative list of food items to be included in food consumption surveys\*

#### I. FOOD FROM THE COMMON FOOD SUPPLY

##### A. Cereals and cereal products

1. Grains as whole grain, meal, flour (specify where important: wheat, rice, rye, barley, oats, maize (corn), millets, sorghums etc.)
2. Pastas: macaroni, spaghetti etc.
3. Commercially baked goods (specify where important: bread and other baked goods)
4. Other cereals and cereal products (specify where important)

##### B. Starches and starchy roots

1. Potatoes (specify form where important: fresh (new, old), canned, dehydrated, flour etc.)
2. Sweet potatoes (specify form where important: fresh, flour etc.)
3. Cassava (specify form where important: fresh, meal, flour etc.)
4. Other starchy roots (specify where important)
5. Starches (pure, dry) (specify where important: wheat, maize, rice, potato, cassava starches, sago etc.)

##### C. Sugars and sweets

1. Sugars (specify where important: crude, refined, cane, beet, palm, coconut, maple etc.)
2. Syrups and molasses (specify where important: molasses of cane sugar, of beet sugar, cane juice, cane, maple, corn, carob, grape, date syrups etc.)
3. Honey (including honey in the comb etc.)
4. Others (specify where important: jams, marmalades, candy)

##### D. Pulses (dry)

1. Beans (specify where important: broad beans, kidney beans, lima beans, mung beans etc.)
2. Peas (specify where important: dry peas, lentils, chick peas etc.)
3. Soybeans and soybean products (specify where important: whole soybeans, soy sauce, soybean curd, soybean paste, soybean milk, soybean flour etc.)

##### E. Nuts

1. Groundnuts (specify form where important: in shell, shelled, roasted, salted, in butter etc.)
2. Coconuts (specify form where important: mature nuts, immature nuts, coconut milk, shredded coconut etc.)
3. Other tree nuts (specify where important: almonds, pistachios, cashew nuts, walnuts, pecan nuts, wild or unspecified etc.)

\* See paras. 12.32-12.33 of the text.

#### F. Seeds

(Specify where important: squash, watermelon, sunflower, sesame seeds etc.)

#### G. Vegetables

(Unless otherwise specified, fresh forms will be assumed. Where important, canned, frozen, powdered, dried—except dry pulses—strained, chopped, pickled etc. should be specified)

1. Roots, bulbs and tubers (specify where important: beets, carrots, kohlrabi, leeks, mature onions, okra, parsnips, radishes, horse radishes, salsify, scorzonera, turnips, rutabaga etc.)
2. Leafy vegetables (specify where important: bean sprouts, beet greens, Brussels sprouts, cabbage, cassava leaves, celery, chicory and endive, kale, lettuce, mustard greens, okra leaves, parsley, spinach, onion leaves, other leafy vegetables)
3. Tomatoes (specify where important: fresh, canned etc.)
4. Other vegetables, edible flowers, stems (specify where important: artichokes, asparagus, broccoli, cauliflower, celeriac, chayots, cucumbers, eggplant, sweet corn, pumpkins, squashes, gourds, red or green peppers (fresh), beans and peas (fresh) etc.)

#### H. Fruit

(Unless otherwise specified, fresh forms will be assumed. When important, canned, frozen, strained, chopped etc. should be specified)

1. Bananas and plantains
2. Citrus fruit (specify where important: grapefruit, lemons, limes, oranges etc.)
3. Fat-rich fruit (specify: olives, avocados etc.)
4. Other fresh fruit (specify where important: apples, apricots, berries, breadfruit, cherries, dates, figs, grapes, guavas, jackfruit, mangoes, melons, papayas, passionfruit, peaches, pears, persimmons, pineapples, plums, pomegranates, quinces, sapodilla, sopote, soursop etc.)
5. Dried fruit (specify: dates, figs, raisins etc.)

#### I. Meat and meat products, poultry and insects

1. Fresh and frozen meat (specify where important: beef, veal, pork, mutton and lamb, goat, buffalo, camel, horse, rabbit, venison, whale and other domestic or wild species)
2. Offal (specify where important: animal and type, that is, liver, kidney, brain, heart, sweetbread etc.)
3. Meat products (specify where important: bacon, ham, dried beef, dried pork, canned beef, canned pork, sausages, according to main types etc.)
4. Poultry and wild birds (specify where important: chickens, ducks, geese, pigeons, turkeys etc.)
5. Insects (specify where important: distinguishing at least between adult insects and larvae)

#### J. Eggs

(Assumed fresh, unless specified: dried, frozen, yolks, whites; specify where important: hen, duck, goose, turtle etc.)

#### K. Fish and shellfish

1. Fish, fresh (specify where important, making a distinction at least between fat fish (salmon, trout, herrings, mackerel etc.) and low-fat types (cod, haddock etc.))

2. Shellfish, fresh (specify where important: lobsters, crawfish, crabs, shrimps, oysters, clams, mussels etc.)
3. Fish, salted, smoked or dried (specify where important: fat-rich types and fat-poor types)
4. Fish, canned (specify where important: in oil, not in oil, fat-rich types, fat-poor types)
5. Shellfish, canned (specify where important: lobsters, crawfish, crabs, shrimps, oysters, clams, mussels etc.)
6. Other aquatic animals (alligators, turtles, frogs etc.)

#### L. Milk and dairy products (excluding butter)

1. Milk, liquid, whole (specify where important: cow, goat, sheep, buffalo, camel etc.)
2. Milk, liquid, skim or buttermilk, partly skimmed milk
3. Cream (where possible, specify fat content)
4. Cheese (specify important varieties: hard, soft, semi-soft, from whole milk, partly skimmed milk, skim milk; whey cheeses, hard, soft, semi-soft etc.)
5. Milk, processed (specify where important: evaporated, whole, unsweetened milk; condensed, whole, sweetened milk; condensed, skim, sweetened milk; dried whole milk; dried skim milk; yoghurt and other fermented milk etc.)
6. Yoghurt, other fermented milk and fresh milk product
7. Ice cream

#### M. Oils and fats

1. Vegetable oils and fats (specify where important: oils, hardened shortening etc.)
2. Animal fats (specify: butter, ghee, lard, suet, tallow etc.)
3. Marine oils (specify)
4. Mixed products of vegetable, animal or marine origin (specify)
5. Other oil and fat products (specify where important: mayonnaise, dressings, sandwich spread)

#### N. Miscellaneous

(Specify where important: spices, cooking chocolate, cocoa, yeast, other raising agents, salt, condiments etc.)

#### O. Prepared or partially prepared mixtures of food and prepared meals obtained outside and consumed at home

(Specify)

#### P. Beverages

1. Alcoholic drinks (specify where important: beer, wine, spirits etc.)
2. Canned or bottled soft drinks (specify important varieties)
3. Other beverages: tea, coffee, yerba, mate etc.

#### II. PURCHASED FOODS EATEN AWAY FROM THE HOME

1. Meals, snacks etc., with specification of type and quantities of the food eaten, wherever possible.
2. Alcoholic drinks, with specification of the drinks as beer, wine, spirits etc.
3. Ice cream, soft drinks, chocolate and sugar confectionery.

### XIII. AGRICULTURE

13.1. In this chapter, the use of household surveys to collect data on various aspects of agriculture is described. Since many developing countries do not have either the qualified manpower or sufficient funds to collect all the statistical data they require, there is a need for establishing data collection programmes which will maximize the efficiency of existing resources. Therefore, national household survey programmes should also be used as much as is feasible for collecting agricultural statistics. For example, the National Household Survey Capability Programme sponsored by the United Nations and the World Bank has as its basic aim "to make optimum use of all available resources to build up an effective and enduring statistical infrastructure in the area of household statistics with a resulting improvement of related national statistical services" (81).

13.2. The first section of this chapter explains the need for agricultural statistics and their main uses, with particular reference to the recommendations of international bodies. Section B deals with the concepts of agricultural holding and household. In section C, a list of items that are recommended for collection in agricultural and other surveys is given. The definitions of some of the items are given in section D.

13.3. The main sources of data on agriculture are described in section E, and some actual country methods of collecting agricultural statistics are explained there. The possibilities of integrating agricultural statistics with household sample surveys are described in section F, which also refers to the problems of tabulating data from integrated surveys. Section G describes some censuses and surveys carried out with the household as the enumeration unit.

#### A. NEEDS AND USES OF DATA ON AGRICULTURE

13.4. During the past decade there has been an ever-increasing demand for timely and reliable statistics on food and agriculture, especially in developing countries where the majority of people derive their livelihood from agriculture. On the national level data are needed for planning social and economic development. Meaningful plans can be developed only on the basis of timely and accurate data covering a wide range of socio-economic and demographic characteristics of the population. Data are also needed for different regions in the country, enabling planned and balanced regional development, and on special groups, such as landless agricultural labourers, women, children and the like. These statistics are of particular value in the design and control of policies and programmes dealing with issues such as poverty, unemployment and malnutrition.

13.5. In monitoring and evaluating specific projects, data are needed not only for the project area itself but also for the broader region where the project is situated, in or-

der to be able to compare the results in the project area with those outside the area.

13.6. The need for statistics on food and agriculture has been recognized by the FAO governing bodies as follows:

"Governments of the Member Nations of the Food and Agriculture Organization of the United Nations have recognized the great importance of food and agricultural statistics in carrying out national and international programmes aimed at fulfilling the main objectives of the Organization—namely, to raise nutrition levels and living standards to improve the efficiency of agricultural production and the distribution of food and agricultural products, and to better the overall conditions of rural populations. Periodic agricultural censuses are particularly important, as they are the main source of basic quantitative information on structure and other characteristics of agriculture that is needed in development planning, socio-economic policy formulation and establishment of national priorities" (14).

13.7. More recently the World Conference on Agrarian Reform and Rural Development, held in Rome in 1979, recommended that "FAO and other organizations of the United Nations system, in cooperation with Member Nations, develop indicators of agrarian reform and rural development and help collect and analyse pertinent data in order to monitor progress toward respective national targets of rural development" (19).

#### B. HOLDING AND HOUSEHOLD CONCEPTS

13.8. The concepts and definitions of holding and household are of primary importance to the use of household surveys for collecting agricultural statistics. A more detailed discussion on them may be found in (3, 14).

##### 1. *Holding*

13.9. According to the international recommendation, "... a holding, for agricultural census purposes, is a techno-economic unit of agricultural production comprising all livestock kept and all land used wholly or partly for agricultural purposes and operated under the management of one person or more, without regard to title, legal form, size or location. The holding as a techno-economic unit under a single management generally has the same means of production, such as labour, farm structure, machinery or draught animals. The above definition covers practically all holdings engaged in agricultural production and includes livestock holdings with practically no significant agricultural land or for which land is not an indispensable element of production" (14).

13.10. In order to be able to collect information about

the holding, it is necessary to contact the person who operates it, that is, the holder. There are different ways to identify the person(s) who operate(s) the holding. One way is in first identifying the land for which information has to be collected. This can be done on the basis of geographical maps or aerial photographs. The second step is to find out who operates this land. This approach is used in some countries for area samples (for example, the United States of America, Tunisia). It should be noted, however, that some agricultural information can be obtained even without contacting the holder. For example, forecasting crop yields or measuring crop areas can be carried out by using a crop field as a unit, and if no other information is needed there is no need to contact the holder. However, for crop cutting to estimate the crop yield, the holder's permission is usually sought.

13.11. A much more widespread method of identifying the holding in the "traditional" sector of agriculture is by approaching the household. Lists of households are prepared or are already available from a previous household survey or a population census. By adding a few simple questions for each household, such as whether any member of the household operates some land or keeps some livestock, a list of households with agricultural holdings can be obtained. If kinds of crops and the area cultivated are known, a list of crops can also be obtained. This approach is used in the majority of developing countries.

13.12. It follows from the definition that holdings comprise all livestock kept and all land used wholly or partly for agricultural purposes. However, some countries, for practical or operational reasons, set a minimum number of livestock kept, a minimum size in terms of area operated or a minimum value or volume of production. Holdings below these limits are not covered in the censuses and surveys. Although the volume or value of production of such holdings may be of marginal importance to the total output of the country, by this restriction a sometimes significant proportion of small holders is not covered by the census results.

13.13. The FAO Programme for the 1980 World Census of Agriculture recommends (14, p. 17) that the minimum size limit be set as low as possible and, where the holdings below the specified limits are important, they be investigated through special inquiries. Information on smallholders becomes very important in monitoring and evaluating rural development, as was stressed by the World Conference on Agrarian Reform and Rural Development (19).

## 2. Household

13.14. The United Nations definition of household (77) is also used in the FAO Programme for the 1980 World Census of Agriculture (14, p. 22):

"The concept of 'household' is based on the arrangements made by persons, individually or in groups, for providing themselves with food or other essentials for living. A household may be either: (a) a one-person household, that is, a person who makes provision for his own food or other essentials for living without combining with any other person to form part of a multi-person household, or (b) a multi-person household, that is, a group of two or more persons who make common provision for food or other essentials for living. The

persons in the group may pool their incomes and have a common budget to a greater or lesser extent; they may be related or unrelated persons, or a combination of both."

Households usually occupy the whole, part of or more than one housing unit, but they may also be found living in camps, in boarding houses or hotels or as administrative personnel in institutions, or they may be homeless. Households consisting of extended families which make common provision for food, or of potentially separate households with a common head, resulting from polygamous unions, may occupy more than one housing unit. The persons involved in the above arrangements are counted as members of the household. Members of the holder's household also include the holder himself. Care should be exercised not to miss members of the holder's household who are temporarily away, while temporary visitors should be excluded for purposes of compiling statistics on agriculture.

13.15. For the agricultural census a large household with more than one holder may have to be split into separate subhouseholds, each treated separately. For the purpose of collecting data on agriculture in survey programmes, identification of agricultural households is recommended (3, p. 31):

"A household is considered to be an agricultural household when at least one member of the household is operating a holding (farming household) or when the household head, reference person or main income earner is economically active mainly in agriculture."

This definition covers two types of households: those whose member(s) operate(s) a holding (farming households) and those whose head (or main income earner) is economically active in agriculture although he does not operate a holding (non-farming agricultural households).

13.16. The notion of main income earner is introduced because some countries may prefer not to take into account the head of the household when he or she is not the real supporter of the dependants. However, most countries still attach the dependants to the head of the household.

13.17. The recommended definition of agricultural household also covers households of landless agricultural workers as well as members of households of holdings operated by a juridical person. Only a small proportion of households connected with agriculture will not be covered, namely, those households which do not operate a holding or where the head (reference person or main income earner) is not economically active mainly in agriculture. Such cases are very rare in rural areas in developing countries.

## 3. Relationship between agricultural holding and agricultural household

13.18. When household surveys are used to collect data on agriculture, some problems may arise in establishing the relationship between a holding and an agricultural household. Different relations may exist:

(a) One-to-one correspondence between a holding and an agricultural household, that is, one holding only is operated by one agricultural household (or by one or more of its members). This situation is typical in many developing countries. Even if there are exceptions to this relationship,

some countries prefer to ignore them for practical or operational reasons and define an agricultural holding as all land and/or livestock operated by the agricultural household;

(b) Two or more households jointly operate one holding. Such cases are not very frequent, but if they do occur, then there are different possibilities for dealing with them. It is recommended that, whenever an agricultural household is selected in the sample, all other households which jointly operate the same holding be included. In the tabulations of some characteristics of holdings (area, tenure, production and so on), such joint agricultural households should be shown as a separate group or treated as single households. Dividing the area, production and so on of one holding between two or more households would be in most cases impossible. On the other hand, for tabulations of characteristics of the agricultural population, each of the joint households may be treated separately as an individual household. If the relative importance of such cases is great, then a combination of both criteria is recommended to enable detailed studies to be done;

(c) Different members of the same household may operate different holdings. Some countries consider such cases as subhouseholds and tabulate each holding according to characteristics of the members of the subhouseholds only. Other countries define all separate holdings operated by members of the same household as one holding. This situation occurs frequently in some countries where some crop fields are operated by wives independently of other household members. Strictly speaking these fields should be treated as separate holdings, but they are usually considered, for practical reasons, as part of the household's holding.

#### 4. Actual country practices

13.19. In census and survey reports, it has been found that many developing countries use the concept of holding. It is tacitly assumed that the holding is the reporting and tabulation unit. However, in examining the field instructions for the enumerators or interviewers, one finds that in many cases the tabulation unit is the farming household and not the holding. In one African country, for every household (as a whole) a question was asked whether any member operated some land and/or raised livestock. If so, the household was considered as one holding, although it may have operated two or more holdings.

13.20. In another African country, after a household was identified as a farming household, all household members were listed and from this list separate holdings were identified. In the 1970 World Census of Agriculture and Forestry in Japan, the farm household was the listing, reporting and analysis unit. The listing operation in almost all developing countries starts with the list of households, from which either holdings or farming households and non-farming agricultural households are identified.

13.21. The decision of whether the concept of holding or of farming household is more appropriate for a particular country will have to be made by the country itself, taking into account the main objective(s) of the survey and the frequency of cases where a one-to-one correspondence between the holding and farming households does not exist. At the first stage of development of integrated programmes of household surveys for most developing countries, it will perhaps be more convenient to use the

concept of farming household and to disregard the cases where this does not fully correspond to the concept of holding. This will enable the countries to benefit immediately from the household survey system as a means for collecting some agricultural statistics. However, it is recommended at a later stage of statistical development to study further the differences between the two concepts and to base the final decision on the outcome of such study.

#### C. MAIN ITEMS TO BE COLLECTED

13.22. Some of the suggested items are normally included or can easily be included in multi-subject household surveys. These are, among others, items on demographic and social characteristics, such as sex, age, employment and so on, of the agricultural population. Other items may in some cases require specialized surveys, as, for example, area of the agricultural holding, yield and production of crops and the like. Which topics will be included in a survey, how and when will depend on the general programme of household surveys in a particular country, and this, in turn, will depend on the priorities established by the country. The topics to be covered can be divided into three groups:

- (a) Topics on characteristics of individual persons;
- (b) Topics on characteristics of households;
- (c) Topics on characteristics of holdings.

13.23. The FAO document on agricultural population and employment (3) contains a detailed list of topics in the first and second groups, and a list of topics in the third group related to the study of agricultural population and employment. The FAO Programme for the 1980 World Census of Agriculture (14) contains a list of topics recommended for collection in the decennial world agricultural censuses, but most of these can also be collected in household surveys.

##### 1. Topics on characteristics of individuals

13.24. These include:

<i>Topic</i>	<i>Time reference period</i>
<i>Residence characteristics</i>	
Place of usual residence .....	One year
Place of previous residence .....	Fixed date in the past
Apurtenance to a holder's household .....	Point of time
<i>Personal characteristics</i>	
Sex .....	Point of time
Marital status .....	Point of time
Age .....	Point of time
Level of education .....	Point of time
Relationship to a reference person (head, supporter or main income earner) .....	Point of time
Identification of main supporter of a dependent person .....	Point of time
<i>Characteristics of economic activity</i>	
Activity status (current) .....	Short period, for example, one week
Activity status (usual) .....	One year
Category of dependant .....	Point of time
Occupation .....	One year
(a) Main (in which most of the time is spent)	
(b) Secondary	
(c) Subsidiary	
Industry (branch of economic activity) .....	One year
(a) Of main occupation	
(i) in which most of the time is spent	

(ii) which brings major income	
(b) Of secondary occupation	
(c) Of subsidiary occupation	
Status of employment .....	One year
(a) For main occupation	
(b) For secondary or subsidiary occupation if 6.0, 6.1, 6.2 of ISCO (31)	
Economic activity on the holding (agricultural work)* .....	One year
Economic activity off the holding .....	One year
(a) Non-agricultural work in the household enterprise	
(b) Agricultural work on other holdings	
(c) Non-agricultural work outside the household	
Time worked (hours/week) .....	One week
(a) On the holding	
(b) Non-agricultural work in the household enterprise	
(c) Paid agricultural work on other holdings	
(d) Paid non-agricultural work outside the household	
Time worked (days/year) .....	One year
(a) On the holding	
(b) Non-agricultural work in the household enterprise	
(c) Paid agricultural work on other holdings	
(d) Paid non-agricultural work outside the household	
(e) Unpaid work off the holding (labour exchange)	
<i>Other economic characteristics</i>	
Source of livelihood .....	One year
(a) Main source	
(b) Other sources	
Industry of source of livelihood .....	One year
(a) Main industry	
(b) Other industries	
Dependency of livelihood on agriculture .....	One year
Industry (branch of economic activity of the supporter of a dependant) .....	One year
Share of income derived from agricultural industry .....	One year
Type of remuneration for paid agricultural workers .....	One year
Wages and/or salaries per day of agricultural workers .....	Day
Income of each member of holder's household .....	One year
(a) From the holding	
(i) monetary	
(ii) non-monetary (valued at retail prices)	
(b) from other sources:	
(i) monetary	
(ii) non-monetary (valued at retail prices)	

## 2. Topics on characteristics of households

13.25. Most of the topics of this section are derived topics generally obtained through the aggregation or the collation of data corresponding to the individual members of the household. These include:

<i>Topic</i>	<i>Time reference period</i>
<i>Structural characteristics</i>	
Residence status .....	Point of time
Size of household (number of persons) .....	Point of time
Type of household .....	Point of time

\* The terminology "on the holding" in relation to topics on persons or households refers to the holding operated by the person or by one or more persons of the same household.

Number of persons .....	Point of time
(a) Economically active	
(i) economically active in agriculture	
(ii) economically active in other industries	
(b) Not economically active	
(i) independent	
(ii) dependent	
<i>Characteristics of economic activity</i>	
Total time worked (man-hours per week) .....	One week
(a) Work on the holding	
(b) Non-agricultural work in the household enterprise	
(c) Paid agricultural work on other holdings	
(d) Paid non-agricultural work outside the household	
(e) Unpaid work off the holding (exchange labour)	
Total time worked (man-days per year) .....	One year
(a) Work on the holding	
(b) Non-agricultural work in the household enterprise	
(c) Paid agricultural work on other holdings	
(d) Paid non-agricultural work outside the household	
(e) Unpaid work off the holding (exchange labour)	
<i>Other economic characteristics</i>	
Dependency of holder's household on the holding ..	One year
Holder's household income .....	One year
Total income .....	Agricultural year
(a) From the holding	
(i) monetary	
(ii) non-monetary (valued at retail prices)	
(b) From other sources .....	One year
(i) monetary	
(ii) non-monetary (valued at retail prices)	

## 3. Topics on characteristics of holdings

13.26. These include:

<i>Topic</i>	<i>Time reference period</i>
<i>Structural characteristics</i>	
Size of holding in terms of .....	Point of time
(a) Total area	
(b) Agricultural area	
(c) Cropland area	
(d) Arable land	
Size of holding in terms of number of head of livestock .....	Point of time
Sector of agriculture .....	Point of time
Type of holding (destination of output) .....	Agricultural year
Type of holding (crop, livestock) .....	Point of time
Type of holding (degree of specialization of cultivation) .....	Point of time
Type of holding (labour inputs) .....	Agricultural year
Type of holding (level of improved techniques) .....	Point of time
Tenure of land .....	Point of time
Level of mechanization .....	Agricultural year
Use of progressive techniques .....	Agricultural year
<i>Characteristics of economic activity</i>	
Agricultural work (operations) .....	Agricultural year
(a) By members of holder's household	
(b) By hired permanent workers	
(c) By hired occasional or seasonal workers	
Number of permanent workers .....	Agricultural year
(a) Members of the holder's household	
(b) Hired workers	
Total time worked on the holding (work-hours per week) .....	One week
(a) By members of holder's household	
(b) By hired permanent workers	
(c) By hired occasional or seasonal workers	
Total time worked on the holding (work-days per year) .....	Agricultural year
(a) By members of holder's household	
(b) By hired permanent workers	
(c) By hired occasional or seasonal workers	

Total time worked on each of the agricultural operations (work-days per year) .....	Agricultural year
(a) Preparation of the land	
(b) Sowing or planting	
(c) Crop husbandry (care of growing crop)	
(d) Harvesting	
(e) Animal husbandry	
(f) Marketing the produce	
(g) Administration and supervision	
(h) Other	
<i>Other economic characteristics</i>	
Volume of production for each main crop .....	Agricultural year
Volume of sales for each main cash crop .....	Agricultural year
Value of total production (valued at prices of first point of sale) .....	Agricultural year
Value of total sales .....	Agricultural year

#### D. REVIEW OF SOME DEFINITIONS

13.27. This section deals mainly with definitions of certain concepts relating to agriculture. A particular definition based on a certain criterion may be suitable under the conditions prevailing in a country or given certain objectives but not under other conditions or given other objectives. Moreover, if and when more than one objective is to be satisfied and thus more than one aspect of the concept is to be considered, collection of the primary data should be done in such a way as to permit the derivation of the data corresponding to the required aspects of the concept. Relevant concepts and international recommendations on definitions, classifications and time reference periods are given in (3, 14).

##### 1. Size and type of holding

13.28. The size and type of holding are major characteristics investigated in agricultural censuses and in agro-economic surveys not only for their own value but also as characteristics for cross-classification with different characteristics of the holding and, in particular, characteristics of the related population and labour force.

##### (a) Size of the holding

13.29. The concept of size can be defined in a number of ways according to the basis of measurement. It can be measured in terms of area, output, livestock, trees, labour and so on. Moreover, each of these has different facets which satisfy certain objectives but not others.

13.30. The concept of area to be considered could be:

- (a) Total area, which may or may not be satisfactory according to the amount of unproductive land;
- (b) Agricultural area, which includes meadows and pastures and may be more relevant when the holding includes both crops and livestock;
- (c) Crop area or arable land area, one or the other of which could be particularly relevant if the size is to be correlated with the labour inputs.

13.31. The agricultural output can be measured in terms of volume or of value. Moreover, the volume could be the volume of the total production or only the volume of the marketed products (sales), and similarly the value could be the total value of the total production or only the income of the farmer from sales. However, since the volume of production of different crops is not additive, it should be shown separately by crop and only for the main crop or crops.

13.32. Since the numbers of head of different species of livestock are not additive, the use of the total number of head of livestock as a measure of size has no meaning unless only one and the same species is considered throughout or if some kind of conversion table is prepared so as to give the equivalent of the different species to a standard unit. It is still more useful if this livestock standard unit is made equivalent to some land area so that a more comprehensive measure of the size of the holding combining both the area of the holding and its livestock is defined.

13.33. In holdings consisting only of tree plantations, the size of the holding (other than the area) could be the total number of trees or only the number of trees in producing age. However, if the plantation consists of different species of trees of different importance, some conversion table should be established in order to make the number of trees of different species additive.

13.34. The size of labour requirements may also be a measure of size of the holding, except that it varies appreciably with the degree of mechanization. Moreover, in the traditional sector of agriculture, work on the farm is mostly done by members of the holder's household in an irregular and perhaps not very efficient way, and this may decrease the value of such a measure of size.

13.35. If area of the holding is used as a measure of size, then many problems may arise. In the first place the respondent may not know the area which he operates, or he may know it expressed in some local units, which in turn may vary from one region to another. Or the operator may know the time needed for ploughing or the amount of seed. This is typical of the situation in most developing African countries and many developing countries in other regions.

13.36. Direct measurements have been recommended by FAO (6) whenever needed and feasible. It is recognized, however, that direct measurements are a rather costly and time-consuming operation. In many cases, therefore, direct measurements are taken only on a small subsample of fields.

##### (b) Minimum size

13.37. In the censuses of agriculture, especially those carried out on a complete enumeration basis, practical considerations make it necessary to limit the enumeration to holdings above a certain limit of size. Further, most of the agro-economic surveys carried out subsequent to a census use as a frame the results of the census of agriculture and thus do not cover holdings below that lower limit. This results in a situation in which the most vulnerable section of the agricultural population is not investigated at all. It is recommended that such holdings be included in survey listings and subsequently sampled with a small sampling fraction.

##### (c) Type of holding

13.38. From the above review of size of holding it can be seen that the measures of size depend on the type of holding. In the Programme for the 1970 World Census of Agriculture, a particular item on type of holding was introduced. This item covered two of the facets of the concept "type of holding", namely, the concept based on the destination of the agricultural output (mainly for home con-

sumption or mainly for sale) and the concept based on vegetal or animal production. The latter was limited to those holdings which produced mainly for sale. The classification based on the most important activity was: crop holdings, livestock and poultry holdings, mixed holdings and others.

13.39. Because of the discouraging experience of many developing countries in the 1970 World Census of Agriculture in collecting data on type of holding and the lack of agreement on criteria of general applicability, the items on type of holding were dropped in the Programme for the 1980 World Census of Agriculture. The 1980 Programme left it open to countries to collect relevant data on type of holdings according to their own requirements, and countries were encouraged to undertake the necessary methodological research for that purpose.

## 2. Sectors of agriculture

### (a) Private, public and collective

13.40. Holdings operated by a civil person or persons (one or more individuals or one or more households) have very different characteristics from those operated by a juridical person (that is, corporation, co-operative, collective or the like). Moreover, it is also found that the characteristics of holdings operated by juridical persons may still differ widely accordingly to the type of juridical person. Thus, it has been found useful to subdivide agriculture into a number of distinct (non-overlapping) sectors and to present the data separately for each of these sectors. This can be done *a priori*, and the questionnaires and the methods used for collecting the data may differ among the sectors.

13.41. A reasonably simple classification is to subdivide the holdings into the following three sectors:

(a) The private sector, which includes all holdings operated by individuals or households;

(b) The public sector, which covers those holdings operated by a central or local government either directly or through a special body;

(c) The collective sector, which covers the holdings operated by a group of persons who voluntarily or by mandate of the governing authority join together to exercise land rights in common. However, if a member of a collective receives a plot for his own personal use, this plot will be part of the private sector.

### (b) Modern, progressive and traditional

13.42. Another classification of agricultural holdings is based on the importance of the holding and the degree of utilization of advanced agricultural techniques. In this classification, the holdings are subdivided into modern, progressive and traditional. Such a classification is very useful, especially in stratified sample surveys of holdings with different sampling fractions for the three sectors. However, no simple definition specifying the exact limits of the different sectors can be given. Attempts have been made to define these sectors along the following lines.

13.43. Holdings in the modern sector (sometimes called estates, agricultural establishments or simply large farms) have to conform to certain recognized criteria. These criteria are based on:

- (a) Size of the holding—Above a certain fixed limit;
- (b) Destination of the products—For sale;
- (c) Labour inputs—Use of paid permanent workers;
- (d) Mechanization—Use of important machinery and equipment;
- (e) Organization—Bookkeeping records of activities, inputs and output.

13.44. Holdings in the progressive sector conform to some of the above criteria but not all. They are of a moderately large size, they produce mainly for sale but some of the produce is for home consumption, and some mechanization and modern agricultural techniques have been introduced in the operation of the holding. Holdings in the traditional sector are generally small in size, produce mainly for home consumption, do not employ or only occasionally employ paid labour, and use simple agricultural implements.

13.45. From the above it can be seen that the definitions are rather vague. Thus, they are differently interpreted by countries, which quite often use only the dichotomy modern/traditional farming or commercial/subsistence farming. To achieve more precise data, it is very useful if the distinction between the different sectors is done *a priori* in the organization of household surveys and they are considered as different domains of study with perhaps different questionnaires and different methods of collecting the data. It is recommended that at least the so-called modern sector, whatever the definition used by the country, be identified, that a separate list of the farms belonging to it be established and that a larger sampling fraction (or the totality) of these farms be investigated.

13.46. It is clear from the above classification of sectors that household surveys will be a suitable means for collecting information only from the private sector of agriculture. Concerning the classification by modern and so on, it should be noted that it is possible to collect information on modern, progressive and traditional sectors through household surveys. However, since by definition holdings in the modern sector keep records of their activities, it is more convenient to collect data from them separately, either by interview or by mail inquiry.

## 3. Agricultural population

13.47. The concept of agricultural population covers different groups of individuals according to the criterion used to identify the members of the group. In the past, different agencies collecting data on agricultural population used different definitions of agricultural population. Thus, the statistical data on agricultural population were not comparable or coherent. In order to remedy this situation, different groups were given different names. These, however, were not always well adapted to their purposes. In what follows, the two concepts of rural population and farm population are reviewed and two other concepts, namely, agricultural population (activity criterion) and agricultural population (income criterion), are proposed.

### (a) Rural population

13.48. There has been no internationally recognized definition of rural population or rural areas nor of its complement, urban population or urban areas. Each country

decides for itself what it considers to be an urban area; the remaining area is then defined as rural. Lack of an international standard is unfortunate but cannot be fully remedied.

13.49. Up to the present time in many developing countries, rural area and rural population were considered to be agricultural and the so-called rural population was assumed to be equivalent to agricultural population. However, in a number of countries, the difference between rural and agricultural populations is now being taken into account in socio-economic surveys by subdividing the households into four groups: rural agricultural, rural non-agricultural, urban agricultural and urban non-agricultural households.

(b) *Farm population*

13.50. The concept of farm population has been based indifferently on one or another or a combination of two different criteria: the criterion of residence and the criterion of appurtenance to a holder's household. In what follows, the term "farm household" will be restricted to the residence concept rather than the definition given in the 1970 and preceding agricultural census programmes, while for the population of a holder's household the term "farming household" will be used.

13.51. In a number of censuses of housing, a question based on the residence criterion was asked, namely, "Is the dwelling situated on a farm?". For the 1980 World Census of Agriculture, the census information on the population, based on the second criterion, is restricted to holders and members of their households. On the other hand, for the previous world censuses of agriculture, the concept of farm population was based on both criteria. The farm population included the members of the holder's household, whether or not they resided on the holding, and also all other persons living on the holding.

13.52. The concepts of rural population, of farm population and of population of farming households should not be confused with the concept of agricultural population. In fact, the farm population in whichever way it is defined and the farming population both include persons active in other branches of economic activity and also inactive persons who do not depend for their livelihood on the agricultural industry. Moreover, they do not cover all persons who depend for their livelihood on agriculture.

(c) *Agricultural population (income criterion)*

13.53. This variant of the concept of agricultural population is based on the criterion of main source of income. The definition is as follows:

"The agricultural population consists of all the persons who derive their main income from the agricultural industry and their dependants."

Here again, as for the preceding concept of agricultural population, the definition can be taken in a limited sense and cover only agricultural and livestock production (ISIC Major Group 111), or it can be extended to cover the totality of agriculture, hunting, forestry and fishing (ISIC Major Division 1, see 69).

(d) *Recommended definition of agricultural population*

13.54. For purposes of regional and international comparability, the most suitable definition which might be

recommended for universal use is based on the usual kind of economic activity (industry) as follows:

"All economically active persons engaged mainly in the agricultural industry (ISIC Major Group 111) during the reference year, irrespective of where they live or work, and their dependants."

Detailed discussion of these definitions with recommended classifications may be found in FAO publications (3, 14).

E. SOURCES OF DATA

13.55. In this section the principal sources of data on agriculture and possibilities of supplementing them by household surveys are reviewed.

1. *Census of agriculture*

13.56. One of the most important sources of information on structural characteristics of agriculture is the decennial census of agriculture. Relatively few countries take the census every five years or annually. In many developing countries the main listing unit for agricultural censuses is the household. Also the primary reporting unit of observation and the unit of analysis and tabulation is in many cases the farming household as defined in section B above.

13.57. Because of the high cost of an agricultural census, few countries can afford to carry out a complete enumeration every 5 or 10 years. In annex table 2, the number of countries which intend to take the 1980 census of agriculture is shown by type of enumeration (complete enumeration census, sample survey or a combination). Many developing countries take a sample of holdings in the traditional sector and enumerate completely holdings in the modern sector. The main advantage of complete enumeration censuses is that they provide data at the lowest administrative level and auxiliary data for subsequent samples.

13.58. Taking into account the rather long period between censuses (5 or 10 years) and also considering the time needed for processing and tabulation of data (the final census results are often published more than two years after the actual census taking), it is clear that the ever-increasing demands for timely data cannot be met by censuses alone.

2. *Agro-economic sample surveys*

13.59. These sample surveys may serve different purposes. In many developing countries they replace the complete enumeration census. In others they supplement on a yearly or shorter basis the data collected through the decennial or quinquennial censuses. Other uses of sample surveys of this kind connected with censuses are pilot studies which precede the census, coverage checks, quality control, preliminary tabulations from census records and so on. Agro-economic sample surveys cover a wide range of subjects and are often of a multi-subject type with a variety of objectives.

13.60. Here again the household is the main listing unit and in many cases where a one-to-one correspondence between agricultural households and holdings exists, it is also the main tabulation and analysis unit.

### 3. Other sources of data

#### (a) Registers

13.61. Farm registers in some developed countries, for example, Denmark, Sweden and Australia, are an important source of information on basic characteristics of agricultural holdings. Since the registers are established mainly for non-statistical purposes and financing is oriented to their principal functions, statistical uses are only secondary. Data from registers provide information at the lowest administrative levels, but usually they do not contain all the needed data. They are frequently used as a sampling frame for sample surveys carried out to obtain the needed detailed data. More recently information from farm registers is being stored on magnetic tapes and discs and therefore it is more readily accessible.

13.62. Also in this category are cadastral (land use) registers, which are used where available as a main source of information on land area and use. These registers are very useful sources of relevant data for monitoring the changes in land tenure, an important topic in analysing the effects of agrarian reforms.

#### (b) Administrative reports and/or records

13.63. These provide a variety of information on agriculture in many developing countries. Agricultural extension workers and agricultural agents report at prescribed regular intervals on area sown, area harvested, estimated yield and production, crop diseases, agricultural inputs (fertilizers, pesticides and the like), the use of machinery and so on. Veterinary officers report on the number of animals vaccinated, from which an estimate of livestock numbers is obtained.

13.64. To this category of sources also belong records of customs offices on imports and exports of agricultural commodities and records from government boards dealing with particular industrial crops (coffee, cocoa, maize and so on), including their production, marketing and prices. The accuracy of these reports varies greatly, but they are an inexpensive source of data, being a by-product of the regular activities of these agencies.

#### (c) Community data

13.65. To fill the gap in data on small areas, more recently emphasis is being given to the collection of information at the village (locality or community) level. This information is kept in the form of village files at the village level or stored on magnetic tapes or discs for ready access and updating in the central office. Topics usually contained in village files include number (or sometimes lists) of households, total population by sex, age and main occupation, area cultivated by crops and so on. Information on access to roads, health facilities, availability of drinking water, access to agricultural services and the like is also collected.

#### F. INTEGRATION OF AGRICULTURAL STATISTICS WITH HOUSEHOLD SAMPLE SURVEYS

13.66. With proper organization household surveys can provide data on many aspects of agriculture. In this section possibilities of integrating some agricultural data on the traditional sector with household surveys are discussed.

13.67. Use of household lists for identifying agricultural holdings was already discussed in paragraph 13.11 above. As was mentioned there, agricultural censuses often set a limit for including an agricultural holding in enumeration. In such cases smallholders and agricultural households with no land are not covered. By adopting the agricultural household as a unit of observation and analysis, smallholders below the specified size limit and agricultural non-farming households will also be covered. These households are of special interest in identifying the rural poor and an important source of data needed for developing strategies and plans for improvement of the levels of living of the population (19, p. 3).

13.68. The topics that will be covered by a particular household survey depend on the main subject of the survey. Topics on agricultural population and employment can be conveniently collected in a household employment survey. Topics on land use, agricultural production, inputs and the like can be collected in a household economic survey. Since most households in developing countries are agricultural households, any nation-wide household survey in these countries will provide some data on agriculture or agricultural population.

13.69. As was mentioned in paragraphs 13.56 to 13.58, censuses can provide useful information needed for subsequent sample surveys. Agricultural censuses can provide measures of size for smaller administrative units such as area cultivated, number of persons engaged in agriculture and so on. Maps of enumeration areas prepared for the census can also be used for designing household surveys in rural areas, provided that they are kept up to date.

13.70. Household surveys can supplement an agricultural census by providing more diverse and detailed data. For example, an agricultural census will normally not provide data on landless households engaged in some agricultural activity, but this information can be obtained through household sample surveys. In addition, data on employment and time use in agricultural activities are not covered in much detail in the censuses, and supplementary information can be obtained through household surveys.

13.71. For some items it is difficult to completely integrate agricultural surveys with household surveys because of operational difficulties. A typical example is crop area and yield surveys. In most developing countries in Africa and some countries in Asia, the farmers do not know the areas of land operated, cultivated and harvested. In such cases direct measurements of areas have to be carried out on a sample of holdings or on a subsample. In either case this is a time-consuming procedure (see also 6, pp. 35 ff.), and it may not leave enough time to the enumerators to collect other data. For this reason it is more practical to organize a special survey for direct measurements of area using farming household as a unit perhaps every five years, and supplement the data through interviews in the annual household surveys on a subsample basis in order to measure changes in areas. These changes are very important in most African countries where shifting cultivation prevails and where operated area is, in fact, equal to cultivated area. In these cases, the size and location of the cultivated areas change from one year to another. For further details on measurement techniques and related problems, see (6). A new manual on estimating crop areas and yields is in preparation in FAO.

13.72. Usually household sample surveys will provide

only estimates at national and regional levels, seldom at lower administrative levels. There are increasing demands for data on small administrative units, and these cannot always be met by relatively small-size surveys. Here again a combination of data from different sources with household surveys may help. Special techniques have been developed for estimates for small areas using a combination of census data, large-sample data, data from administrative registers and the like. (For more details, see 6 and the references listed there.)

13.73. Another possibility of obtaining data for small areas is to use a rotating sample design. For characteristics that do not change very rapidly, 1/50 of units (or if this is not feasible, a smaller fraction, 1/100 or 1/200) could be used in yearly rotation, which will give in five years averages for 10 per cent of the units. This is sometimes more than a developing country could afford in a quinquennial or decennial sample census. (For more detailed discussion, see 358.)

13.74. It is recommended, when organizing a household survey, to separate from the start households associated with agriculture from other households. It is especially recommended to treat as a separate domain of study those households whose members operate a holding (farming households—see also 3, paras. 101-107). These can then be shown in the tables as a separate group, but linkage with other non-farming households will still be possible.

13.75. Since in rural areas of many developing countries most of the households are farming households, a common questionnaire for all households can be used, containing questions on the characteristics of the holding. This approach was used in the 1970 World Census of Agriculture and Forestry in Japan (173) and in the Integrated Rural Survey in Kenya, 1974-1975 (175). In urban areas where farming households are the exception or relatively few, specific questionnaires can be added to the main questionnaire for those households which are so identified.

#### G. NATIONAL CENSUSES AND SURVEYS USING THE HOUSEHOLD AS A UNIT

13.76. In this section, a brief description is given of some agricultural censuses and surveys which have used the household as the reporting and tabulation unit.

##### 1. *National Integrated Sample Survey Programme in Kenya*

13.77. The collection and analysis of data needed for development planning and monitoring the existing state of the economy is largely the responsibility of the Central Bureau of Statistics of the Ministry of Economic Planning and Development. The Central Bureau of Statistics commenced the creation of a permanent survey capability in the mid-1970s. The first five-year programme of surveys, during which a continuous survey capability was achieved, was entitled the National Integrated Sample Survey Programme (NISSP).

13.78. The main feature of NISSP was the Integrated Rural Survey, conducted in four rounds, each covering an agricultural year, from 1974 to 1979. These surveys covered a wide range of demographic, agricultural and socio-

economic characteristics. In addition, studies of special topics were included in the rural surveys, such as marketing of food commodities, crop forecasting, nutritional status, literacy, housing and water supply. More details can be found in the report of the 1974/1975 rural survey (175).

13.79. During the second half of 1979, a second phase of the programme was prepared, entitled the National Sample Survey and Evaluation Programme, 1980-1984. A report on this phase is in preparation. As an illustration of the possibility of cross-tabulation of data by holdings and households, a few tables from the 1974/1975 report are reprinted in annex table 2 at the end of this chapter.

##### 2. *1975 integrated census of population and its economic activities (phase II)—the Philippines*

13.80. In 1975 an integrated population census was undertaken in the Philippines, consisting of two phases. In the first phase, data on socio-demographic characteristics of the population were collected on a complete enumeration basis. A sample of households was then selected in order to collect data on the economic activities of persons 10 years old and over in farming or gardening, livestock and poultry raising, fishing, manufacturing, processing and so on.

13.81. The following topics on agriculture were covered: area of farm or garden operated, tenure of farm, area planted, production and disposal of produce, cost of operation and other expenses, farm equipment and facilities used, livestock and poultry (number, quantity consumed, quantity sold, cost of operation and so on), fishing, including off-shore or deep-sea fishing operated by households, fishing equipment, quantity and value of catch.

##### 3. *National Sample Survey in India*

13.82. The National Sample Survey was started in India in 1950 to collect comprehensive socio-economic data relating to different sectors of the economy. The thirty-second round was carried out in 1977/1978. This round covered both urban and rural areas, and the main topic was employment. Other items covered were usual and weekly activity of household members of ages five and above, cash expenditure and consumption of food, tobacco, fuel and light.

13.83. For rural labour households, both agricultural and otherwise, additional information on the type of agricultural operations and other work performed during the reference week was collected. Information on the usual activity during the past year was also collected. Data on land area possessed by the household, land tenure and area of cultivated land were collected where appropriate, that is, for households with land.

13.84. All households were classified among five categories:

(a) Households self-employed in non-agricultural occupations. These were defined as those deriving more income from non-agricultural sources than from either rural labour or other sources;

(b) Agricultural labour households, defined as those which earned more than 50 per cent of their total income during the past year from wage-paid manual labour in agriculture;

(c) Other labour households, defined as those which earned 50 per cent or less from wage-paid labour;

(d) Households self-employed in agricultural occupations, defined as those which earned more than 50 per cent of their total income from self-employment in agriculture during the past year;

(e) Other households.

It may be seen that these definitions differ from those recommended by FAO (3). However, from the tables it is possible to separate agricultural holdings, farming households and other agricultural households from other holdings, according to FAO recommendations.

#### 4. The 1970 World Census of Agriculture in Japan

13.85. The 1970 World Census of Agriculture and Forestry in Japan is an example of combining different observation units in one survey. As can be seen from annex table 3, reproduced from the 1970 census report (173), the survey of farm households provided information on the composition of the household, working conditions of household members, land and its utilization, livestock, sericulture, agricultural machinery and so on. In addition, a survey of holdings other than households was conducted, for co-operatives, joint holdings, companies and so on.

13.86. A survey of rural communities was also conducted for all agricultural rural communities, providing information on each community's composition and function, production environment, life environment, co-operatives and the like. The forestry sector was covered by interviewing agricultural and forestry households and other forest holders, by using the same questionnaire as for farm households.

#### 5. Practices in some countries

13.87. In the 1971 agricultural census of Iraq, agricultural holding was the unit but households of hired workers were also included for some items. In Afghanistan in the 1969/1971 agricultural sample survey, households were used as enumeration units. In the Syrian Arab Republic in the 1970 Census of Agriculture, agricultural

holding was used as an enumeration unit. The list of holdings was obtained through the household list from the population census. In Benin, the agricultural household was the unit of enumeration in the 1976/1977 agricultural survey.

13.88. In many cases in the developing countries, where the census report refers to the "holding" as a unit, it may be seen from the field instruction manuals and other documents that the main listing unit was the household (Liberia, the Niger, the Upper Volta) or the extended household (for example, compound in Senegal), and by interviewing the household heads a list of holders or, alternatively, farming households was obtained.

13.89. In the Philippines, the main unit is the farming household for the crop and livestock surveys and the household for the food consumption survey. In the first round of the Household and Village Survey in the United Republic of Tanzania in 1980, a household questionnaire was used which covered most of the relevant agricultural topics for farming households. The FAO publication on national methods of collecting agricultural statistics (12) gives a detailed review of different country practices.

### ANNEX

#### Selected information on national experience in agricultural censuses and surveys

TABLE 1. NUMBER OF COUNTRIES REPORTING VARIOUS METHODS OF AGRICULTURAL CENSUS-TAKING, BY REGION

Region	Complete enumeration <sup>a</sup> (a)	Sample enumeration (b)	Combination of (a) and (b)	Total
Europe .....	10	—	7	17
North America .....	1	—	1	2
Latin America .....	10	—	9	19
Near East .....	5	—	7	12
Asia and Far East .....	1	2	5	8
Africa .....	1	11	11 <sup>b</sup>	23
Oceania .....	5	1	—	6
TOTAL	33	14	40	87 <sup>b</sup>

Source: 1980 World Census of Agriculture, Census Bulletin No. 1. FAO, Rome, 1979.

<sup>a</sup> Complete enumeration refers in most cases to the modern sector of agriculture.

<sup>b</sup> Excluding two countries for which filled-in questionnaires were not available.

TABLE 2. DATA FROM THE INTEGRATED RURAL SURVEY, KENYA, 1974

#### A. Percentage distribution of holdings by holding size group and household income group

	Less than 0 K. Shs.	0-900 K. Shs.	1,000-1,999 K. Shs.	2,000-2,999 K. Shs.	3,000-3,999 K. Shs.	4,000-5,999 K. Shs.	6,000-7,999 K. Shs.	8,000 K. Shs. and over	Percentage total
Below 0.5 hectares .....	14.00	24.61	11.53	16.50	15.74	11.30	10.68	8.15	13.91
0.5-0.9 hectares .....	11.85	23.51	24.12	16.25	14.45	19.97	6.56	14.76	17.92
1.0-1.9 hectares .....	26.86	24.90	31.12	24.13	29.60	26.88	23.90	24.33	26.99
2.0-2.9 hectares .....	19.64	13.28	14.44	13.80	21.07	15.58	9.60	14.41	15.11
3.0-3.9 hectares .....	9.75	8.65	5.58	12.82	6.38	7.91	15.85	9.28	8.89
4.0-4.9 hectares .....	4.84	0.52	7.46	7.47	7.50	4.61	16.38	11.58	7.22
5.0-7.9 hectares .....	11.74	1.67	3.18	4.68	3.35	11.51	12.37	10.14	6.50
8.0 hectares and over .....	1.35	2.86	2.57	4.35	1.91	2.24	5.65	7.36	3.47
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Number of holdings .....	98 982	175 057	322 813	204 972	174 002	200 501	117 919	179 176	1 483 422

TABLE 2 (continued)

## B. Percentage distribution of holdings by holding size group and household size group

	1 member	2-3 members	4-5 members	6-7 members	8-10 members	11-15 members	16 members and over	Percentage total
Below 0.5 hectares .....	8.81	15.32	14.53	15.33	13.83	10.94	13.01	13.91
0.5-0.9 hectares .....	13.90	28.58	17.60	19.12	14.14	13.66	12.92	17.91
1.0-1.9 hectares .....	46.54	18.94	31.79	25.83	25.17	28.83	20.03	26.99
2.0-2.9 hectares .....	19.89	12.03	12.36	18.31	15.19	16.29	9.51	15.11
3.0-3.9 hectares .....	6.34	4.31	10.25	6.89	11.85	11.17	10.06	8.89
4.0-4.9 hectares .....	0.03	14.17	7.37	5.47	6.67	4.63	12.36	7.22
5.0-7.9 hectares .....	3.90	4.41	3.44	5.95	8.88	8.51	16.59	6.50
8.0 hectares and over .....	0.60	2.25	2.66	3.10	4.27	5.97	5.53	3.47
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

## C. Percentage distribution of holdings by number of parcels and holding size group

	Below 0.5 hectares	0.5-1.0 hectares	1.0-2.0 hectares	2.0-3.0 hectares	3.0-4.0 hectares	4.0-5.0 hectares	5.0-8.0 hectares	8.0 hectares and over	Percentage total
Single parcel .....	49.52	64.57	66.91	74.18	57.81	64.57	56.23	67.51	63.52
2 parcels .....	34.76	26.46	23.93	15.07	30.13	13.00	24.10	14.72	24.01
3 parcels .....	8.51	6.18	6.17	7.94	9.56	16.57	5.49	8.10	7.84
4 plus parcels .....	7.21	2.79	2.99	2.81	2.50	5.86	14.19	9.66	4.64
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

TABLE 3. DATA FROM THE CENSUS OF AGRICULTURE AND FORESTRY, JAPAN, 1970 (324)

## Number of farm households that owned or held individually agricultural machinery and number of machines owned

Size	Power cultivator—Tractor								Unit: Holdings			
	Total		Under 5 horse power		5 and under 10		10 and under 15		15 and under 20			
	Number of farm households	Number of machines	Number of farm households	Number of machines	Number of farm households	Number of machines	Number of farm households	Number of machines	Number of farm households	Number of machines		
Total .....	2 909 187	3 329 568	994 983	1 037 896	1 962 278	2 031 119	196 363	198 123	32 650	32 752		
Exceptional provisions .....	455	518	234	247	231	243	18	19	5	5		
Under 0.3 hectares .....	98 768	100 528	53 922	54 274	43 610	43 759	2 208	2 216	187	192		
0.3 and under 0.5 .....	288 528	297 676	132 477	134 122	153 958	154 777	7 866	7 894	603	606		
0.5 and under 1.0 .....	1 042 123	1 125 264	389 516	401 955	669 104	679 168	39 688	39 876	2 923	2 936		
1.0 and under 1.5 .....	749 649	876 116	238 017	252 298	552 694	573 030	44 523	44 846	4 032	4 051		
1.5 and under 2.0 .....	372 277	463 657	106 656	114 598	290 263	307 369	34 739	35 023	4 508	4 516		
2.0 and under 2.5 .....	162 728	210 123	41 425	44 787	126 692	136 307	22 288	22 468	4 453	4 465		
2.5 and under 3.0 .....	71 107	93 641	15 961	17 372	53 042	57 666	23 085	13 207	3 586	3 593		
3.0 and under 5.0 .....	79 045	103 886	13 287	14 431	52 323	56 803	19 869	20 141	7 145	7 153		
5.0 hectares and over .....	44 505	8 159	3 488	3 812	20 361	21 997	12 069	12 433	6 208	5 236		
Number of machines owned or held jointly by farm households .....	—	118 202	—	22 478	—	66 318	—	15 544	—	4 828		
Agricultural holdings other than farm households .....	2 169	4 029	378	575	797	1 122	265	280	227	227		
Total of agricultural holdings .....	2 911 356	3 451 799	995 361	1 060 949	1 963 075	2 098 559	196 618	214 051	32 877	48 852		

## XIV. HEALTH

14.1. Every country, whatever its stage of social and economic development, needs quantitative information on the health status of its population, the utilization of health services and socio-economic and environmental factors affecting health. This information is a basic requirement for planning, management, and evaluation of health services in the country and for monitoring the health status of the population. Depending on its intended uses, this information may be needed at the national, regional or local level. In some countries, some of this information may be routinely generated by the health services. In others, the health services may be so rudimentary as to provide no opportunity for the generation of such data. In addition, even with the most complete and efficient organization of routine administrative statistics in the health services there are usually significant gaps in the data. For example, health services can usually generate data referring only to users of the health system. Information on non-users, and in particular on their characteristics and reasons for non-utilization, can only be derived from other sources.

14.2. Thus, even where administrative data generated by the health system serve a large part of the health and related information needs of the country, it is necessary to collect data using other sources as well. Important factors influencing health and health planning which are outside the scope of statistics generated by the health services include such socio-economic variables as age-sex distributions, nutrition, employment, and household size and composition. These are only some examples of information necessary for the proper understanding of health. While health statistics should be closely integrated with related fields of socio-economic statistics, this chapter will concentrate on those issues which deal with data directly concerning the health sector. Where information from other sectors enters into consideration, reference will be made to the appropriate chapter of the present *Handbook*. The strategic importance of national multi-subject household surveys for providing data on health when substantial proportions of the needed health-related information must come from non-health fields should be kept in mind. Specific applications of the multi-subject approach will be considered in the following sections.

14.3. In order to provide a framework for dealing with the issues of health data needs and health data sources and to examine the place of household surveys in providing for these needs, the concept of a health information system will be introduced. Since the purpose of a health information system is to aid in planning and management of the health services required by the population, it provides guidelines for the population-based data needed for these activities. It also points up the need for population-based, problem-oriented data, defined in operational terms and directed to the appropriate decision levels of the health system.

### A. HEALTH INFORMATION SYSTEMS

#### 1. Conceptual framework

14.4. A health information system can be defined as an ensemble of mechanisms for the collection, processing, interpretation, and dissemination to appropriate users of information required for the planning, organization, operation, and evaluation of health services, and for research and training purposes. In such a system emphasis is placed on the collection of data in a timely fashion to serve specific needs at local, regional or national levels. The collection and dissemination of the data are seen as being task- or action-oriented. For example, information for health planning at the national level is of a different nature and is required at different time intervals than is the information required for management of local health services.

14.5. The information needs of a health system depend in part upon the size and complexity of the system. If health planning is carried out at the national level there are likely to be demands for greater amounts of data on long-term potential health requirements (for example, future demands for services, future supply of health workers, changes in population structure) than if planning were not carried out or were restricted to regional or local levels, or if short-term decisions were taken at the management level. At present there is no country in which a completely integrated and comprehensive health information system is fully functional. However, many countries are increasingly making use of the concept as a means of rationalizing the functioning of their health statistical services.

14.6. There are six basic fields in a health information system which are seen as important in meeting the needs of planners and managers of health services and in aiding health service research and training. These are (143):

(a) Statistics of the state of health of the population, such as mortality, morbidity and disability data in varying detail, and various physiological and psychological parameters;

(b) Measurements of the need for and utilization of health services—the use of hospitals, maternal and child health care centres, primary health care centres, and the like;

(c) Statistics on available resources, such as health manpower and its distribution; availability, accessibility and acceptability of available health services and facilities; and financial resources;

(d) Social, demographic and economic data on the population;

(e) Environmental data, for example on natural risks and dangers created by pollution;

(f) Outcomes of various preventive and curative measures.

14.7. Even in the most highly developed information systems there are large gaps in the availability and quality of data relating to these six elements. Much data may be collected from routine sources designed for other purposes, but very often they are incomplete or inappropriate for services evaluation and planning. Thus, the collection of mortality statistics may be mostly oriented to legal requirements and the cause of death recorded may be problematic. Hospital statistics seldom include information on ambulatory (outpatient) care. Cause-specific morbidity data are often non-comparable because of lack of standardization of diagnoses. Data from the records of health centres, dispensaries, or private physicians are often inaccessible and very sketchy. Moreover, in many developing countries even the most rudimentary sources of routine health information are lacking.

## 2. Data needs for a health information system

14.8. One of the functions of health statistics is to measure the extent, distribution and nature of ill health, to measure the way in which ill health is translated into demands for health services, and to provide data on the ways in which health services respond to these demands. The totality of these data may be thought of as serving three separate needs:

(a) For planning health strategies at national or regional levels directed at morbidity (ill health);

(b) For the management and evaluation of health programmes which have been designed to meet goals set in (a);

(c) For identifying relationships important for research into the etiology of health problems.

14.9. The type of data needed, its sources, and the uses to which it may be put depend upon which of these three uses is to be served. The needs for planning, management and research may be met by different means and the multi-subject household survey has a role of varying importance in meeting the data needs for each. Each will, therefore, be dealt with in turn, identifying first the data needs of each group, assessing the overlap in data needs where they occur, and finally indicating the way in which the separate and common needs can be met from various sources in terms of routinely collected health data and in terms of sample surveys of varying degrees of complexity.

### (a) Needs for health planning

14.10. Health planning must be based on a broad range of properly collected, analysed and interpreted health data. These indices or indicators must be problem-oriented and population-based. If in addition they can be related to persons and events and can be cross-classified according to demographic and socio-economic characteristics, other social indicators, and place of residence, their usefulness to the health planner will be greatly enhanced (134).

14.11. In the area of morbidity statistics, health planners are generally interested in measuring those morbid conditions which can be related to specific populations, correlated with other characteristics of the population and the environment, and which translate into the needs and demands for health services. The exact diagnostic categories of disease need not be established precisely. Instead

emphasis is placed on the impact that morbidity will have on the health needs and behaviour of the population. Thus, data on functional aspects of health, the perceived or real needs of the population for health services based upon dysfunction, and the socio-economic consequences of dysfunctions are the health planners' primary needs for morbidity data. Data for morbidity in terms of various nosological categories (such as cause-specific mortality rates) are also of importance in defining the major health problems of a country, but for planning purposes the desired accuracy of the diagnosis is much less than that needed for health management and research. In some cases a ranking of most important morbid conditions and/or mortality causes will suffice in order to establish priorities for resource allocations.

14.12. Data on utilization of health services are necessary for planning in order to establish where and to what extent gaps in unmet needs and/or demands exist which should be filled by the provision of health services. For planning purposes it is usually necessary to have data on the characteristics of both utilizers and non-utilizers and to be able to relate utilization patterns to health needs, both perceived and medically verified.

### (b) Needs for health services management

14.13. Health services management generally requires information for three purposes (382). First, data are needed for monitoring the functioning of health services. This primarily involves defining the goals of the health system in terms of resources committed and results forthcoming and seeing what is being done, to whom it is being done and at what cost in resources. Second, data are needed to evaluate the functioning of the health system by a regular and systematic comparison of the care provided by the system with the needs or demands of the population being served. Finally, research is required on ways to improve the delivery of health care.

14.14. Monitoring and evaluation may be thought of as continuing activities built into the health system, while research is more of an *ad hoc* response to specific needs, taking into account the specific interests and capacities of the researchers. The data needs for monitoring are primarily concerned with measuring coverage of the health system, for example, the proportion that benefits from a specified health care activity or a total population that should benefit from that activity (145). Knowledge of morbidity patterns is often necessary to evaluate the denominators of these rates since the denominator group consists of persons having a particular health status, for example, pregnant women who also have iron deficiencies, and at whom a specific activity is aimed.

14.15. Evaluation, as defined above, involves examining changes in health conditions in relation to those resources brought to bear on them by the health system. An important condition is, of course, change in the level of the health status of the population as measured by changes in morbidity in specific parts of the population. Here the morbidity information needed is likely to be biomedically oriented, as distinct from the more socially oriented morbidity measures needed by the health planner. Where specific measurements have been made in order to deal with individual health problems, precise measures of the impact of the health intervention measures are needed. Thus, a vitamin supplementation programme for young children

must be evaluated in terms of changes in the specific morbidity conditions which are due to vitamin deficiencies, such as marasmus, kwashiorkor or keratomalacia. The health planner in the same situation might be content to examine changes in mortality rates for all children under five years of age over a relatively long period of time. Health services management also needs breakdowns in morbidity rates by other variables which may influence, or be influenced by, the functioning of the health system. Information for administrative subareas will almost certainly be needed, while various socio-economic and demographic correlates will also be important in the interpretation of changes brought about in health services. Some of these data may be routinely generated by the health care system or be otherwise available from population registration schemes, but other variables may only be known and correlated with morbidity on the basis of surveys.

### (c) Needs for research and training

14.16. Research needs for morbidity data on a population basis tend to be based upon precisely defined medical criteria. Here the goals tend to be more scientific than administrative, with precisely defined hypotheses to be tested. Even though the questions to be answered will relate to a whole population (as opposed to small clinical studies which are commonly restricted to selected populations) and the results will be used to answer questions important for management and planning purposes, the emphasis will be on *ad hoc*, highly focused studies, using precise diagnostic definitions of morbid conditions. In most cases it is unlikely that research needs for morbidity information can be met by data routinely generated by the health system or other sectors. Nor will data collected by laymen not especially trained in complex measurement techniques be capable of providing the desired information. In short, specially designed and necessarily more costly surveys will probably be needed to meet the special data requirements of these research studies.

### 3. Data sources of health information systems

14.17. There are, generally speaking, two main sources of data available to health information systems:

(a) That routinely generated by the health or other administrative sectors;

(b) Population based data specially collected either within or outside of the health sector.

In the latter category, household interview surveys are included. Routine administrative data will be dealt with briefly below, while population based data sources will be more fully considered, particularly where household surveys are involved.

#### (a) Routine administrative statistics

14.18. These are data which arise from the functioning of the health services sector. They are for the most part based on records kept by the health system itself, for example, utilization of hospital or other medical services, or queries to various entities of the health system on the health status of those persons coming into contact with them, for example, morbidity data derived from hospital inpatient and outpatient records, or records from doctors' practices. Other sources of morbidity data may be registration systems for various diseases where registration is

either mandatory or has been set up for other administrative or epidemiological purposes. Data from medical insurance and other social security plans also fall under this heading.

14.19. Data on health workers and health facilities are usually available from the health system itself or from other legal registration systems. Where there are licensing regulations for certain categories of health workers, information is recorded for regulatory purposes. For other categories of health workers, listings may not be readily available centrally and sometimes sampling of decentralized records is the most efficient way of estimating the size of certain categories and their distributions in the population. Listings from which information can be obtained are in all cases derived from the health provision system rather than from the general population. Whether complete enumerations or samples are used depends upon costs, details of health worker characteristics needed and administrative convenience. In any case these information sources do not involve sampling of the general population and will not be further considered here.

14.20. With all of the sources mentioned above, there are problems in identifying the population at risk. While these sources do have the advantage of providing continuous data, these data are often related more to utilization of health care facilities than to actual morbidity. Changes in morbidity rates over time are difficult to interpret since they may reflect only changes in utilization of health facilities. Thus, even when the coverage of a record system is virtually complete for a country's population, as is the case for many health insurance plans, the numerator data refer only to those whose morbid condition led them to use the health care facilities covered by the health insurance scheme. Similarly most record-based systems do not provide the wealth of detail on other characteristics needed to interpret meaningfully the morbidity rates derived from the system. Data relating to an individual's demographic, socio-economic and household characteristics are often unavailable from administrative sources, or if available may be incomplete or inconsistent with other sources in important respects.

14.21. When health planning is carried out only on a national level, administratively collected statistics may meet some of the health planning information needs, providing the health sector is generating the necessary data and there is some correspondence at the national level with complementary data from other sources. At the regional and local levels, planning based on these statistics may be confronted with a situation where the statistical systems generating complementary data are inconsistent with the system of health statistics, rendering impossible or difficult the cross-classification or comparison of health data with data from other sources. In these cases *ad hoc* ways of providing comparable health and related data must be utilized. Sometimes surveys of a carefully defined population are the only solution.

14.22. Some of these record-based systems may meet the requirements of the health manager since they can use more exact definitions of morbidity and provide this information on a continuous basis, but care must be taken in the interpretation of the morbidity rates derived from such sources in evaluating the effect of health care delivery on the health status of the population. Research needs may

also be met by special disease registers set up on the basis of record-oriented systems, for example, myocardial infarction registers set up on the basis of hospital records and notification by general practitioners for a defined community.

14.23. Data on coverage and utilization may be obtained both from the providers of health services and from the consumers. Data on utilization obtained from the providers are usually regarded as more comprehensive of health conditions and more valid since they are obtained from an established record-keeping system. They have the disadvantage, however, of being event-oriented rather than person-oriented, and they require some form of record linkage or other analytical work to establish the utilization patterns of individuals. Moreover, the necessary socio-demographic information on an individual which is needed to cross-classify utilization patterns with explanatory variables is usually not available from the health system records. Perhaps the greatest disadvantage of routine health services data from providers is that they do not generate any data on non-utilizers and their reasons for non-utilization. Along these same lines they supply little insight into the dissatisfactions of both utilizers and non-utilizers with the services delivered. They are unable to get at those perceived needs of the population for health care which are not translated into demand, or if translated into demand are not met by the health services because of either non-accessibility or non-acceptability of the care to the population served.

#### (b) *Population-based data*

14.24. These include census data, mass diagnostic and screening surveys, health examination surveys, health interview surveys, and multi-subject household surveys.

##### (i) *Census data*

14.25. Census data, while achieving complete population coverage and being free of sampling error, produce limited information because of the infrequency of the census (usually every 10 years) and the highly restricted number of questions which can be asked on health status by interviewers whose main task is to enumerate the total population. However, some data relating to health coverage might be available from census sources, for example, accessibility can be measured in terms of physical distance of various population subgroups from existing health services, or numbers of persons in health professions can be determined.

##### (ii) *Mass screening*

14.26. Mass diagnostic and screening surveys may give highly detailed information about one or more particular disease entities, but they rarely, if ever, cover the total range of morbidity and are, in addition, quite often restricted to certain well-defined population subgroups thought to be at high risk for the diseases being screened. Thus, these types of surveys possess the capability of providing detailed data on specific morbidity conditions, cross-classifiable with other characteristics of interest, and which may be linked to a well-defined (but often restricted) population group. They therefore provide infor-

mation on the morbidity status of the population which is of use to health managers for monitoring purposes.

##### (iii) *Health examination surveys*

14.27. In order to get a broader picture of medically defined illness in the population, health examination surveys may be of value. In this case a probability sample of the population is invited to a medical examination wherein each member of the sample is subjected to an appropriate medical examination and history-taking. In this way, even unrecognized, undiagnosed, and asymptomatic conditions may be uncovered, and distributions of a variety of physical, anthropometric, physiological and psychological conditions in the population may be described and related to a wide range of socio-economic and demographic data simultaneously collected for each person.

14.28. Surveys may be conducted continuously on the general population using a standard examination of certain index conditions, or at intervals special conditions might be examined, for example, special organ systems such as the cardiovascular or circulatory system. There is also the possibility of examining special population groups, for example, children or the elderly, with specially designed examination procedures at certain of the examination cycles. Data in these examinations may also be collected on medical care sought or received during a fixed time period. This allows for identification of those medically determined health needs which are not currently being met by the health system thereby giving health managers certain possibilities of evaluating coverage of the health system. By establishing a series of norms the health planner has, for example, the possibility of following trends of certain health indicators, such as height for age or mid-arm circumference in children, which are of importance in identifying chronically malnourished populations.

14.29. A health examination survey is likely to provide the maximum information needed on health system coverage, since it is able to measure the amount of perceived health needs and medically verified health needs of the population which are being met by health services. By including appropriate questions on reasons for non-utilization, a good idea can be gained of how the health services are meeting the needs of the population for health care.

14.30. The major drawback of health examination surveys is their high cost, due to the trained personnel needed to administer the examination and interpret the findings and the specially equipped mobile examination centres often needed to perform the examinations. This restricts the number of persons on which the examination can be carried out. This means that certain estimates will be subject to large sampling errors when applied to subpopulations, or when the morbid condition or other characteristic to be estimated occurs relatively rarely in the population being examined.

14.31. Health examination surveys also share with other survey methods the problem of non-representativeness due to incomplete co-operation of the population sample. Since lack of co-operation is unlikely to be proportionally distributed across the population, biases may occur in morbidity or other estimates. Usually a substantial part of a survey budget must be devoted to minimizing the number of incomplete examinations and/or to inde-

pendent studies that must be carried out to evaluate the effects of non-response.

(iv) *Health interview surveys*

14.32. The health interview survey, which makes use of questionnaires administered by an interviewer in the home or in some cases mailed to or left with the potential respondent to be mailed back to the sponsoring agency, is one of the most common methods of collecting data on the health status of the population. These surveys may treat specific population groups or deal with restricted health matters in some detail—for example, surveys of drug usage in adolescents, nutritional status of children in rural areas, environmental exposure of certain occupational groups—but the focus here is on large-scale national studies having the following features:

(a) Data are collected on a wide variety of health and health-related topics rather than one or a few specialized topics;

(b) The studies are conducted on a national basis on large representative population samples with the intention of providing national and subnational estimates of known precision;

(c) The interview method is used and the interviews are conducted by lay interviewers. Only very simple objective tests or measurements may be used and professional diagnostic services or devices are not used;

(d) The surveys are continuous or at set intervals, but have limited longitudinal capabilities. Even panel surveys rarely follow individuals or households over more than one year. Thus, the type of morbidity information the survey is capable of producing is point or period prevalence rather than incidence data over time.

14.33. The potentialities and limitations of health interview surveys have been documented elsewhere (142, 148) and may be briefly summarized here as follows:

(a) Broad subject coverage is possible compared to data collected from record-based systems, and the data consequently serve a general range of health information needs;

(b) As opposed to data collection systems with specialized objectives based on other than health considerations, which therefore cannot be easily modified to provide currently useful data, the health interview survey is a flexible instrument which is responsive to changing health information needs. The data collected are determined (within the limits of resources) by current information needs and not by extraneous administrative conditions;

(c) Representativeness of morbidity is assured since, if a properly designed and carried out probability sample of the population is used, the appropriate denominator data are automatically generated for the calculation of various rates. Data on morbid conditions collected from hospital records or medical practitioners can seldom provide denominator data, thus restricting the usefulness of the data for the evaluation of health status;

(d) The individual is the focus of the inquiry, allowing for the collection of health or health-related series not available from record-oriented systems. In particular, data are also available for those individuals who do not come into contact with the health care system. This may be the

only source of information on the characteristics and health status of non-utilizers of health services. Even when data can be collected from various record-oriented sources, it is usually not feasible to link these data for individuals in a way permitting cross-classification;

(e) The major disadvantage of the health interview survey is the nature of data that may be collected by the interview method using lay interviewers. These may be referred to as response errors, and should be distinguished from sampling errors, which may be substantial but are estimable in advance in most cases and unlike response errors have consequences which may be objectively evaluated. Response errors will be discussed in more detail in section B below;

(f) Morbidity as measured from health interview surveys is necessarily that perceived by the respondent and is not necessarily that which has been medically verified as arriving from a pathological condition to which a diagnostic entity can be attached. Emphasis is based on those conditions which have caused the respondent over a short or long period to reduce temporarily or permanently his habitual activities or to seek aid from the health care system, or at least to express a need for such aid. This form of measurement of health status would appear to best suit the information needs of health planners, since it provides prevalence data which may be classified in broad categories, such as acute conditions, minor and major chronic conditions, injuries and impairments and disabilities.

14.34. The household health interview survey is likely to be the most feasible instrument for collecting data on utilization from the population point of view. Compared with the health examination survey, it has the disadvantage of dealing with the perceived needs of the population for health services, rather than medically determined and medically verified needs, but this might not entirely be a disadvantage since it is the perceived needs of the population that determine pressure on health services. At the same time the interview survey is capable of assessing the attitudes of both those who utilize and those who do not utilize certain types of health services, of measuring what the respondents feel are the barriers to use and what are their major satisfactions and dissatisfactions with the structure and functioning of the health delivery system. This type of data, when integrated with data provided by the health services themselves, can give a more complete picture of utilization and the potential for improvement in coverage and efficiency of the service.

14.35. It is important in considering the feasibility of a survey to consider whether utilization data are being gathered as part of the planning and evaluation aspects of health management or whether they are being gathered as part of a research study. The information derived from a one-time research study where consumer needs are examined in depth may justify the cost of the household survey in that a large amount of in-depth data can be collected by means of a detailed questionnaire. In this case valuable information on health consumers' needs and attitudes can be gathered, perhaps in advance of and then following some innovation in health planning (for example, the establishment of a new type of service) or some change in health management (for example, new staffing patterns for health clinics), which will aid in the evaluation of such innovations. It should not be expected that such special-purpose household surveys can be mounted routinely because of

the delicate nature of the information being collected and the detail and length of the questionnaire needed to answer the questions posed by new innovations in health care delivery. Up to the present, most health surveys have been of the one-time type designed to answer specific questions (not only on the effects of changes in delivery of health care, utilization and coverage, but also on the effects of health intervention programmes on health status), at a relatively high cost per interview.

14.36. If carried out for the purpose of monitoring and evaluating utilization of health services at the national level, health topics may be incorporated into existing continuing multi-subject national household surveys in order to achieve the economies inherent in this type of investigative tool. It should be realized, however, that all the detailed information on needs for and utilization of all types of services and on the attitudes of consumers and non-consumers cannot be incorporated in a questionnaire devoted to several other subject-matter fields as well. The fact, however, that information on other topics is included with the questions on health services need and utilization may provide other possibilities for analysis by cross-classifying health needs and utilization data with demographic, socio-economic and household data not ordinarily collected when the survey is concerned only with health.

14.37. Data on the use in the household of substances which may be harmful to health may be collected by means of a household survey provided the use is a legal and socially acceptable one and one on which the respondent is willing to report. Use should also be widespread enough in the general population for the household survey to be an efficient method of collecting the data. Data on exposure to or use of noxious substances connected with the work experience of individuals might be better obtained by sampling places of work. If the use of noxious substances is restricted to certain segments of the population, then sampling might better be carried out where these individuals congregate rather than using the household as the sampling unit. For example, drug usage surveys are often carried out on university or secondary school students or young military personnel, using samples derived from rosters of these individuals. Even though large segments of the population will be missed, few users might be missed since the sampling has been concentrated in those parts of the population at high risk.

14.38. Drug and alcohol usage questions can also have a detrimental effect on multi-subject surveys since they may create opposition by the respondent to answering other questions in the questionnaire. It is also unlikely that a proxy respondent can give reliable answers for another person for these types of questions. While questions on drug or alcohol usage might be acceptable in a survey uniquely concerned with health questions and sponsored by a health agency, it is less likely they will be welcomed where the sponsorship of the survey is some other governmental agency. On the other hand, such subjects as tobacco usage or potential exposure to various noxious agents such as polychlorinated biphenyls (PCBs) in the household environment usually meet with little respondent resistance.

14.39. While data on environmental hazards which affect large segments of the population, such as air or noise pollution, can be obtained individually from each household, ambient levels can be obtained directly by sampling the environment itself. However, the consequences of

various levels of environmental pollution (for example, respiratory difficulties from air pollution, psychosomatic problems from noise) must be measured by means of a household survey. If a household survey is used, then only perceived conditions due to environmental pollution will be recorded, but rough measures of consequences might be obtained using data from households subject to different levels of environmental pollution.

## B. SELECTED ISSUES CONCERNING HEALTH TOPICS IN HOUSEHOLD SURVEYS

### 1. *Definition of health status in household surveys*

#### (a) *General considerations*

14.40. The Constitution of the World Health Organization states in its preamble: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (133). In view of this definition, it is perhaps ironic in considering the health status of a population that it is departures from health, that is, illness or morbidity, rather than the positive aspects of health that are almost always measured. This is not only because the concept of health is itself usually defined by the absence of illness, but also because it is simpler to measure morbidity than it is to operationalize for measurement purposes the more complex positive concept of health.

14.41. An illness or morbid condition may be defined as a departure, subjective or objective, from a state of physical or mental well-being, as a result of either disease or injury. An individual may or may not be aware of this condition, and the condition may consist of active or progressive disease or of chronic or permanent defects resulting from disease, injury, or congenital malformation. If the presence of the morbid condition is determined by means of a health record from a physician or hospital or from a health examination survey, a diagnostic category can be attributed to the condition and the severity of the condition can be objectively evaluated.

14.42. The subject need not have been aware of the condition and the condition need not have had any influence on the subject's activities. For example, a subject, as a result of a visit to a doctor or as the result of a health examination by a qualified technician on a survey basis, may be discovered to be suffering from arterial hypertension. He may not have been aware of the condition and unless the condition was quite severe would not have modified his usual activities because of it.

14.43. On the other hand, in order for a morbid condition to be reported in a household interview survey, the subject must be aware of the presence of the condition, and it usually must have caused some modification in his daily activities or necessitated a visit to the health services. Thus, the type of morbid condition covered by the household interview survey is that which is perceived by the respondent, which has caused him to take some action because of the condition and which may or may not correspond to a medically verified diagnosis of illness. The subject is often able to identify more or less precisely the diagnostic category in which his morbid condition falls, but this depends upon the level of communication with the physician and whether the subject has been given precise information about his condition.

(b) *Acute and chronic conditions*

14.44. Household surveys usually attempt to distinguish between acute and chronic disease conditions. Acute conditions are frequently characterized by sudden onset and are of finite duration. In addition they tend to severely restrict the subject's usual daily activities. These three characteristics lead to a simple and reliable method of estimating prevalence using the household survey since the recall period is short, the event has had an impact on the respondent, and the period of illness is usually well-defined with a specific medical diagnosis.

14.45. In the case of chronic illnesses the onset is usually insidious, with a gradual progression of symptoms or with problems of a more permanent nature resulting as sequels to a series of acute conditions. Daily activities may or may not be restricted during any given period although there is usually a more general series of limitations of activities. Medical diagnosis may be more difficult, treatment less sure and demands on health services, while perhaps less intense over a short period, will also be of long duration. It is the consequences of chronic conditions that usually lead to a need to measure disabilities.

(c) *The person and condition approach*

14.46. Two main strategies for collecting morbidity data are currently used in household interview surveys. These are described below.

(i) *The person method for acute conditions*

14.47. The presence of the morbid event is measured by queries as to reduction in a respondent's usual activities due to a health problem during a certain reference period (for example, two weeks before the interview), or about contacts with the health services during a reference period (for example, 12 months before the interview). These are usually referred to as acute episodes of illness or impairment. In addition the duration of the episode is queried, and very often the cause of the episode is also asked. The cause is elicited either by asking the respondent to describe the condition in his own terms or with the aid of a check-list of conditions. The check-list may or may not correspond to standard diagnostic categories found in the International Classification of Diseases (137) and is usually phrased in ways meaningful to the respondent. The main purpose of the check-list is not to estimate prevalence of the condition but to act as a recall aid on the range of illnesses being considered, some of which may otherwise be overlooked by the respondent.

(ii) *The condition method for acute conditions*

14.48. This approach differs from the person approach in that initially only those health conditions are queried that caused the person to take action or to change his usual activities. The condition approach asks about all illnesses during the reference period whether or not the illness had any modifying effect on the respondent's health behaviour. Whether these conditions were acute or chronic is established later as is the action (if any) that is taken by the respondent because of the condition (restriction of activity, consultation with a health service). The condition approach includes minor illnesses that may have required no action of any kind on the part of the respondent and potentially serious conditions which do not yet require action.

14.49. It has been shown that the person approach, by restricting attention to those conditions which have an impact on persons, has the following characteristics (220):

- (a) It produces an emphasis on health problems of importance to the population;
- (b) It reduces the amount of interviewing time needed to elicit the information;
- (c) It reduces response errors found to be present when reporting events of minor importance to the respondent.

The same advantages also apply to the use of the person approach to estimating the prevalence of chronic conditions where initially limitation in activities over a long reference period (usually 12 months) is recorded. Only for those persons reporting some limitation of activities during the reference period is the duration and cause queried.

14.50. The person approach to recording morbidity emphasizes the ability of the household interview survey to obtain health status data which emphasize those conditions which have an impact on the person's usual activities, cause him to seek medical care, and therefore have social and economic consequences for the person, the community, and for the health care system. The approach does not provide an exact biomedical description of the health of the community in terms of diagnostic categories and is of little value for obtaining cause-specific prevalence data.

(d) *The measurement of disability*

14.51. The measurement of disability by means of household surveys raises some special problems not the least of which relates to terminology currently used. Such terms as disability, impairment, dysfunction, handicap, disorder, infirmity, are often used interchangeably to express the same condition, while in some studies distinctions are drawn among these conditions. Thus, it is not always clear whether a household survey reporting an estimate of prevalence of handicaps in the population refers to the same events as another household survey reporting an estimate of the prevalence of disability. Only examination of the questions posed and the probes used to elicit responses can resolve the question of comparability.

14.52. An attempt has been made to bring some order to this problem of terminology and it is strongly recommended that when attempting to measure the consequences of disease using household surveys the classification scheme outlined in the WHO manual should be taken as the standard (138).

14.53. The consequences of disease, particularly chronic conditions, may be presented schematically as follows: disease → impairment → disability → handicap. The arrows represent the logical order of the event in a sequence of consequences arising from the disease.

14.54. The definitions of the terms in (138) are as follows:

(a) An impairment is any loss or abnormality of psychological, physiological or anatomical structure or function. This includes what are generally called "disorders" and in addition losses, such as loss of a limb. An impairment may be temporary or permanent. Impairments are disturbances at the organ level;

(b) A disability is any restriction or lack (resulting from an impairment) of ability to perform an activity in

the manner or within the range considered normal for a human being. Disabilities involve activities and behaviours in personal care, in the performance of usual activities of daily living, and in locomotor activities. Disabilities reflect the awareness at the level of the person of an impairment. A person can be impaired but not necessarily disabled if the impairment does not interfere with the person's ability to perform according to the definition;

(c) A handicap is a disadvantage for a given individual resulting from an impairment or a disability that limits or prevents the fulfilment of a role that is normal (depending on age, sex, and social and cultural factors) for that individual. It is characterized by the differences between an individual's performance and status and the expectations of the individual himself or of the particular group of which he is a member. Handicaps may be thought of as the socialization of disabilities and impairments. A person may suffer an impairment and may be disabled, but may or may not be handicapped.

14.55. A household survey using lay interviewers may measure disabilities and handicaps, since both of these can be arrived at by questions dealing with limitation of activities over a long period of time. For example, the United Kingdom General Household Survey (1980 version) asks the following questions (192):

"Do you have any long-standing illness, disability, or infirmity? By long-standing I mean anything that has troubled you over a period of time or that is likely to affect you over a period of time."

If yes:

(a) "What is the matter with you?" (NO PROBES)

(b) "Does this illness or disability limit your activities in any way?"

The answer to part (a) of the question determines the nature of the impairment as perceived by the respondent and stated in his own words, while part (b) determines whether this impairment is a disability and perhaps also a handicap.

14.56. The distinction between a disability and a handicap may be important if one of the aims of the survey is to assess unmet needs and demands for health, since a disabled but not handicapped person may not have any need for rehabilitative services if he is performing to his and his group's expectations. Further probes with the type of question illustrated above are likely to be necessary to distinguish between disabled and handicapped status. If the survey is dedicated only to the causes and prevalence of impairments, disabilities and handicaps, then a large number of supplementary questions on the exact nature of the condition, its antecedents, its severity, and its consequences should also be considered. However, few of these could be considered in the context of a general household survey aimed at providing data for general planning or management purposes. A specialized survey is likely to be needed to provide data for research or for evaluation of specific programmes. In these instances a specially trained staff can be employed to evaluate the history of disease leading up to the event and to grade the severity of the event itself.

#### (e) *Lay reporting of mortality and morbidity*

14.57. In many areas of the world, a large proportion of the population has no access to health care provided by medically qualified personnel. This is particularly true of

the developing countries. In these areas, health care is often provided by lay or paramedical personnel and is based on traditional methods or elementary medical training. The health information needed to indicate the existence of health problems or to facilitate the management of primary health care systems needs must to a large extent be provided by these same personnel. The term "lay reporting" has come to be used to describe methods of achieving the provision of this information (140).

14.58. The system of lay reporting is based on a series of assumptions:

(a) A person familiar with a local community and who possesses administrative or moral authority, such as a village chief or an auxiliary health worker, will learn of any death occurring in the community;

(b) An auxiliary health worker, adequately trained, will be able to record symptoms and associations of symptoms as expressed by the patients;

(c) The circumstances of death and the manifestations of diseases, as recorded by the layman or paramedical personnel, can be classified by a suitable and simple method and interpreted by a qualified health worker in such a way as to prove useful for practical health actions.

14.59. Several requirements must be met: (a) each stage in data collection and in particular the means for the identification of health problems and recording of data should be so simple and unambiguous that the least skilled grade of staff can perform efficiently; (b) the system should be practical under rural conditions, without the need for costly facilities or additional health personnel, and should fit well within the administrative structure of the health service; (c) acceptable standards of accuracy should be achieved and maintained systematically during the operation of the system.

## 2. *Response errors in household surveys*

14.60. Response errors arise from various sources, most of which are found in the household interview situation.<sup>1</sup> These are described below.

### (a) *Defective recall of morbid events*

14.61. The problem of recollection is a complex one since some types of events, for example, those requiring hospitalization or those involving considerable trauma, have recall periods much longer than events having less serious health consequences. In order to record as many events as possible and thus reduce sampling errors, there is a temptation to utilize long periods of time (say a one-month or a one-year period). It has been shown, however, that recall falls off rapidly even over a four-week period for those morbid conditions for which no medical care or restriction of activity is required (221). Over the same four-week period, there is less evidence of memory loss for those conditions involving medical care and activity restriction.

14.62. Another problem with memory loss is that certain cultures use different frameworks to measure time, and periods involving weeks or months may have little

<sup>1</sup> Experience with response errors in surveys in the field of health in the United States of America is reviewed in (268).

meaning for these respondents. It is usually necessary to adopt a time frame which is important for a given culture, providing that the events constituting the time frame (a period of harvest, a religious festival or the like) are not too far removed from the date of the interview.

14.63. It thus appears that each class of morbid events has its own best recall period. Thus, the General Household Survey of the United Kingdom (1980) uses the following recall periods (192):

- (a) Any illness or injury involving restriction of activities—two weeks;
- (b) Consultation with doctor—two weeks;
- (c) Use of health or welfare services—one month;
- (d) Use of casualty ward, outpatient or inpatient services of a hospital—three months;
- (e) Chronic limitation of activities—unlimited recall period.

(b) *Non-familiarity with the nature of the morbid condition*

14.64. Very often the respondent is not familiar with the medical nature of the condition from which he is suffering or has suffered. This may be because he has not consulted the medical services or because an exact diagnosis has not been communicated to him by the health services. Even when a person is advised of a condition, it is not described in sufficient detail to be classifiable into an exact diagnostic category. For example, the subject may be told he has a "heart condition" instead of "acute myocardial infarction". Many physicians do not inform persons of the exact nature of certain cancers but may describe the condition in less threatening terms. Many morbid conditions are in addition non-symptomatic, for example, hypertension and anaemia, so that the respondent may not be aware of their existence. The consequences of such lack of familiarity are both underreporting and misclassification of conditions.

(c) *Reluctance to report*

14.65. Certain conditions may be underreported because of reluctance of the interviewee to discuss them with a lay interviewer. Examples of this are certain mental illnesses, venereal diseases, genito-urinary conditions and alcoholism, for which a certain amount of shame (or societal disapproval) is felt. Reluctance to report these conditions may vary from one social or demographic group to another, among different cultures, or over time. Thus, the result of unwillingness to report conditions does not necessarily result in uniform underreporting of these kinds of conditions, but might result in artefactual differences being discovered among different subgroups of the population or between different times for the same population.

(d) *Proxy respondents*

14.66. In most household interview surveys, each individual residing in the selected household is a basic unit on which health status information is required. Since not all household members are usually present when the interviewer calls, a decision must be made either to call back at the household until all household members can be interviewed or to accept an adult member of the household found at the initial visit to serve as a proxy respondent for all other household members. It is the usual procedure for

a parent to serve as proxy respondent for children. It has been estimated in the United States of America National Health Interview Survey that direct field costs of the survey are approximately 25 per cent higher when each household member is interviewed, but that the estimates of prevalence of certain conditions tend to be underestimated when proxy respondents are accepted. It has also been found that minor non-chronic conditions tend to be underestimated more than major non-chronic conditions or chronic conditions.

(e) *Probe questions*

14.67. In order to refresh the respondent's memory of past morbid events or to ensure that the respondent fully understands the full range of morbidity being queried by the survey, a series of probe questions, which may also include the presentation to the respondent of a check-list of conditions, is usually administered. It has been shown that a final probe with a check-list can increase the number of all chronic conditions found by over 50 per cent, and for those chronic conditions not involving medical care or restricted activity by 67 per cent. Thus, two surveys querying the same set of conditions but using different systems of probes can arrive at quite different prevalence rates for the same morbidity condition (221).

(f) *Differential biases*

14.68. A further type of response bias has been noted in health interview surveys involving diary keeping by the respondents on their health conditions (183). It has been found that higher socio-economic status, higher income, and urban households tend to report a higher prevalence of morbid conditions. This is thought to be partly due to their greater experience with medical services, greater sensitivity to disease conditions and greater aptitude for reporting these conditions. Differences tend to be greatest in reporting minor and obscure diseases and injuries.

3. *Needs, demands and utilization of health services*

14.69. It has been noted that morbidity either as perceived by the subject (see subsection 1 above) or as verified by a medical diagnosis does not completely explain the utilization of health services (443). While perceived morbidity has been shown to be important in the utilization of physician and dental services (136), other factors have also been important in explaining utilization. Information on factors which have been designated as "predisposing" and "enabling" factors are usually not available from health service records, and if available, only for those who have utilized the health service.

14.70. Predisposing factors are those socio-cultural variables that predispose or deter a person from using health services. These may include demographic characteristics, household and family composition, education, attitudes to health, and the like. Enabling factors are those that relate to "cost" in a broad sense, and may include family financial resources, availability and accessibility of health care, health insurance and income security. The concept of utilization of health services is that perceived morbidity by an individual represents the individual need for health services, the series of predisposing factors determine whether the need is translated into a demand for

services, and the enabling factors determine whether the individual uses the health services. There is of course an interaction with factors which are characteristics of the health system itself, that is, the existence of the facilities for which a demand is manifested, and information on this latter aspect is best collected from the health system itself.

14.71. Data on these factors are well suited to collection through household inquiries, since the household interview survey allows for putting together household, family and individual data, including perceived individual morbidity, in a way which can account for utilization patterns and for reasons for non-utilization.

### C. NATIONAL EXPERIENCE

14.72. While many countries carry out *ad hoc* household surveys on health and health-related topics at either the national or subnational level, few use this instrument in a continuing fashion for the routine collection of data for health planning (148). In those countries which do conduct such surveys regularly, for example, Japan and the United States of America, they are dedicated primarily to health data, with data from other fields included only inasmuch as they are thought to be essential to the interpretation of the health interview data. In the United States of America, the Health Interview Survey is one of a series of national health surveys that also includes a health and nutrition examination survey and a national inventory of hospital and institutions which allows for the sampling of medical and institutional records.

14.73. In addition, the Federal Republic of Germany and the United Kingdom carry out multi-subject household surveys on a continuing basis, that in the Federal Republic of Germany every two years as the micro-census programme and that in the United Kingdom annually as the General Household Survey (GHS). In addition to data on health and health services utilization, GHS collects data on employment, housing, income, education, and special topics which change on a rotational basis. The micro-census in the Federal Republic of Germany uses an area random sample based on the previous population and occupation census. The sampling fraction is 1 per cent. Data on acute and chronic diseases, injuries due to accidents, and disabilities are recorded. In addition, information on various environmental pollution risk factors and smoking and utilization of health services is included. GHS covers a probability sample of about 15,000 households each year. The major health topics are activity limitation due to sickness, consultations with general practitioners, use of health services and visits to hospitals.

14.74. The specific content of questionnaires can differ greatly both in the way in which data are recorded and in the different items which may be included to get at morbidity and health services utilization. The content of five national health interview surveys conducted during the 1950s is compared in annex tables 1 and 2 (from 142). While the specific questions have likely changed in those three countries where the surveys are still conducted on a continuous basis (Japan, the United Kingdom, the United States of America), the tables do illustrate the different specific items that have been used by each country to get morbidity and health care utilization information using the same general conceptual framework. Thus, all national household interview surveys tended to use the same gen-

eral concepts of morbidity—querying prevalence of acute and chronic conditions, impairment and injuries due to accident and disabilities. Table 2 illustrates differences in information actually obtained on various aspects of these morbid conditions.

14.75. Differences in the recall periods for various classes of morbidity and utilization are shown in annex table 4. Again wide divergencies in recall periods are noted even when the same general question is asked. Since there are no established standards for health interview questions, it is impossible to give guidelines for optimal forms of questions, recall periods, probes and so on that might be suitable for all national household surveys. Improvements in data collection from national household health interview surveys carried out in the United States of America which have been documented indicate that changing the focus of some questions and including expanded check-lists of chronic conditions lead to improvements in the underreporting of certain chronic conditions and long-term disabilities (214).

14.76. It was found that the percentage of persons reporting chronic illness in the General Household Survey of the United Kingdom increased from 25 per cent to 56 per cent in interviewed males and from 26 per cent to 70 per cent in interviewed females between the 1976 and 1977 surveys, when the format of the question was changed in 1977 to include a check-list of conditions (191). It is thought that the increase in prevalence of chronic illness was in large part due to the inclusion of conditions in the check-list (for example, backache, varicose veins) which the respondents to the 1976 format did not feel to be serious enough to volunteer. Several of the items on the check-list concerned women more than men (for example, varicose veins, menstrual and menopausal difficulties), which may account in part for the greater increase in prevalence among women than among men. It is not entirely clear whether the 1976 format yielded an underestimate or whether the 1977 format should be considered as giving an overestimate of chronic illness. The 1979 and 1980 formats have dropped the check-list and have returned to reporting separately those chronic conditions which limit activities and which are closer to the "person" approach than to the "condition" approach described in section B above. Whether these differences would be found in applying the same approaches in different national contexts and whether these techniques would be feasible in multi-subject household surveys where relatively little time can be spent in the interview administering detailed questions and probes on health are questions for further research in health interview survey methodology.

14.77. Questions and interview techniques appropriate to a particular health system in a particular cultural setting may not be appropriate when dealing with other health systems in other cultures. An example of an international comparative study on health care carried out in 12 centres in seven countries using a household interview survey is the WHO/International Collaborative Study of Medical Care Utilization (136). This study demonstrated that it is possible to obtain locally valid and cross-nationally comparable data from a common household interview survey questionnaire on such topics as psychosocial and demographic characteristics, levels of health and perceived morbidity, and detailed use of various health services using a detailed and carefully planned questionnaire (302 questions). However, all but one of the centres (Buenos Aires)

was either in Europe or North America, so that the range of cultural variability was not as great as it might have been if Asian or African populations had been included in the study. All seven countries were industrialized, with well developed health care systems already in operation, so that the measurement errors due to different conceptual meanings of certain questions and their responses were minimized.

#### D. DATA REQUIREMENTS AND TABULATIONS FOR HEALTH TOPICS

##### 1. *Data requirements*

14.78. As has already been emphasized in section C above, there is no universally acceptable question format or set of health questions that can be collected by all countries by means of national multi-subject household surveys. Similarly, data requirements for special health surveys carried out for research purposes or for evaluation of specific programmes must follow specific formats depending on the aims of each study, the research design employed, and the resources available. General guidelines on format and content cannot be given in these cases without taking account of these considerations.

14.79. There does appear to be, however, a core content of health items for general multi-subject household surveys which can be collected by means of interviews, using lay interviewers. The exact format of the questions cannot in general be given since this will depend upon conditions particular to a country. For example, if a check-list of conditions is presented to the respondent as a recall aid, or as an indication of the range of health conditions being considered, the content of the check-list would be quite different in an industrialized country with a temperate climate than in a developing country with a tropical climate.

14.80. A report of the United Nations Economic Commission for Africa has suggested a listing of health and health-related items which could be included in a survey programme. The health questions would alternate in certain annual rounds with coverage of other topics, such as household income, consumption and expenditure, detailed demographic topics, employment, and so on. Items apply to each household member. These items may be grouped as follows:

- (a) Health status:
  - (i) Illness during last 14 days:
    - a. Nature of illness;
    - b. Duration of illness during last 14 days;
    - c. Number of days of restricted usual activity;
  - (ii) Injury during last 14 days:
    - a. Nature of injury;
    - b. External cause of injury;
    - c. Number of days of restricted usual activity due to injury;
  - (iii) Impairments (no time-limit):  
Nature;
- (b) Utilization of health facilities:
  - (i) Consultation for health care:
    - a. Number of visits during the last 14 days, by place of visit;
    - b. Type of service rendered;

- c. Date of last visit (if before 14 days), stating the place of visit;
- (ii) Hospitalization during the last 12 months:
  - a. Number of admissions;
  - b. Duration of hospitalizations;
- (iii) Expenditures:
  - a. Drugs and medical appliances prescribed by a doctor or those under his supervision;
  - b. Hospital expenses;
  - c. Doctor's fees;
  - d. Other (specify);
- (c) Other items related to health:
  - (i) Nutrition: this includes anthropometric measurements on young children and mothers, food consumption history, breast-feeding and weaning information;
  - (ii) Housing and water supply: includes items on sanitary facilities in the home, waste disposal facilities, and source of water supply.

14.81. To this list of items, which is seen as meeting health information needs of developing countries in Africa, could also be added:

(a) Further items on chronic illness (with a recall period of 12 months) which may or may not limit activities. A check-list of items appropriate to the national health situation should be presented in order to remind the respondent of the types of conditions being queried. Where a subject cannot read, the interviewer will have read the list to the subject. Each condition should be described in locally understood terms;

(b) An extension of the item on impairments in order to determine the extent of limitation of activities and their consequences for the subject's particular situation, that is, the need to take special medicines or use special aids, special diets, limit certain habitual activities and the like.

14.82. All the items listed above could be included as basic items for a health component of a national household survey when resources permit the administration and subsequent tabulation of more comprehensive survey content at each survey round. The General Household Survey of the United Kingdom is an example of a multi-subject survey which includes several topics at each survey round, although the specific items constituting a topic may change from round to round to reflect either changing interests or changing concepts relating to that topic.

14.83. The illustrative listing of items given above should not be confused with the specific question format which might be used in a questionnaire in a particular national context. The way in which the question is asked, the response categories listed and the positioning of the question in the questionnaire will depend upon specific circumstances, including the training and education of the interviewers, cultural and educational characteristics of the population interviewed, and data processing facilities available for tabulations.

##### 2. *Tabulations*

14.84. Both health status and health behaviour usually vary by both age and sex. Prevalence of both acute and chronic conditions increases with age, and women usually report more illness and disability than men. Utilization of health services also varies with age, with some facilities,

for example, maternal and child care centres, used uniquely by young children of both sexes, or by women of childbearing age. Thus, almost all tabulations involving either health status or utilization are cross-tabulated by age and by sex. The other variable by which many health variables are classified is socio-economic group. The definition of socio-economic group varies from one culture to another and various proxies, such as income, occupation, education, housing, or various combinations of these, have been used to describe it. In specific national contexts, other variables may also become important for cross-classification, for example, marital status, ethnic group, family size, rural or urban residence, physical access to health care facilities. If the household survey is dedicated to special health topics, then the classifying variables will depend upon the research aims of the study.

14.85. As an example of tabulations possible from a multi-subject household survey, 12 tabulations of the 45 presented by the General Household Survey (1977) of the United Kingdom are given below (191):

- (a) Persons reporting chronic health problems, by sex and age;
- (b) Persons in contact with health services in the year before;
- (c) Persons who did something differently from usual in the 14 days before interview because of chronic health problems, by sex and age;
- (d) Persons consulting a general practitioner (GP) in the 14 days before interview about chronic health problems, by sex and age;

- (e) Persons reporting short-term health problems in the 14 days before interview, by sex and age;
- (f) Persons consulting a GP in the 14 days before interview about short-term health problems, by sex and age;
- (g) Health problems in the 14 days before interview, by sex and age;
- (h) Persons consulting a GP in the 14 days before interview about health problems, by sex and age;
- (i) Persons reporting chronic health problems, by sex and socio-economic group;
- (j) Persons taking constant care because of chronic health problems, by sex and socio-economic group;
- (k) Doctor consultations:
  - (i) Persons consulting a GP, National Health Service (NHS), in the 14 days before interview, by sex, age, and socio-economic group: rates per 1,000;
  - (ii) Average number of GP, NHS, consultations per person per year, by sex, age, and socio-economic group;
- (l) Outpatient attendances:
  - (i) Persons attending as "outpatients" in a three-month reference period, by sex and age: rates per 1,000;
  - (ii) Average number of attendances per outpatient in a three-month reference period, by sex and age.

The major cross-classifications in this context involve age, sex, socio-economic group and marital status.

ANNEX  
Content, verification methods and recall periods  
in health interview surveys in five countries

TABLE 1. SURVEY CONTENT: HEALTH SERVICES

	Canada	Denmark	England and Wales	Japan	United States of America
Medical services .....	Yes	No	No	No	Yes
Consultations, total number .....	Yes	No	No	No	Yes
Number by place of consultation ...	Yes	No	No	No	Yes
Nature of service received .....	Yes	No	No	No	Yes
Place of consultation .....	Yes	No	No	No	Yes
Elapsed time since last visit to a doctor .....	No	No	No	No	Yes
Hospitalization .....	Yes	Yes	Yes	No	Yes
Date of admission .....	No	Yes	No	No	Month only
Name and address of hospital .....	Yes	Yes	No	No	Yes
Nature of condition .....	Yes	Yes	No	No	Yes
Number of stays, overnight or longer, in:					
Hospital .....	Yes	Yes	Yes (days)	No	Yes
Nursing home .....	No	No	No	No	No
Sanatorium .....	No	No	No	No	No
Operation performed? .....	Yes	Yes	No	No	Yes
Dental services .....	Yes	Yes	Yes	No	Yes
Total number of consultations .....	Yes	No	Yes	No	Yes
Types of expenditure for health .....	Yes	No	No	Yes	No
Appliances .....	Yes	No	No	No	No
Equipment .....	Yes	No	No	No	No
Health services .....	Yes	No	No	Yes	No
Method of payment .....	Yes	No	No	Yes	No
Medicines .....	Yes	No	No	Yes	No
Doctor-prescribed .....	Yes	No	No	Yes	No
Self-prescribed .....	Yes	No	No	Yes	No
Premiums for pre-paid plans .....	Yes	No	No	Yes	No
Kind .....	Medical and hospital combined	No	No	Medical, hospital and dental	No

TABLE 2. SURVEY CONTENT: MORBIDITY CONDITIONS

	Canada	Denmark	England and Wales	Japan	United States of America
Duration of illness .....	Yes	Yes	Yes	Yes	Chronic only
Date of onset .....	Yes	Yes	Yes <sup>a</sup>	Yes	Yes <sup>b</sup>
Date of termination .....	Yes	Yes	Not stated	Yes	No
Days illness during survey period .....	Yes	Yes	Yes	Yes	No
Interference with usual activities .....	Yes	Yes	Yes	Yes	Yes
Days kept indoors .....	Yes	Yes	Yes	No	No
Days in bed .....	Yes, home and hospital	Yes, home and hospital	Yes, home and hospital	Yes, hospital only	Yes, hospital only
Days prevented from working .....	Yes	Yes	Yes	Yes	Yes
Days prevented from attending school .....	Yes	No	No	Yes	Yes
Source of income if not working .....	No	Yes	No	No	No
Nature (name) of condition .....	Yes	Yes	Yes	Yes	Yes
Number of conditions .....	Yes	Yes	Yes	Yes	Yes
Outcome .....	No	No	No	Yes	No
Circumstances of accident resulting in injury .....	Yes	Yes	No	No	No
Place injury occurred .....	Yes	No	No	No	Yes
Site of condition .....	Yes	Yes	Yes	No	Yes
Treatment for each condition listed .....	Yes	Yes	No	Yes	Yes <sup>c</sup>
Medical services .....	Yes	Yes	Yes	No	Yes
Consultations, total number .....	Yes	No	Yes	Yes	No
Number by place of consultation .....	Yes	Yes	Yes	No	No
Date of first consultation .....	Yes	No	No	Yes	No
Date of last consultation .....	No	No	No	Yes	For chronic conditions only
Physician's diagnosis .....	Yes	Yes	No	Yes	No
Place of consultation .....	Yes	Yes	Yes	Yes	No
Hospitalization .....	Yes	Yes	Yes	Yes	Yes
Number of admissions .....	Yes	Yes	No	Yes	Yes
Date of admission .....	No	Yes	No	Yes	Yes
Date of discharge .....	No	Yes	No	Yes	No
Days hospitalized .....	Yes	Yes	Yes	Yes	Yes
Name and address of hospital .....	Yes	Yes	No	Yes	Yes
Operations .....	Yes	Yes	No	No	Yes
Dates of .....	No	No	No	No	No
Nature of .....	Yes	No	No	No	Yes
Dental services .....	Yes	Yes	No	Yes	No
Dates of commencement .....	No	No	No	Yes	No
Days of treatment during survey period .....	Yes	No	Yes	Yes	No
Medicine .....	No	Yes	No	Yes	No
Home nursing .....	Yes	No	No	Yes	Yes
Still under medical care for each chronic condition .....	No	No	No	No	Yes
Examination for glasses; physiotherapy; osteotherapy; chiropractic and chiropract treatments .....	Yes	No	No	No	No
Type of condition .....	Yes	No	Yes	Yes	Yes
Continuing .....	Yes	No	Yes	Yes	Yes
New .....	Yes	No	Yes	Yes	Yes
Recurring .....	Yes	No	Yes	No	No
Special questions about alcoholism .....	No	No	No	No	No
Special questions about death .....	No	No	No	Yes	No
Special questions about mental disorders .....	No	No	No	Yes	No
Special questions about pregnancies .....	No	No	No	Yes <sup>d</sup>	No
Use of appliances .....	No	No	Yes	No	Yes
Use of habit-forming drugs .....	No	Sleeping draughts	No	No	No
Use of tobacco .....	No	Yes	No	No	No
History of vaccinations and immunizations ...	No	Yes	No	No	No
X-rays, volume of exposure to .....	No	No	No	No	No

<sup>a</sup> Question framed to determine whether condition is present in period of interview, and whether it started more or less than one year ago.

<sup>b</sup> Only whether condition was first noticed in past two weeks, in past three months, or in past 12 months.

<sup>c</sup> Only when necessary for International Statistical Classification coding.

<sup>d</sup> Only when complications require special medical treatment.

TABLE 3. METHODS USED FOR VERIFICATION AND EVALUATION OF DATA IN QUESTIONNAIRES

	Canada	Denmark	England and Wales	Japan	United States of America
Questionnaires edited for consistency and completeness? .....	Yes	Yes	Yes	Yes	Yes
Missing or defective data queried? .....	Yes	No	Yes	Yes	No
Routine evaluation procedures:					
Completeness of reporting measured by comparison with records from independent sources? .....	No	Yes; compared with total population	No	No	Yes*
Reinterview made to measure response errors?	No	No	No	No	Yes
Verifications of reported morbidity conditions? .....	Yes	Yes	No	No	No*
By subsequent medical examination	No	No	No	No	No*
By comparison with doctor's records .....	Yes	Yes	No	No	No*
By comparison with hospital records .....	No	No	No	No	No*
Scrutiny of completed questionnaires ..	Yes	Yes	Yes	Yes	Yes
Quality control of coding, punching, and tabulating .....	Yes	Yes	Yes	Yes	Yes
Components of variance measured at each sampling stage? .....	No	Yes	Yes	No	Yes
Comparison of survey statistics made with other independent statistics?	With communicable disease statistics, illness in the civil service, hospital statistics, international sources etc.	With cause of death data; also with morbidity statistics from other sources (tuberculosis, diabetes, ulcer)	All demographic material with existing records	With national census; also with Patient Survey (receiving medical services in hospitals and clinics)	With other data at report-writing stage, but survey data not adjusted except that basic ratio estimating procedure makes data consistent with independent controls with respect to age, sex, and race distribution of population

\* Several special studies based on checks with hospital and physicians' records are being made, but these are not routine verification procedures.

TABLE 4. PERIODS COVERED BY QUESTIONNAIRE USED IN FIELD OPERATIONS

	<i>Canada</i>	<i>Denmark</i>	<i>England and Wales</i>	<i>Japan</i>	<i>United States of America</i>
Recall periods for:					
Illnesses .....	Period between interviews, which were usually monthly	One month prior to interview	Acute: two months prior to month of interview. Chronic: one year prior to month of interview	Day of interview for first visit; period between subsequent visits <sup>a</sup>	Acute: two weeks prior to week of interview. Chronic: one year prior to week of interview
Injuries .....	Recall period for most variable items was period between interviews, which were usually monthly.	Not applicable	Two months prior to month of interview	When medical attention required, day of interview for first visit; period between subsequent visits <sup>a</sup>	Two weeks prior to week of interview
Residual effects of previous injury or illness .....	However, instructions were given that as much information for Household Record Card as possible be recorded on initial visit, with delay until interviewer felt he had confidence of family before asking certain questions			Not investigated	Accidents: two weeks prior to week of interview. Injuries causing present residual effects or impairments: any time in past
Impairments .....					Day of interview
Accidents resulting in injury ....					
Disability .....				Day of interview for first visit; period between subsequent visits <sup>a</sup>	Current: two weeks prior to week of interview. Long-term: one year for bed days from chronic condition; day of interview for chronic limitation of activity
Health services					
Medical .....		One month prior to interview			Two weeks prior to week of interview
Dental .....					Two weeks prior to week of interview; also visits in past year
Hospital .....					One year prior to interview
Home nursing ..		Not applicable		Not investigated this way	Day of interview
Economic activity ..		One month prior to interview		Day of interview	One year prior to interview
Industry and occupation ...					Not investigated
Income .....		Not applicable		Not investigated	One year prior to interview

TABLE 4 (continued)

	<i>Canada</i>	<i>Denmark</i>	<i>England and Wales</i>	<i>Japan</i>	<i>United States of America</i>
Medical and hospital insurance .....		One month prior to interview	Not stated	Day of first interview	July 1957-June 1958 for hospitalized persons only; one year period
Veteran status .....		Not applicable	Not stated	Not investigated	Day of interview
Death .....		Not applicable	Not investigated	Day of interview for first visit; period between subsequent visits.* For pregnancy, where abnormal complications required medical attention	Not investigated
Use of appliances ..				Not investigated	Day of interview
Does period shift forward with delay in interviewing? .....	No	No	No	No	No
Range of period between end of recall period and date of interview .....	Only recall period between monthly interviews (memory aided by diary)	1 to 10 days	Up to 15 days	Not stated	Median, two days; usually completed one to six days; delay as much as six days

\* Usually no more than a day, at most a week.

## XV. EDUCATION AND LITERACY

15.1. In the field of education, household surveys have to date been used principally for collection of statistical data in three areas: literacy, educational attainment and school attendance. The following discussion of issues in survey content, design and operations in relation to education will therefore concentrate on issues related to these specific areas. However, it might be useful at the outset to present a very brief overview of the whole field of educational statistics as background and to understand the role and potentialities of household surveys in this general context.

15.2. In principle, statistics related to education cover all aspects of the educational system, organization, people involved, activities, results, economic and social features, and the like, for which quantitative data are considered necessary, or at least desirable, in a given situation. Two major sectors should be distinguished in this field of statistics, namely:

- (a) Statistics related to the educational system *per se*;
- (b) Statistics related to educational characteristics of the population.

15.3. The first sector is very broad, dealing with all types of statistics regarding schools, pupils, teachers, educational finance, and the like, and data are normally collected directly from the institutions concerned by means of specific questionnaires or from current administrative records. Most of these data are collected on a yearly basis, but some statistics of a more detailed or specific nature may be obtained through intermittent investigations at regular intervals, say three or five years, or through *ad hoc* surveys devoted to particular problem areas in the field of education. Historically, these statistics, which we may designate as "traditional" or "institutionalized" educational statistics, have been developed within ministries of education or other national agencies responsible for education to meet the current needs for such data for administrative and planning purposes. Within the overall system of national statistics, the development of this particular field must be characterized as rather slow—especially if compared with demographic and economic statistics. In most countries, developed as well as developing, it is only over the last 20 years or so that educational statistics have been significantly improved and reinforced. Inasmuch as the important role of education for the general economic and social development process has only lately become widely recognized, more emphasis has been put on educational planning and costing, and, by implication, on the required statistical data base therefor.

15.4. The second major sector of educational statistics is closely related to and in fact overlaps with demographic statistics, as it deals with the impact of the educational system, past and present, on the population in its totality or with regard to selected groups. Such statistical data are consequently in the first instance collected by means of population censuses and concern primarily literacy, educational attainment and school attendance. In most countries, censuses are taken only at 10-year intervals. How-

ever, household surveys on a sample basis are now being used more and more to supplement the infrequent census data with frequent, more up-to-date, and sometimes also more detailed information. This holds true in many fields but what is of interest in this particular field is the fact that such surveys provide an excellent tool for obtaining more timely, reliable and differentiated statistics on educational characteristics of the population. As such data are essential for formulating development plans, not only for education proper but also for economic and social progress in general, where frequent references are made to the "stock of skilled manpower" or "human resources", it is to be hoped that developing countries especially will make more frequent use of household surveys for this particular purpose. The major aim of this chapter is to provide technical guidance and explanations in order to facilitate such undertakings.

15.5. As for the place of this particular type of educational statistics in the national statistical system, it should be noted that central statistical services, or special census or survey agencies, are responsible for the operation of population censuses and household surveys, even those which include educational data. In this connection, it is appropriate here to make reference to some pertinent features of statistical organization as regards educational statistics.

15.6. First, in countries with a federal system of government, educational statistics, like all other branches of public statistics, must originally be collected for each state separately and then co-ordinated and compiled at the federal government level. This may, in certain countries with important diversities and inequalities between the educational systems of the different states, be a quite difficult and complex operation.

15.7. Secondly, in certain countries with a highly centralized statistical organization, the "traditional" sector of educational statistics, referred to above, is no longer dealt with by the ministries of education, but by the central statistical services. However, in most developing countries, the responsibility for these "institutionalized" educational statistics still remains with the ministries of education. When household surveys with items on education are organized in such countries, it is therefore particularly important to ensure the closest possible co-ordination and collaboration between the agency in charge of the survey and the ministry of education, which can provide valuable specialized expertise from both statistical and subject-matter viewpoints for the education part of the survey.

### A. SCOPE, PURPOSE, USES AND NEEDS FOR DATA

#### 1. Scope

- (a) *Educational characteristics of the total population and of specific population groups*

15.8. It goes without saying that the household survey approach is particularly suitable for collection of educa-

tional statistics that illustrate the situation of an individual member of a household with regard to education. Therefore we will discuss here what was called above the second major sector of educational statistics, namely, educational characteristics of the population. "Individualized" data on education which can usefully be included in household surveys relate primarily to the following subjects:

- (a) Literacy/illiteracy;
- (b) Educational attainment;
- (c) School attendance;
- (d) Access to education.

15.9. Explanations concerning concepts, definitions, classifications and tabulations are given below in the pertinent sections of this chapter. It should be recalled here that the above types of data may also be collected in population censuses, but household surveys have important advantages. Because of the restricted size of the operation, they can study the subjects in question in more depth, using specific tests where appropriate, so they constitute a very useful complement to large-scale censuses for checking their results and extending the scope of the data base and frequency of observations.

(b) *Statistics related to the educational system*

15.10. As has been explained above, data pertaining to the first major sector of educational statistics are normally collected within the institutional framework in the field of education. It is nevertheless appropriate here to make some brief supplementary reference to these traditional educational statistics in order to place the types of data being collected through household surveys in the right perspective. Institutionalized statistics on education generated by the educational system itself normally relate to the following subjects:

- (a) Schools and other institutions providing education and training (by level and type of educational programme);
- (b) Enrolment (by level, type and grade), completion of study course, repetition, drop-out, and the like;
- (c) Teaching staff and other personnel;
- (d) Educational facilities (buildings, classrooms, laboratories, libraries, equipment, school meal and health services, and the like);
- (e) Educational expenditure and finance.

15.11. It is evident that on the whole the institutionalized data collection method traditionally used for these types of educational statistics is the most appropriate one. Nevertheless, household surveys may in a given situation provide a useful complementary source of information. For example, data on private expenditure on education could be obtained from such surveys to supplement the institutionalized statistics, as these may often be rather incomplete in this respect. Furthermore, on some occasions data regarding the socio-economic situation of pupils might usefully be collected by means of household surveys. The details must be worked out in each particular case, depending on the purpose and the capability of the survey and on specific conditions of the country.

## 2. Purpose

15.12. First of all, the purpose of including one or another item on education in a household survey depends on the overall nature and objective of the survey.

(a) *Education as main topic of a survey*

15.13. If education is the main topic, or one of several major topics, of a survey, the purpose, in principle, is to provide statistical information concerning the status and development of education (regular, adult and special, of all levels, types and grades) which is needed and which is not elsewhere available. The information should primarily refer to the country as a whole but to the extent possible, depending upon survey design, it is desirable to provide for breakdowns by major regions. Given the scope of the data (as presented in section 1 above) which deal essentially with educational characteristics of the population, the aim of the household survey in this connection is generally to throw light upon the outcome of the educational process in the country. This is reflected in the educational situation of individuals, that is, acquired knowledge and skills or lack of them.

15.14. Data concerning the main educational characteristics, literacy and educational attainment are key indicators to denote progress or critical shortcomings of the educational system over a long period of time. They thus have an important role to play in national plans for the advancement of both regular and adult education. In this connection it should be noted that literacy and educational attainment statistics may be particularly helpful if appropriate breakdowns by age and by specific categories within the population are provided, such as labour force, ethnic and religious groups, urban-rural, migrant workers, and so on.

15.15. To summarize, for household surveys mainly focusing upon education, the major motivation is to provide data which, along with other types of information, can serve as a basis for administration, planning, evaluation, study and research in the field of education.

(b) *Education as ancillary subject of a survey*

15.16. If, on the other hand, education is only an ancillary subject in a household survey, the situation is completely different. The purpose of the data on education is then to provide the means for studying possible interrelationships between the main topic of the survey and, for example, the literacy status and educational level of the individual concerned. Such connections may be anticipated between education and several socio-economic and other characteristics of the household, for example, conditions of work and employment, income, housing, nutrition, health, mortality and fertility.

## 3. Uses

(a) *Education as main topic of a survey*

15.17. Beginning again with the first alternative, where education is the main topic or one of the major topics of a household survey, the data are generally used for compilations, analyses and special studies devoted to the educational system in the country, including past trends, present situation and prospects for the future. In particular, such basic data and derived statistics can be utilized for evaluation, planning, projections, and similar studies. Literacy data are essential for developing an adequate network of adult education centres to combat illiteracy. Statistics on the educational attainment of the population, total as well as economically active, provide benchmark data for the process of planning the future educational system

to better meet the requirements of overall economic and social development.

(b) *Education as ancillary subject of a survey*

15.18. As for the second alternative, with education as an ancillary subject in a household survey, the data on education are primarily used to complement the statistics pertaining to the main topic so as to make possible analyses and special studies aimed at throwing light on the interrelationships among educational characteristics of the household and its members on the one hand, and the relevant demographic, economic, social and cultural subjects, and the like, on the other. In turn, the results of such analyses and studies can be exploited for planning purposes in various fields which bear upon household living conditions in the country. Again, this means that within the broader perspective of national planning for economic and social development, due consideration will be given to the important role of education for the fulfilment of development plans.

(c) *Reliability checks of census data*

15.19. In addition, the data on literacy and educational attainment obtained by means of household surveys can be utilized for testing the reliability of the same types of statistics collected in population censuses. In specialized sample surveys more time and resources can be devoted to a fairly detailed investigation of educational characteristics of household members than is the case in a large-scale statistical operation of the census type, covering a broad variety of different items.

(d) *Collaboration with users of data*

15.20. Finally, when considering possible uses of statistics collected through household surveys, it is as important for educational data as for other types of data that very close collaboration be established in planning and throughout the whole survey operation with potential users of the data. The specific needs of administrators, planners and research workers can then be appropriately matched and balanced against the technical knowledge of the survey operators, statistical, financial and personnel resources available, cost-efficiency considerations, and so forth.

15.21. It is only through careful preparations of this kind that adequate organization and content of the survey can be ensured, including proper selection of items and a reasonable degree of detail, so that optimal use is made of necessarily very limited resources. This holds true both when education is the main topic of a survey and in cases where it is only an ancillary subject. Normally it cannot be expected that the agency responsible for a household survey and the staff primarily engaged in this operation have a specialized knowledge of the field of education. Hence, for those in charge of such a survey it is essential to maintain the closest possible co-operation not only with subject specialists in the ministry of education and other relevant bodies, but also with statisticians working directly in this field.

#### 4. Needs

(a) *General considerations*

15.22. To determine exactly which types of data should be collected in order to best meet the objectives of a given statistical operation is invariably a rather intricate matter. Bearing in mind the scope and purpose of the sur-

vey in more general terms and the contemplated use of the data to meet particular needs of planners and administrators, one has to examine very carefully which items should be included in the survey and with what degree of detail. It is a well-known fact that exaggerated ambitions and expectations, especially on the part of future users of the data, pose a considerable risk of overburdening the survey with a variety of data and details, all of which are not absolutely indispensable in a given situation. As the resources available normally are very restricted, this might easily lead to a low level of precision and quality in the data collection process and thus be detrimental also to those data which are really essential for the major purpose of the survey.

15.23. From this, it is clear that the main emphasis of the survey, on education or on another topic, will have a direct effect upon the selection of items, the classifications to be used, and so on. Normally, broader content and a greater degree of detail will be aimed at when the survey is focusing on education. However, if the major concern is to study other topics, the education part of a survey must necessarily be limited to a few significant types of data, to illustrate the particular impact of education upon the demographic, economic or social phenomena in question.

(b) *Nature of the survey*

15.24. Another criterion with regard to data needs is obviously the nature of the particular survey in the general context of other surveys and other relevant statistical operations in the country. If the survey forms part of a continuing and systematic data collection scheme with surveys conducted on a regular basis and with rotating topics, the education element may at a certain phase of the operation be dealt with more comprehensively and in greater detail. On the other hand, in countries which still do not have continuous survey programmes established, it may be necessary to restrict the education content to a bare minimum of essential and highly significant items in order to cover a greater variety of other subject areas.

(c) *Co-operation with users*

15.25. Finally, it must be strongly emphasized again that for difficult decisions regarding the types of data and degree of detail to be retained in the field of education for a given household survey, very close co-operation must be established with those who will use the results of the survey. Only after a careful examination of survey content with users and with specialists in the various fields of statistics will it be possible to arrive at a realistic and balanced decision as to the data needs for the survey, choice of items and degree of detail.

## B. CONCEPTUAL ISSUES

### 1. *General considerations*

15.26. As is the case with all statistical undertakings, household surveys depend first of all upon a rational, systematic and logical approach with a well delineated universe and clear-cut concepts, definitions and classifications to meet their objectives. An important prerequisite for carrying out such a survey successfully is therefore a strict and concise conceptual framework. For those in charge of a household survey in which data on education

are to be collected, it is thus essential to be at least reasonably familiar with common terminology used in this field. To this effect, a few conceptual issues of a more general nature will be discussed in this section. Detailed guidelines concerning suitable standard definitions, methods of measurement and classifications for the principal education items will be presented in section C, below.

15.27. It goes without saying that strict adherence to established standards and norms, whether national or international, is of the utmost importance for achieving consistency and comparability with regard to the statistics obtained from household surveys. In countries where national statistical standards already exist for the field of education, they must be taken into account when organizing surveys. This is one important reason for maintaining close collaboration with ministries of education and other relevant agencies, as discussed above.

15.28. However, many countries, particularly among the developing ones, have not as yet established any comprehensive system of definitions and classifications relating to education. The discussion in this and following sections therefore primarily focuses upon international standards, norms and terminology which are widely used and accepted. This should, however, in no way prevent countries from working towards national definitions and classifications which properly reflect characteristic features of their respective educational systems and particular conditions in each country. At the same time, it is highly desirable to make such national standards as compatible as possible with current international systems in the same field.

## 2. Basic conceptual issues

### (a) Concept of education for statistical purposes

15.29. A general discussion of conceptual issues should first concentrate on how to delimit the field under study, namely, education. The first concern is to draw the boundaries of the universe to be covered as neatly and sharply as possible. Quite a number of different words and concepts may be encountered in education terminology, such as education, instruction, learning, training, study courses and programmes of different levels and types, intended for a variety of groups and specific categories within the population and with a broad range of objectives. This is not the place to enter upon a full-fledged discussion of such concepts and definitions nor to attempt a comprehensive definition of the concept education for overall purposes, still less to try to impose a standardized conception of the philosophy, aims, or content of education or reflect on its ideological or cultural aspects *per se*. What is essential here is to have a simple, deliberately short definition of education, even if it is arbitrary, to meet the practical requirements of statisticians. Such a definition is given in the *International Standard Classification of Education* (ISCED) established by UNESCO (118, p. 2), namely:

“Education is taken to comprise organized and sustained communication designed to bring about learning.”

15.30. For a proper interpretation of this definition, the following supplementary clarifications are provided (118, pp. 2-3):

(a) Communication requires a relationship between two or more persons involving the transfer of information;

(b) Organized is intended to mean planned in a pattern or sequence with established aims or curricula. It involves an educational agency which organizes the learning situation and/or teachers who are employed (including unpaid volunteers) to consciously organize the communication;

(c) Sustained is intended to mean that the learning experience has the elements of duration and continuity;

(d) Learning is taken as any change in behaviour, information, knowledge, understanding, attitudes, skills or capabilities which can be retained and cannot be ascribed to physical growth or to the development of inherited behaviour patterns.

15.31. Included, therefore, are activities that in some countries and in some languages may not usually be described as education, but rather as training or as cultural development. Excluded, however, are types of communication that are not designed to bring about learning or that are not planned in a pattern or sequence with established aims. Thus, all education involves learning but many forms of learning are not regarded as education. Leisure activities such as recreation, sports, and tourism which are not designed to bring about learning and which do not involve an organized educational programme are excluded from education. “Self-directed learning”, “family and socially directed learning” and “random learning” are excluded because they involve no organized agency or teacher in the above sense. Also excluded are isolated events involving no sustained educational activity, such as one or two public lectures, conferences or meetings; entertainment; information, advertising and sales programmes; other social and corporate activities, such as meetings of clubs or associations and work camps.

### (b) Principal types of education

15.32. From the administrative and organizational point of view, there are three principal types of education to be distinguished:

(a) Regular education;

(b) Adult education;

(c) Special education.

15.33. The first type of education corresponds to the traditional educational system, at all levels. This is regular school and university education, that is, the system that provides a “ladder” for children and young people who may progress from pre-primary or primary school through university (although many drop out on the way). Education of this type is covered regardless of ownership or sponsorship of the institution concerned (for example, public or private).

15.34. The second principal category, adult education, comprises education provided to people who are not in the regular school and university system, including adult literacy programmes as well as organized and sustained training for such groups as farmers, craftsmen, industrial workers or homemakers. Programmes of this kind may be arranged by government departments, industry, trade unions, the armed forces, and many other agencies. From a statistical point of view, this implies that this category is a highly differentiated and complex one, giving rise to numerous problems with regard to data collection, as the administrative framework is much less rigid and

well-defined than for the regular educational system. However, the statistician must face these difficulties and find practicable solutions so that the data collected reflect the factual situation as faithfully as possible.

15.35. In the past, the adult education sector was in many countries of relatively minor importance from a quantitative point of view. Lately, however, this situation has changed drastically, in line with modern developments in educational policy and planning. It is now widely recognized that education is not an instructional "package" provided to children and young persons in schools and universities, but is a continuing process providing opportunities for enlarging experience, understanding and skill throughout the life of the individual, through "permanent education" or "life-long education". Household surveys, because of their comprehensive population coverage, are well-suited to collecting statistics in this section.

15.36. The third category is, in effect, one which overlaps the former two categories in the sense that special education, organized specifically for various groups of handicapped or otherwise exceptional children, adolescents, or adults, may be discerned within both the regular education system and the adult education one.

### (c) *Content of education*

15.37. It should also be noted that teaching and learning may take place in all kinds of places, for example, in classrooms, community centres, or the open air, and by many methods, for example, lectures, discussions, practice work, correspondence, through any appropriate media, for example, books, teaching machines, radio, films, and television. It is thus the content and objectives of a learning process rather than varying organizational and technical arrangements that determine whether any given process should be considered as education or not. In the same way, education in principle embraces all types of pupils and students of all age groups, whether studying on a full-time or on a part-time basis, with varying characteristics and under varying circumstances.

15.38. As the concept of education is thus primarily focused upon the content or subject-matter of study, it is appropriate here to give a brief presentation of current terminology in that respect.<sup>1</sup>

15.39. The most detailed unit of education is denoted as a course and represents a planned series of learning experiences in a particular range of subject-matter or skills offered by a sponsoring agency and undertaken by one or more students. A selection of one or more courses is called a programme, mainly oriented towards a specific field and with an expressed or implied aim, such as qualification for more advanced study or for one or several occupations, or solely an increase in knowledge and understanding. Programmes which are related in terms of level and major subject-matter content may be combined into programme groups, identified in the ISCED system by a five-digit code. Programme groups related to the same general subject-matter or area are further aggregated into fields (ISCED three-digit code).

### (d) *Level of education*

15.40. Finally, there is the concept of level of education (ISCED one-digit code), which represents a broad section of the education "ladder", that is, the progression from very elementary to more complicated learning experience, embracing all fields and programme groups that may occur at that particular stage of the progression.

### (e) *Use of ISCED in household surveys*

15.41. As has been explained, the *International Standard Classification of Education* is a three-stage classification with a coding system of five digits, providing successive subdivisions from level to field to programme group. This system, adapted as necessary to particular conditions and requirements in the country concerned, may also be used in household surveys for classification of education. The degree of detail will depend on the purpose and nature of the survey. At this stage, it will suffice to indicate some basic elements in the ISCED system.

15.42. The "education ladder" is made up of the following major levels:

(a) Education at the first level (ISCED category 1), which usually begins between ages five and seven and lasts for about five or six years;

(b) Education at the second level, first stage (ISCED category 2), which begins at about age 10-12 and lasts for about three years;

(c) Education at the second level, second stage (ISCED category 3), which begins at about age 13-15 and lasts for about three years;

(d) Education at the third level (ISCED categories 5, 6 and 7), which begins at about age 17-19 and is of varying durations depending upon the stage, as discussed below.

15.43. A more comprehensive picture of the ISCED level-category pattern is obtained by using the one-digit classification in full, as follows:

- 0 Education preceding the first level
- 1 Education at the first level
- 2 Education at the second level, first stage
- 3 Education at the second level, second stage
- 5 Education at the third level, first stage, of the type that leads to an award not equivalent to a first university degree
- 6 Education at the third level, first stage, of the type that leads to a first university degree or equivalent
- 7 Education at the third level, second stage, of the type that leads to a post-graduate university degree or equivalent
- 9 Education not definable by level.

15.44. Here two new categories have been introduced: 0 (for pre-school education, nursery schools, kindergartens and similar institutions) and 9 (for types of education which do not lend themselves to the level concept). In addition, education at the third level has been broken down into three categories to provide for a more differentiated presentation of what has usually been called "university and other higher education" or "post-secondary education".

15.45. The next step in the ISCED system is the field. A detailed description of that part of the structure is beyond the scope of the present discussion. For this purpose

<sup>1</sup> For more detailed information, reference is made to the ISCED system (118).

ISCED itself should be consulted (118). However, by way of example, it may be mentioned that the two second level categories (ISCED codes 2 and 3) can be subdivided into the following major groupings of fields:

(a) General education, which stresses the theoretical, philosophic or mathematical aspects of the subjects covered, with little emphasis on technical subjects dealing with practical skills (ISCED codes 201 and 301);

(b) Teacher training (ISCED codes 214 and 314);

(c) Other education at the second level (ISCED codes 224, 234, 250, 252, 262, 266, 270, 278, 289, 318, 326, 334, 350, 352, 354, 362, 366, 370, 378 and 389).

15.46. With a similar subdivision at the third level, one arrives at an intermediate grouping of levels and fields comprising 18 categories (118, pp. 31-32), which might be of interest for some household surveys. The full three-digit classification contains some 100 categories and is thus relevant mainly for specialized surveys concentrating on an in-depth study of education.

### 3. Other conceptual issues of a general nature

15.47. Having dealt above with certain central conceptual issues in the field of education, this section will refer to a few concepts and terminological usages typical for educational statistics as such. Some familiarity with such concepts and expressions is helpful to place the whole area of educational statistics in perspective.

#### (a) Stock/flow

15.48. In the past, educational statistics were predominantly of a static character. Figures were presented concerning the number of pupils registered (enrolment) and teachers engaged at given points in time, without any attempt to describe in more detail the continuous process of evolution and change in these respects during and, above all, between the school years.

15.49. In modern educational statistics, there is a very clear trend towards a more dynamic approach. To this end, the concepts of stock and flow have been introduced. Instead of simply observing and reporting net changes in enrolment figures (stock data) from one school year to the following one, educational statisticians have recently developed and improved methods to follow cohorts of pupils year by year as they progress through the educational system (flow data). These are used to describe what happens to cohorts at each particular step of their "school career". Similarly, the flow approach can be used for teachers, analysing the movements into, within and out of the teaching staff.

15.50. Even with modest means, it is feasible to arrive at a fairly satisfactory data base for flow studies. With a view to assisting countries where only stock data still exist, UNESCO has developed a methodology for flow analyses giving special attention to evaluation of "educational wastage". Another methodology of interest to developing countries has been designed using specific registration numbers for pupils, identifying them with the original cohort of school entry (120). This coding system represents a substitute for a complete individualized data system and is intended for countries where lack of computer facilities makes the latter, more sophisticated approach impractical.

#### (b) Educational wastage

15.51. The important concept "educational wastage" is now currently used as a kind of "main heading" for the two phenomena, "repetition" and "drop-out". For statistical purposes, the following definitions may be used (125, p. 16):

"Drop-out or school desertion: leaving school before the completion of a given stage of education or leaving at some intermediate or non-terminal point in a cycle of schooling;

"Repetition: a year spent by a pupil doing the same work in the same grade as in his previous year in school;

"Educational wastage: incidence, in a country's education system, of drop-out and repetition."

15.52. In some countries very high levels of drop-out and repetition constitute an extremely serious problem. Continuous analyses are then indispensable to evaluate what might be called the internal efficiency or the "output" of the educational system. This is all the more important in situations where available resources are severely limited and where it therefore is imperative to use them with maximum efficiency. In certain cases, household surveys may be used to collect data on enrolment repetition and drop-out.

#### (c) Educational disparities

15.53. Another conceptual issue which also focuses on potential deficiencies of the educational system concerns educational disparities. Here it is the social aspect that is decisive, namely, questions of equal access to various kinds of education, the position of different population groups *vis-à-vis* the educational infrastructure, handicaps of a geographical, economic, cultural, ethnical nature, and the like. This is an area which so far has been much neglected, as traditional educational statistics have tended to study the education system in terms of structures and institutions. This is an information gap which can be filled by using the household survey approach, as the unit of observation should be the individual. The concern is with the individual's relation to the supply of educational services, that is, how people avail or do not avail themselves of educational facilities. In this connection, concepts such as access to education, distance to school, and the like also come to the fore.

15.54. This is a relatively new and unexplored sector of educational statistics which still lacks a generally accepted conceptual framework and a standardized terminology. However, this situation is changing as interested survey organizers undertake new work in this area. Various approaches are being tried in order to shed light on a complex problem of great importance for educational policy and planning.

## C. PRINCIPAL ITEMS OF INFORMATION

### 1. Items especially suitable for household surveys

15.55. As has already been pointed out above, household surveys lend themselves particularly well to collecting data on educational characteristics and activities of the population. Among items to be included in such surveys, the following are of first importance:

- (a) Literacy;
- (b) Educational attainment;
- (c) School attendance.

15.56. Depending upon the specific nature and purpose of the survey and upon particular conditions and requirements, other items might also be covered, such as educational qualifications, access to education (distance to schools and other educational institutions), and so forth. It must be recalled that it is not possible to present any firm recommendations on survey content with respect to the vast field of education because of the highly differentiated and flexible character of household surveys and the great variety of specific national circumstances throughout the world.

## 2. *Items normally included in educational statistics collected directly from educational institutions*

15.57. In section B.1, it was noted that institutionalized educational statistics as a rule will continue to be collected in the traditional way. A brief list of the most important types of data for this category was given in that section as background information, in order to convey some idea of the whole universe of educational statistics. It has furthermore been indicated that in particular cases, for example concerning private expenditure on education or the socio-economic characteristics of pupils and their households, the household survey approach is useful for collecting data pertaining to the "traditional" sector of educational statistics.

15.58. The next section presents a comprehensive review of standards recommended for the typical household survey items on education. The following section will refer briefly to similar standards for a few key elements in traditional educational statistics.

## 3. *International standards relating to educational characteristics of the population*

15.59. The following standard definitions, methods of measurement, and classifications are based on current international recommendations or, if recommendations do not exist, on commonly accepted practice. In cases where more detailed and specific information might be required for elaborating survey programmes, the reader is referred directly to the sources quoted.

### (a) *Literacy/illiteracy (124)*

#### (i) *Definitions*

15.60. A person is literate who can with understanding both read and write a short simple statement on his everyday life.

15.61. A person is illiterate who cannot with understanding both read and write a short simple statement on his everyday life.

15.62. A person is functionally literate who can engage in all those activities in which literacy is required for effective functioning of his group and community and also for enabling him to continue to use reading, writing and calculation for his own and the community's development.

15.63. A person is functionally illiterate who cannot engage in all those activities in which literacy is required

for effective functioning of his group and community and also for enabling him to continue to use reading, writing and calculation for his own and the community's development.

#### (ii) *Methods of measurement*

15.64. To determine the number of literates (or functional literates) and illiterates (or functional illiterates), any of the following methods may be used:

(a) Ask a question or questions pertinent to the definitions given above, in a complete census or sample survey of the population;

(b) Use a standardized test of literacy (or functional literacy) in a special survey. This method could be used to verify data obtained by other means or to correct bias in other returns;

(c) When none of the above is possible, prepare estimates based on:

(i) Special censuses or sample surveys on the extent of school enrolment;

(ii) Regular school statistics in relation to demographic data;

(iii) Data on educational attainment of the population.

#### (iii) *Classification*

15.65. The population aged 10 years and over should be classified first into two groups: literates and illiterates. Where appropriate, functional illiterates should also be distinguished.

15.66. Each of these groups should be classified by sex, and also by age in the following groups: 10-14, 15-19, 20-24, 25-34, 35-44, 45-54, 55-64, 65 years and over. Additional classifications should be made, where appropriate, for:

(a) Urban and rural populations;

(b) Such ethnic groups as are usually distinguished within a state for statistical purposes;

(c) Social groups.

### (b) *Educational attainment of the population (124)*

#### (i) *Definition*

15.67. The educational attainment of a person is the highest grade completed and/or the highest level of education attained or completed by the person in the system of regular, special and adult education of his own or some other state.

#### (ii) *Methods of measurement*

15.68. To measure the educational attainment of the population, the following methods can be used:

(a) Ask a question or questions pertinent to the definition given above, at a complete census or sample survey of the population;

(b) Where this is impossible, prepare estimates based on:

(i) Data from previous censuses or surveys;

(ii) Records over a number of years of school enrolment, of examination, of school-leaving

certificates, and of degrees and diplomas granted.

(iii) *Classification*

15.69. The population 15 years old and over should first be classified by educational attainment, expressed preferably in terms of highest grade completed, but at least in terms of level of education attained or completed. Wherever possible, distinction should also be made among different fields of study at each level.

15.70. Each of these groups should be classified by sex and also by age in the following groups: 15-19, 20-24, 25-34, 35-44, 45-54, 55-64, 65 years and over. Additional classifications should be prepared, where appropriate, for:

- (a) Urban and rural populations;
- (b) Such ethnic groups as are usually distinguished within a state for statistical purposes;
- (c) Social groups.

(c) *School attendance (124)*

(i) *Definition*

15.71. School attendance is defined as attendance at any accredited educational institution, public or private, for systematic instruction at any level of education at the time of the survey, or, if the survey is taken during the school vacation period, at the end of the last school year. Instruction in particular skills which is not part of the recognized educational structure of the country (for example, in-service training courses in factories), is not considered as school attendance for purposes of a survey.

(ii) *Methods of measurement*

15.72. Ask a question or questions pertinent to the definition given above, in the first place to all persons between the usual age for entrance into the first level of education and 24 years of age inclusive. If it is considered likely that a significant number of older persons is attending school, such information may also be collected for persons over 24 years of age. This is particularly the case in countries which may also wish to investigate attendance at facilities providing adult education, outside the regular school and university system.

15.73. It should be borne in mind that there is a very great variety of durations in adult education programmes. Accordingly, a question should be asked on the duration in hours of programmes for adults. The population in the relevant age range, as indicated above, should first be classified by level of education attended. Whenever possible, a classification by grade and broad fields of study should also be made. If adult education has been included, this sector of education should be shown separately and, preferably, should be classified according to ISCED five-digit (or three-digit) codes. In addition, those attending school should be classified by sex and five-year age groups. Additional classifications may be introduced, where appropriate, for urban and rural populations, ethnic and social groups, and the like.

(d) *Educational qualifications (124)*

(i) *Definition*

15.74. Educational qualifications are the qualifications (that is, degrees, diplomas, certificates, and the like) that

an individual has acquired, whether by full-time study, part-time study or private study; whether conferred in the home country or abroad; and whether conferred by educational authorities, special examining bodies or professional bodies. The acquisition of an educational qualification implies the successful completion of a course of study.

(ii) *Method of measurement*

15.75. Ask a question or questions pertinent to the definition given above, primarily to all persons having completed a course of study at the third level of education (ISCED codes 5, 6 and 7), regardless of the age of the person.

4. *Other international standards in the field of education*

15.76. As has already been emphasized, data on education collected through household surveys should not be seen in isolation but rather as an integral part of an overall statistical information system for the field of education as a whole. The international standards most directly relevant to educational data which might be collected in household surveys were discussed above. Standard definitions relating to other key elements in education statistics are summarized below (124):

(a) A pupil (student) is a person enrolled and/or registered in a programme of education;

(b) A teacher is anyone employed, even part-time and/or without remuneration, to communicate knowledge, skills, and the like;

(i) A full-time teacher is a person engaged in teaching for a number of hours customarily regarded as full-time at the particular level of education in each state;

(ii) A part-time teacher is one who is not a full-time teacher;

(c) A grade is a stage of instruction usually covered in the course of a school year;

(d) A class is a group of pupils (students) who are usually instructed together by a teacher or by several teachers;

(e) A school (education institution) is a group of pupils (students) of one or more grades organized to receive instruction of a given type and level under one teacher, or of various types and/or levels under more than one teacher, under the direct supervision of the head of the establishment (the school or educational institution is often the unit from which statistics may be secured):

(i) A public school is operated by a public authority (national, federal, state or provincial, or local), whatever the origin of its financial resources;

(ii) A private school is a school not operated by a public authority, whether or not it receives support from such authorities. Private schools may be defined as aided or non-aided, respectively, according as they derive or do not derive financial support from public authorities;

(f) The compulsory school-age population is the total population between the age limits of compulsory full-time education;

(g) Educational finance:

- (i) Receipts refer to cash received by or made available to or for schools, including appropriations, subventions, fees, cash value of property received as gifts, and the like;
- (ii) Expenditures refer to financial charges incurred by or on behalf of schools for goods and services. Expenditures, in turn, may be further subdivided into:
  - a. Current expenditures;
  - b. Capital expenditures;
  - c. Loan transactions.

15.77. Again, it should be recalled that the major instrument for classification regarding these various elements is the *International Standard Classification of Education* (118), the main features of which have already been dealt with above.

D. SPECIAL SAMPLING, MEASUREMENT AND OPERATIONAL ISSUES

1. *Sampling issues*

15.78. Regarding sample design and related preparations for household surveys in general, background information and technical advice is provided in part one of the present *Handbook*. For surveys which deal with education, it has to be examined in each particular case what further considerations may be required with due regard to the specific purpose and character of the survey, the role and importance of education and other subjects included in it, regional and local conditions, and the like.

15.79. In the case of household surveys which include education merely as an ancillary subject, such considerations will naturally depend first and foremost on the topic of major concern for the survey. Nevertheless, proper attention must at the same time be given to possible side-effects that the chosen sample design might have with respect to the educational characteristics of the population groups under study.

15.80. When education constitutes the main topic of a household survey or survey module or round, it is evident that decisions concerning sample design primarily have to be made after careful consideration of their practical implications for the various educational features to be investigated. As educational infrastructures and related circumstances vary very much from country to country, it is, however, difficult to establish any firm and universally applicable rules and guidelines as to how to proceed in order to ensure adequate representativeness of the sample in this respect. Moreover, the household survey approach has so far not been much used in the field of education, and practical experience is thus rather limited. It is therefore necessary to tackle this problem from case to case.

15.81. The needs for specific compilations and analyses are also of importance for the sampling arrangements to be made. If, for example, the survey aims at studying the educational situation of relatively small population groups, such as ethnic and religious minorities or migrant workers, particular attention has to be given to the adequacy of the sample.

15.82. A particular sampling issue concerns literacy and related problems of data quality. In order to ensure reasonably reliable information on literacy, enumerators

should use some simple test material to check, where required, the ability of each household member aged 10 and over to read and write. In certain cases, it may even be considered necessary to have recourse to more sophisticated test procedures as a complementary control measure. Such an in-depth investigation of literacy status implies, however, considerable demands on time and specialized personnel and could normally not be extended to more than a limited number of respondents. At the first stage of drawing up the sample design for the survey, the needs for this kind of reliability checking should be considered and provision made, where required, for an appropriately chosen subsample for this particular purpose.

2. *Measurement issues*

15.83. International recommendations concerning methods of measurement have been presented above, dealing with some of the educational characteristics of the population. Some further explanations and suggestions, especially regarding those concepts which may create specific difficulties for survey organizers, are given below.

(a) *Literacy*

15.84. At the outset, it should be emphasized that substantial experience in population censuses and special surveys indicates that the measurement of literacy presents quite particular problems. The concept itself may be given varying interpretations by those planning a survey, the enumerators, heads of households and the persons whose level of literacy is being measured. In effect, literacy in this connection should be seen as a continuous variable, ranging from the most elementary and mechanical ability to read and write a few words with great difficulty and no or little understanding to well-developed reading and writing skills that can be utilized for the most advanced purposes of communication. It is obvious that a person who can, for example, write only his name and some numerals and/or read just a few very simple words such as "eyes", "no", "good" or "bad", is not literate in any meaningful sense. The crucial problem is therefore to determine a threshold level within this wide range, corresponding to a reading and writing ability that really makes some sense for the individual concerned by enabling him to communicate with other people and to be informed by means of written language, at least in a very modest way.

15.85. The definitions given in paragraphs 15.60 and 15.61 above of a literate person and of an illiterate person are precisely formulated with the intention of describing a "bare minimum" level of literacy. The key words are "with understanding", to eliminate any kind of merely mechanical ability (rote learning) with no practical meaning, "short simple statement", to indicate a quite humble level of communication, and "everyday life", to signify that the message refers only to things that are very elementary and familiar to the person concerned.

15.86. Ever since this first definition of literacy was introduced by UNESCO in 1958, the need for a more qualified concept of literacy has been felt to supplement the above "bare minimum" level. Especially in formulating objectives for mass literacy campaigns at the international as well as at the national levels, it has been necessary to aim at a more ambitious degree of literacy, focusing primarily on the proper "functioning" of the individual in relation to his community and socio-economic

situation. Thus the concept of "functional literacy" has been created, corresponding to the third and fourth definitions above (paras. 15.62 and 15.63), definitions which were included in the 1978 revision of the UNESCO recommendation (124).

15.87. Functional literacy represents a significantly higher level of literacy which is clearly "work-oriented" and which puts special emphasis on the continuous use of the acquired ability in reading, writing and also calculation for practical purposes. The skills must be sufficiently advanced to make it possible for the individual to participate fully and effectively in activities commonly occurring in his life situation that require a reasonable capability of communicating by written language. This is applicable to both occupational activities and community life. A functionally literate person must, for example, be able to receive written instructions for his work, read newspapers, notices, advertisements, popular literature, and the like, write ordinary letters, notes and messages, and make elementary calculations, keep simple accounts, and so forth.

15.88. In view of this dualistic approach to the level of literacy, it is especially important that a sharp distinction be consistently maintained between the concepts literacy and functional literacy. The relevant questions in the survey form should closely follow the respective definitions and the enumerators must be provided with comprehensive instructions on how to ensure a correct interpretation of the replies obtained. It is also essential that such questions are not just answered by the head of the household on behalf of its other members but put directly to each individual aged 10 years and over. The enumerator will in this way have a better opportunity of controlling the answers received. The method of private interviews may also have the advantage of overcoming certain psychological inhibitions and prestige attitudes which tend to disguise the real literacy status.

15.89. In order to measure the literacy level of respondents as accurately as possible, enumerators should take every opportunity of verifying the received replies by means of various control questions. To this effect, it is appropriate that questions on educational attainment precede those on literacy so that immediate comparisons of the replies can be made and apparent mistakes corrected. It is obviously not possible to give any firm rules about the relationship between completed grades of regular schooling and the two literacy concepts in question as educational systems and other circumstances vary greatly from country to country. As a very tentative indication, however, it might be said that for an average developing country, literacy would roughly correspond to three to four years of primary schooling (repetition not included), and functional literacy to five to six years of such schooling. For those having participated in adult literacy courses instead, the corresponding time equivalents might be estimated, very approximately, at some 100 hours and 300 hours, respectively. However, there may be quite considerable individual variations. Even a respectable amount of regular or adult education is not a guarantee in itself against relapse into illiteracy when motivation or appropriate reading and writing material is lacking.

15.90. Other ways must therefore be sought to check and validate the literacy status claimed by the respondent. It is of great help if oral control questions can be combined with at least some simple test material, for example,

a set of "literacy cards" to be shown to respondents after they have answered the main literacy question(s). Such cards might contain a short printed paragraph followed by a few related questions to which the respondent should give a brief reply, if possible also in writing, thereby providing concrete proof of his ability to read and write with understanding. With the help of special instructions for the evaluation of these answers, the enumerators would then be able to determine whether the respondent was to be considered literate or not.

15.91. While some rather simple test material of this kind substantially increases the validity of data on literacy, it is evident that still better measurement of literacy levels can be obtained by introducing standardized achievement tests of a more comprehensive nature. By standardized test in this connection is meant a test for which the content has been selected and checked empirically, norms have been established, uniform methods of administering and scoring have been developed, and which may be scored with a relatively high degree of objectivity. Especially when dealing with functional literacy, such an achievement test, covering not only reading and writing but also arithmetic, is an ideal measurement tool. However, more elaborate tests of this kind are quite resource-demanding in terms of specialized personnel, time allocation, and the like, and they are usually administered in schools. As has already been indicated in paragraph 15.82 above, they are therefore as a rule utilized only on a subsample basis. Nevertheless, such standardized tests have a very important role to play in checking reliability with regard to the measurement methods ordinarily used for the survey as a whole.

15.92. Finally, it should be mentioned that the international guidelines on methods of measurement relating to literacy also include methods for the preparation of estimates. Direct information on literacy obtained through population censuses and special surveys is often rather scarce, and it may sometimes be helpful to have recourse to estimates to fill gaps in time series and for establishing projections. For technical advice, reference is made to the relevant UNESCO document (117). When preparing such estimates, specific national conditions should be taken into due account, for example, the impact of large-scale literacy campaigns.

#### (b) *Educational attainment*

15.93. To measure the educational attainment of a person requires, in principle, some investigation, more or less detailed, of his "school history" to determine which segment or point he has reached on the "educational ladder". This can, in practice, be done with different degrees of precision, as is apparent from the definition given in paragraph 15.67 above, giving a choice with regard to "the highest grade completed and/or the highest level of education attained or completed". In most cases, especially when education is a major topic in a survey, it is preferable to use the more precise alternative, that is, the highest grade completed at the highest level of education attained. Particularly for many developing countries, where drop-out rates are often high, restricting the information to the highest level completed implies extremely crude measurement of the stock of educated people and would, for example, deprive the survey organizers of useful control possibilities with respect to literacy responses.

Even among those who have not completed the first level of education as such, there may be a considerable number who have completed at least grade 3 or 4, who are thus potentially literate.

15.94. Once the choice has been made as to the degree of precision desired, it is important that the questions in the survey form and the related instructions are formulated in a clear and concise way so as not to give rise to any misinterpretation. The key words in the definition of "level" and "grade" have been given above in paragraphs 15.40 to 15.44. Reference was also made there to other possibilities of using the ISCED system, including, for example, groupings by fields of study. This might be of particular interest in connection with manpower studies, but the degree of detail to be introduced will naturally depend on the principal orientation and purpose of the survey.

15.95. It is very important to avoid any confusion between "highest grade completed" and number of years spent in school. A person may very well have stayed at school during seven years but, because of repetition of several grades, reached only grade 4 before leaving. For the measurement of educational attainment it is not the amount of time as such spent in educational institutions that is relevant, but instead the years successfully completed in terms of the educational level/grade structure.

15.96. It is also important to note that educational attainment is not confined to regular education only but should comprise adult and special education as well. Enumerators must devote special attention to these categories of education, which might otherwise easily be overlooked, and thereby also try to identify to the extent possible the level/grade equivalence in relation to the regular education system.

15.97. Finally, for those who are found not to have participated in any form of organized education, a special category, "no schooling", should be provided for in the reporting form.

### (c) *School attendance*

15.98. It should be noted that the term "attendance" must not in this context be given too narrow an interpretation, in the sense of physical presence at an educational institution on the day of the interview. What is essential is to identify all persons who in principle are to be considered as pupils or students, that is, enrolled and/or registered in a programme of education. Temporary absence because of illness or for other reasons should be disregarded.

### 3. *Operational issues*

15.99. This section will discuss some practical questions regarding the organization of data collection and field work in connection with surveys covering educational topics.

15.100. First of all, it should be recognized that detailed coverage of educational topics is relatively rare in household surveys and that survey organizers, enumerators and respondents as a rule are not sufficiently familiar with educational terminology, concepts and structures. Special care must be taken to ensure a clear, concise and consistent presentation of questions relating to education

in the survey form. It is essential to pre-test the questionnaire in order to find out whether these questions are properly understood and whether the answers can be considered as reasonably correct. In particular for countries with no or little experience of household surveys on education, pilot studies are indispensable to make sure that the envisaged survey is practicable in terms of operating procedures, time, budget and personnel allocation, and the like. The findings of such studies, together with experience, should be fully utilized for amending and improving questionnaires and instructions, as well as for preparing manuals and organizing training programmes for enumerators so as to achieve a technically correct and meaningful treatment of the education component of the survey. To that effect it is of great importance that the agency in charge of the survey operation maintain very close co-operation with the relevant educational authorities, particularly with the ministry of education, but where required, with local educational agencies, school inspectors, and the like, as well.

15.101. One particular form of educational involvement in survey planning and operation is achieved by recruiting enumerators from the teaching profession and/or among students and pupils in higher and secondary education, as appropriate. This type of arrangement has been practised in some countries where conditions are favourable and where in particular the survey operations can be efficiently synchronized with the respective educational activities. Undoubtedly, an educated field staff, often possessing valuable knowledge and experience of local conditions of relevance to the survey, is an asset for the survey project as a whole. In particular, it can be helpful in providing the required expertise for an adequate treatment of the education component.

15.102. What has been said so far about operational issues concerning educational subjects in general applies with even stronger emphasis with regard to literacy, which, as has been discussed above, is a relatively complex subject. Specific interview techniques and tools have to be developed, taking into due account relevant national, cultural and, where required, linguistic factors. The enumerators must be carefully prepared and trained in applying such techniques and methods of measurement in order to determine the degree of literacy of respondents as accurately as possible. In particular, detailed instructions should be given concerning the use of control questions and simple test material, "literacy cards" and the like, for checking the reliability of the answers. In the case of surveys with a dualistic approach, that is, literacy and functional literacy, enumerators must be given specialized training in distinguishing effectively between these two levels of literacy.

15.103. For the preparation of materials and the organization of training programmes, survey organizers should seek the advice and co-operation of the pertinent educational authorities, literacy boards, and the like. If standardized tests are to be used for a thorough examination of literacy levels, materials and procedures should be worked out in close collaboration with competent institutions specializing in pedagogics and psychometry.

15.104. Finally, it may be noted that some multilingual countries find it appropriate to introduce in their survey programme a specification of literacy according to language. One such example is given in the National Literacy

Survey in Kenya in 1976,<sup>2</sup> in which the principal question concerned the ability to read and write in the mother tongue. In addition, similar questions regarding Swahili and English were to be put to the respondents actually speaking those languages. The experience of this survey shows, however, that the diversified approach to literacy easily can lead to misunderstandings. In cases of this kind, it is therefore essential that the relevant questions are very clear and precise and that enumerators are given explicit instructions to keep the respective linguistic groups separate.

## E. POSSIBILITIES OF TABULATION AND ANALYSIS

### 1. Tabulations

15.105. The possibilities for compiling tables on various educational items collected in household surveys depend on quite a number of factors, including the principal purpose and nature of the survey, the specific place and role of education in this context and whether it is a major topic or an ancillary subject, the various educational items included, the data base and its degree of detail, the need for and feasibility of cross-classifications in different respects and sampling considerations. Careful attention must evidently also be given to the anticipated use of the tables for analysis and research purposes. A comprehensive and detailed tabulation programme can therefore only be drawn up for a particular survey programme taking into due consideration all these factors as well as specific national circumstances with regard to educational structures and socio-economic conditions.

15.106. This subsection therefore provides only a tentative list of a few basic and typical tabulations, corresponding to commonly occurring requirements for interpretation and analysis of survey data relating to the various educational items. These might provide a starting point for further adaptation to specific conditions and needs in each programme.

#### (a) Literacy

15.107. Initial tabulations might include:

(a) Population 10 years of age and over, by literacy, age group (10-14 years, 15-19, 20-24, 23-34, 34-44, 45-54, 55-64, 65 years and over) and sex;

(b) Population 15 years of age and over, by literacy, sex, urban and rural areas, and possibly major regions;

(c) Population 15 years of age and over, by literacy, sex and ethnic group;

(d) Population 15 years of age and over, by literacy, sex and social group.

#### *Special observations*

15.108. For surveys dealing with functional literacy, similar tabulations may be used for that subject.

15.109. In some developing countries, the average age for school entrance may be rather high, which means that data on literacy for the lowest age group, 10-14 years, are not very meaningful and can be omitted. The

rest of the age classification indicated above is, however, a minimum requirement for purposes of international comparisons, with the age of 15 years as a common lower limit.

15.110. In multilingual countries, specification by "language in which literate" may be introduced in the tabulations.

15.111. In the case of multi-subject surveys, tables concerning literacy might, in accordance with the purpose and character of such surveys, also include cross-classifications with demographic and socio-economic subjects of special relevance, such as fertility, employment, economic activity and occupation.

#### (b) Educational attainment

15.112. Initial tabulations might include:

(a) Population 15 years of age and over, by educational attainment, age group (15-19 years, 20-24, 25-34, 35-44, 45-54, 55-64, 65 years and over) and sex;

(b) Population 15 years of age and over, by educational attainment, sex, urban and rural areas and possibly major regions;

(c) Population 15 years of age and over, by educational attainment, sex and ethnic group;

(d) Population 15 years of age and over, by educational attainment, sex and social group.

#### *Special observations*

15.113. In principle, these tabulations should concern the total population of the particular age group, including both persons with completed education (that is, having left the educational system) and children and young people still undergoing education at the time of the survey (that is, remaining within this system). However, if the latter category includes a significant proportion of the population aged 15-24, it is recommended that the age group 25 years of age and over be used in preference to that of 15 years and over, as the educational status of those still in school is subject to change in the future.

15.114. Depending on the purpose and orientation of the survey, the tabulation programme might also provide for cross-classifications between educational attainment and certain demographic and socio-economic subjects of particular interest, such as fertility, mortality, employment, economic activity and income.

#### (c) Educational qualifications

15.115. Initial tabulations might include:

(a) Population that has successfully completed a course of study at the third level of education, by educational qualifications (degrees, diplomas, certificates, and the like), age group (15-19 years, 20-24, 25-34, 35-44, 45-54, 55-64, 65 years and over) and sex;

(b) Population that has successfully completed a course of study at the third level of education, by educational qualifications, sex, urban and rural areas and possibly major regions.

#### *Special observations*

15.116. In case the survey also covers qualifications (diplomas and certificates) pertaining to the second stage

<sup>2</sup> Conducted as part of the National Integrated Sample Survey Programme (175, 176).

of second level education, similar tables should be prepared for the persons having acquired such qualifications.

15.117. With due regard to the purpose and coverage of the survey and to sample error, educational qualifications might be cross-classified with, for example, economic activity, occupation and income.

(d) *Distance from school*

15.118. Initial tabulations might include:

(a) Number of households and population in households, by distance from the home to the nearest school at the first level of education, by urban and rural areas, and by major regions;

(b) Number of households and population in households, by distance from the home to the nearest school at the second level of education, by urban and rural areas and possibly by major regions.

*Special observations*

15.119. Depending on the local situation, the distance from the home to school may be classified by length of way (for example, 0-1 km, 1-3, 3-6, 6-10, 10 km and over), or, especially where school transport facilities exist, by travel time (for example, 0-10 minutes, 10-30, 30-60, 60-100, 100 minutes and over).

15.120. These examples of distance classifications are intended for schools at the first level of education. With regard to second level schools, where distances are usually of a quite different order of magnitude, the classification has to be adapted to the actual conditions. Moreover, in countries with a very sparse network of such schools, tabulation (b) would be of a rather theoretical interest in so far as rural areas are concerned.

15.121. Where special school travel and boarding facilities are organized, a supplementary table regarding the availability and use of such facilities should be introduced.

(e) *General remarks*

15.122. Finally, it must be recalled that the various tabulations briefly outlined above are only meant to serve as illustrative examples. The detailed choice and design of tables for a given survey will necessarily depend on the needs, potentialities and constraints of that particular survey. It is especially important to ensure that the degree of disaggregation in tabulations and cross-classifications is kept within reasonable and realistic limits, taking sampling error into account. Too detailed breakdowns may lead to so many very small figures as to be meaningless.

## 2. *Interpretation and analysis*

15.123. In reviewing possibilities of interpretation and analysis of survey data with regard to educational features and their relationships with other subjects covered by the survey, a few general observations may be kept in mind.

15.124. Theoretically, different analytical approaches are conceivable, but survey organizers must make their final choices from a purely practical standpoint, taking into consideration the specific purpose and nature of the survey. It is therefore necessary from the first stage of planning to examine carefully which methods of analysis are

most appropriate in a given survey situation and to adapt data collection and processing accordingly.

15.125. A properly designed tabulation programme constitutes in itself a basic instrument for interpretation and analysis of the data. Appropriate breakdowns and cross-classifications in these tables are essential for studying relationships between educational characteristics and certain demographic and socio-economic factors, such as age, sex, occupation and income.

15.126. On the basis of the material thus available, different statistical measures, such as percentages, rates, ratios, means, medians, standard deviations, and the like, can be computed for analyses and studies. Some typical examples of such derived statistics are given below, together with some further suggestions and explanations.

(a) *Literacy*

15.127. The two commonly used statistical measures related to literacy are complementary. The positive one, the literacy rate, represents the percentage of a given population which is literate. The negative measure, the illiteracy rate, gives the percentage of the population concerned which is illiterate. These rates have identical meanings, but there is a tendency to prefer the latter as the more "striking" measure, particularly in countries where mass illiteracy constitutes a serious problem.

15.128. Specific literacy and illiteracy rates may be calculated for adults age 15 and over and any other age range age 10 and over, such as 10-14, 15-19, 20-24, 25-34, and so forth. If functional literacy is covered by the survey, specific rates should be computed for that item in the same way.

15.129. It should be emphasized that these rates can be used for a variety of analytical purposes, not only within the static context of comparing different population groups for a survey conducted at a given point in time but also in a dynamic sense, studying changes in literacy over time on the basis of data from a series of surveys and censuses. Such time series are particularly important in connection with educational reforms and massive literacy campaigns in many developing countries, as they provide basic statistics for the evaluation of progress towards the eradication of illiteracy and other educational objectives.

(b) *Educational attainment*

15.130. The most direct and simple method of analysis for this item is to use percentage distributions by educational attainment for different population groups, in order to illustrate and compare their educational profiles. In effect, each percentage in such a distribution can be considered as an educational attainment rate for a specific level, or level and grade as the case may be, within the population group concerned.

15.131. It should be noted that the percentage rate for each category or grade of attainment relates to the completion of that grade, no more and no less. In order to measure the stock of educated people having completed at least a given grade, a cumulative grade attainment rate can be used.

15.132. Where a full distribution by grade is available, it is also possible to introduce a central tendency measure, for example, the median number of school years completed (taking care not to include repeated years). This

measure may be defined as the value which divides the distribution of the population by educational attainment (expressed as the number of school years completed and treated as a continuous quantitative variable) into two equal parts, one half of the cases falling below this value and the other half exceeding it. The median number of school years completed may be quite useful for the purpose of comparisons between different population groups and over time. However, for countries where the majority of the population has no or very little schooling, this measure is not very useful. In the extreme case, it can even assume the value of 0 (more than 50 per cent of the population with no schooling at all).

15.133. As for orientation of the analytical work, it may be mentioned that in multi-subject surveys there are particularly interesting possibilities for studying relationships between educational attainment and certain demographic and socio-economic factors, such as fertility, economic activity and income.

(c) *Educational qualifications*

15.134. Methods of presentation and analysis for this item have to be rather flexible, depending on the particular survey, degree of detail of available data, type of classification used, and the like.

15.135. In general, at least some overall educational qualification rates should be calculated to indicate the relative order of magnitude of the stock of persons with special qualifications, for relevant broad age groups of the population. To the extent possible further differentiation should be made by fields of specialization in order to allow comparisons with the needs for skilled personnel in various economic and social sectors. However, as has been mentioned above, caution should be exercised not to go into too detailed breakdowns of this usually rather small category of highly educated people, taking the sampling error into proper consideration.

(d) *Distance from school*

15.136. A percentage distribution of households, as well as population by distance from school, is the natural basis for studying the physical aspect of access to education. In addition, the median distance, expressed in physical distance or in travel time, as appropriate, could be used as a central tendency measure so as not to overrate extreme distances.

15.137. In the analysis pertinent information on school transport and boarding facilities should be taken into account. Useful indicators in this respect could be the proportions of households having access to such facilities on the one hand, and of households actually utilizing them on the other.

## F. METHODS OF EVALUATION OF DATA QUALITY

15.138. Data on education collected by means of household surveys are inevitably, like other types of data in such surveys, subject to errors of various kinds. Many questions concerning the quality of survey data have already been discussed in part one of the present *Handbook*. In the present section, issues which relate specifically to data quality in the field of education are discussed.

15.139. As has already been noted, education has to

date been relatively rare as a primary subject in household surveys, and, as a result, experience regarding the quality of educational data collected by means of such surveys is rather limited. There are nevertheless some findings which tend to indicate that data on education are subject to particular risks of error because respondents, and even enumerators and survey organizers, often have not been familiar with educational topics and the related, specific terminology. In addition, it is possible that respondents sometimes deliberately give inaccurate answers, for example concerning literacy and educational attainment, for reasons of personal prestige.

15.140. In these circumstances, it is evident that the problem of data quality has to be given special attention during the whole survey operation. Various methods can be used in order to reduce the risk of errors as much as possible, depending on the particular survey situation, personnel and other resources available, supplementary sources of information for comparison and control, and so forth.

15.141. Primarily, it is of great importance that all possible efforts be made to ensure continuous evaluation of data quality throughout field operations, data processing, compilation of tables, preparation of reports and analysis. Comparisons should be made wherever possible with data collected in other ways, for example, in population censuses and from educational institutions. There are also possibilities for internal logical checks between different topics in the survey programme, such as literacy and educational qualifications.

15.142. In addition, special in-depth investigations could be undertaken subsequent to the main survey in order to test the validity of answers obtained in the original round of interviews. Such post-enumeration tests are of particular importance for evaluation of the quality of data on literacy. As was emphasized in section E above, the measurement of literacy in the usual type of survey and census operation is subject to important limitations. It cannot normally be expected that the time allowed for interviews and the qualifications of interviewers will be sufficient to determine the level of literacy of respondents with the desirable precision, especially when there is need for a clear distinction between simple literacy and functional literacy.

15.143. The most adequate method to check the reliability of responses concerning literacy obtained by means of routine interviews is to use standardized achievement tests for an appropriately chosen subsample of the survey population. With such tests, conducted by specialized personnel and using uniform methods of administering and scoring the individual tests, the degree of literacy can be determined with satisfactory precision.

15.144. One example of an extensive standardized test of reading and writing ability for post-enumeration testing is from the 1953 population census in Yugoslavia (446). The major result of this in-depth investigation was that census data on literacy are not likely to be very reliable, but that the degree of precision may vary considerably depending on the specific conditions. Two main problems were identified. One concerned the extreme cases, complete illiteracy and very high literacy, which normally should not raise any problems but which might nevertheless be wrongly classified because of an inadequate system of enumeration. The other concerned intermediate cases

which presented serious difficulties of a conceptual nature related to the lack of a criterion as to the level of ability to write and read at which literacy begins. In any case, an important conclusion of this post-enumeration survey was that the chosen method of sampling control of literacy data did not raise any serious difficulties.

15.145. Another example of such a method for evaluation of literacy data relates to a post-enumeration study in connection with a special survey of personnel in the Iranian Oil Company, 1955, cited in (444). This study was based on reading and writing tests of a simpler type,

but it is of particular interest because it was concerned with literacy in both the national language, Farsi, and in English. In both cases it was concluded that there was a fairly significant correlation between the census determination of literacy and test performance. It was, however, also found that comparability between literacy levels in the two languages was difficult to achieve, even with the use of tests. It is interesting to note that both studies concluded (contrary perhaps to general belief) that there was not a systematic bias towards overstating one's level of literacy.

## XVI. CULTURE

16.1. The two main topics related to culture which have been covered in household surveys are the cultural facilities of households and the use of free time. Both topics are of paramount importance in any discussion of cultural development as they are closely linked to participation in cultural activities. Statistics on the cultural facilities of households, together with statistics on facilities outside the household, such as cinemas, theatres and libraries, may be used to measure access to cultural activities. The use of free time provides statistics on participation in cultural activities and sums up information on the use made of the cultural facilities of households and those of the community at large.

16.2. Few household surveys have been conducted which specialized in cultural topics, but many surveys have covered cultural facilities and use of free time to a greater or lesser degree. The present chapter draws on this experience, and it is hoped that the information in it will be used to expand the range and frequency of such coverage in future surveys and in turn facilitate the study of cultural topics and their relation with other socio-economic topics.

### A. SCOPE, PURPOSE AND COVERAGE

16.3. Survey coverage of cultural topics should aim at obtaining quantifiable information on access to cultural resources and on participation in cultural activities which can be used in planning programmes for the dissemination of culture. It should lead to the identification of the cultural resources accessible to the population, as well as the cultural activities which they engage in. The combined knowledge of available resources and of the actual use which people make of them enables identification of the basic characteristics of what might be called "cultural demand".

16.4. By cultural resources is meant the sum total of available goods and services making possible or facilitating the conduct of cultural activities in a wide sense, going beyond the traditional concept which confines them to activities directly connected with the fine arts. Viewed in this way, cultural activities are those through which members of a society express themselves, develop their potential and expand their personalities.

16.5. Obtaining information on access to cultural resources requires:

(a) The identification of available cultural resources, which for present purposes will be confined to those connected with:

- (i) Modern media for the dissemination of culture: books, newspapers, magazines, radio, television;
- (ii) Traditional media for the dissemination of culture: the oral tradition;

(iii) Goods (tools and equipment) used for activities in the arts and crafts and in play and sport; and

(b) The identification of the use made of the available cultural resources.

16.6. Obtaining data on participation in cultural activities requires:

(a) The identification of activities in which the available cultural resources are used;

(b) The identification of activities carried out during free time.

16.7. The survey topics which are considered here include not only cultural activities linked to the modern media, as indicated, but also "oral traditions", as recommended by many Governments to UNESCO. Originally, it was thought that oral traditions would comprise the major portion of cultural activities in some communities, but it has been found that modern media such as radio have permeated virtually all communities to such an extent that it is unrealistic to concentrate purely on oral traditions. Hence, oral tradition is covered in the topics here as one cultural resource among various others. An attempt is made to ascertain basically the aspects connected with its dissemination: the kinds which are known and used, the persons involved, the circumstances of dissemination and so on.

16.8. Surveys covering topics in the field should obtain information on characteristics of the cultural facilities of the households and the amounts of free time of household members and the activities to which this time is devoted, in addition to the usual demographic and socio-economic characteristics of the household and its members, as discussed in chapter IX. These two topics are covered by the illustrative questions presented in the annex to this chapter. Section I of the annex takes the household as the statistical unit and presents questions on cultural facilities in the household, such as books, magazines and equipment and supplies for arts and crafts, hobbies and games. Section II presents questions concerning individuals' use of free time, mainly in terms of activities they engage in. Most countries restrict the coverage of statistics on the use of time to persons 10 or 15 years of age and over.<sup>1</sup>

### B. CULTURAL FACILITIES OF HOUSEHOLDS

16.9. The concept of cultural facilities of households refers to the cultural goods and services (resources) which are available in the household. Investigation of the cultural facilities should be accompanied by investigation of their use. The mere existence of a resource constitutes an incomplete datum, concerning as it may a resource which is unused or underused by the members of the household.

<sup>1</sup> See (110) for further information.

16.10. The first set of illustrative questions in the annex aims to:

- (a) Determine the cultural resources of the household;
- (b) Determine who among the various members of the household are users of the different cultural resources; and
- (c) Obtain information on the use of the resources, particularly as regards the selection made of them and the concrete content of activities for which they are used most. These three objectives lead to the overall objective, which is to identify the cultural circumstances of the household and their influences on the household members.

16.11. The following three categories of resources or cultural goods are usually taken into account:

- (a) Resources connected with modern media for the dissemination of culture. These include printed and electronic media, such as books, magazines, newspapers, radio sets, television sets, tape recorders;
- (b) Resources consisting of the oral tradition understood as a traditional medium for the dissemination of culture; and
- (c) Resources connected with the carrying out of activities in play, the arts, crafts and sport.

16.12. The principal concepts in the illustrative questions are defined as follows:

- (a) Modern media for the dissemination of culture. These are instruments used to send out messages to wide-spread (sometimes very heterogeneous) sections of the public. One medium consists of printed material, such as books, newspapers and magazines. Among others are the electronic media, such as radio, television, tape recorders and cinema;
- (b) The oral tradition or oral literature. This consists of traditional artistic forms of expression which are handed down by word of mouth from one generation to another. Apart from a literary or aesthetic aspect, the oral tradition transmits messages and in this sense is an element of cultural preservation and dissemination. It takes many different forms, such as myths, legends, tales, poetry, sayings and riddles;
- (c) Cultural resources. These consist of the available goods and services which make possible or facilitate the conduct of cultural activities, understood in a wide sense which goes beyond the usual concept whereby cultural activities are limited to those directly connected with the fine arts. Viewed in this way, cultural activities are those through which members of a society express themselves, develop their personality and exercise their creativity.

### C. USE OF FREE TIME<sup>2</sup>

16.13. Research on time-budgets goes back over 60 years and was very extensive between the two world wars, especially in countries which had attained relatively high levels of industrialization and urbanization. The development of the mass media after the Second World War gave impetus to such research, with radio and television audience research a focus of activity.

16.14. The interest of UNESCO in time-budgets and leisure started in 1965 in the context of the relationship

between adult education and leisure. A regional conference held at Prague in 1965 on that issue recommended that UNESCO encourage comparative research in a number of countries in collaboration with the International Labour Organisation and specialized institutions. That recommendation resulted in the pilot international comparative research project on time-budgets, carried out in 1965 and 1966 and covering urban areas in 12 countries (433).

16.15. Use of free time has since been the subject of surveys of various kinds carried out regularly in many countries. A number of countries publish data regularly on time used for leisure activities. For example, the *Social and Cultural Report, 1978*, of the Netherlands tabulates time used for leisure according to the following classification of activities:

- (a) Visiting and entertaining;
- (b) Television, radio, sound reproduction equipment;
- (c) Newspapers, magazines and books;
- (d) Resting;
- (e) Political, social, religious or club activities;
- (f) Going out;
- (g) Recreation outdoors;
- (h) Hobbies, sport and games;
- (i) Jobs in the home, gardening or looking after plants or animals;
- (j) Total as a percentage of the whole week;
- (k) Number of persons.

These are cross-classified by the following population groups:

- (a) Total population;
- (b) Men, women;
- (c) Under 30, over 50;
- (d) Single persons, parents with children under 14;
- (e) Working men, working women (working 20 hours or more per week);
- (f) Homemakers, schoolchildren and students, retired men;
- (g) Primary education, secondary education and above;
- (h) Lower occupation level, higher occupation level (occupation of head of household).

16.16. The illustrative questions in section II of the annex also incorporate the concern with oral tradition in cultural activities which has already been discussed.

16.17. The distinction between "free time" and "time used for leisure activities" should be clearly made. Both fall within the overall coverage of time-budgets. The total amount of time at people's disposal, being constant, is distributed among the various activities which they carry out. The most elementary division is the distinction between time taken up by the conduct of productive or educational activities and free time, the latter being broken down into time used for satisfying basic (physiological) needs (sleeping, eating and the like), time devoted to the fulfilment of social obligations (religious, family and the like) and leisure time.

16.18. The illustrative questions in section II of the annex are addressed to the use of time, of which free time is a component. They are intended to:

<sup>2</sup> *Ibid.*

(a) Ascertain the amount of time which people spend each day in:

- (i) Carrying out their productive or educational activities;
- (ii) The travel time required to carry out these activities;
- (iii) Sleeping.

These activities take up roughly two thirds of available time;

(b) Ascertain the amount of free time available for leisure activities on a daily, weekly and yearly basis. The expression "weekly" or "weekend" represents the day or days (possibly the hours) which remain available once the working or school week is finished;

(c) Identify the activities which are carried out during free time and establish preferential activities. It is also desirable to obtain information on individuals' aspirations and limitations as regards their use of free time.

16.19. The main concepts above are defined as follows:

(a) Activity time is that time given over to work in a job or a profession or to studies which are part of an educational programme;

(b) Free time is that time which is available after normal and extra working or studying hours and travel time between the home and the place of work or study.

#### D. STATISTICS OF EXPENDITURE ON CULTURAL ACTIVITIES

16.20. The General Conference of UNESCO at its twenty-first session at Belgrade adopted the Recommendation Concerning the International Standardization of Statistics on the Public Financing of Cultural Activities. Member Governments of UNESCO have stated that, while it is desirable for national authorities to collect statistics relating to the public financing of cultural activities for general information and for the use of those responsible for cultural policy and planning, the collection of such statistics should not be limited to public expenditure on culture, but should cover private expenditure as well.

16.21. In countries where household budget data are collected, expenditure on cultural activities is often lumped together with expenditure for various other purposes. When expenditure on cultural activities is identified as such, a breakdown according to the different cultural goods and services is seldom given. In addition to the illustrative questions discussed above on cultural facilities of households and use of free time, an item on expenditure might be added against each category of cultural equipment selected for the survey and against each of the recreational and leisure activities purchased. These expenditure items for cultural goods and services could be integrated with household budget topics, as discussed above in chapter X.

#### E. TABULATIONS

16.22. Cultural activities based upon "oral traditions" should be classified by urban and rural. The list of items of data discussed in section I calls for tabulations according to economic groups or household in-

come. Cross-classifications with "cultural equipment of the home" would allow useful analysis.

16.23. Other classifications relating to individuals could be done according to sex, age, employment and level of education, especially as regards "use of free time". The classification urban/rural is also of great importance for "use of free time" and for "cultural equipment of the home".

16.24. A wide choice of tabulations is left open to the researcher, policy-maker or planner in the field of cultural development, on the basis of the primary data collected at the level of individual observations.

#### ANNEX

##### Illustrative Questions on Cultural Facilities of Households and Use of Free Time\*

##### I. CULTURAL EQUIPMENT OF THE HOME

##### 1. Books in the home

1.1 Are there any books in the home?

Yes \_\_\_ No \_\_\_ No information \_\_\_

Go on to 1.5

1.2 How many books does the collection comprise?

\_\_\_ books No information \_\_\_

1.3 Which subjects does the collection cover?

Social sciences	1	2	3
Pure or applied sciences	1	2	3
Religion	1	2	3
Philosophy	1	2	3
Literature	1	2	3
History	1	2	3
Geography	1	2	3
Art	1	2	3
Reference books	1	2	3
Other subjects	1	2	3
			No information ___

Observations on the contents of the collection

1.4 Do school textbooks make up half or more than half the collection?

Yes \_\_\_ No \_\_\_ No information \_\_\_

1.5 Who in the home reads books?

Regular readers \_\_\_\_\_

Occasional readers \_\_\_\_\_

No information \_\_\_

1.6 Do members of the home borrow books?

\_\_\_ Never

\_\_\_ Always

\_\_\_ Frequently

\_\_\_ From time to time

Go on to 2

No information \_\_\_

1.7 The borrowed books come from:

\_\_\_ Public libraries

\_\_\_ School libraries

\_\_\_ Specialized libraries

\_\_\_ Libraries in the film

\_\_\_ Relatives and friends

\_\_\_ Others

No information \_\_\_

\* This material is drawn from a trial survey on access to cultural resources and participation in cultural activities, conducted by the Antioqueñan Social Studies Foundation, Antioqueña, Colombia.

2. *Magazines in the home*

2.1 Do any magazines come into the home?

Yes \_\_\_ No \_\_\_ No information \_\_\_  
 Go on to 3

2.2 What sort of magazines come into the home, how often and who are their regular readers?

Type of magazine	How often acquired	Regular readers
General information		
Sport		
Home and varieties		
Technical/scientific		
Photographic		
Tricks		
Politics		
Religion		
Strip cartoons		
Other types		

No information \_\_\_

2.3 How are the magazines coming into the home acquired?

\_\_\_ Bought  
 \_\_\_ Borrowed  
 \_\_\_ Hired  
 \_\_\_ Other ways

No information \_\_\_

3. *Papers in the home*

3.1 Do daily papers or periodicals come into the home?

Yes \_\_\_ No \_\_\_ No information \_\_\_  
 Go on to 4

3.2 Which papers come into the home, how often and who are their regular readers?

Paper/periodical	How often acquired	Regular readers

No information \_\_\_

3.3 How are papers usually acquired?

\_\_\_ Bought  
 \_\_\_ Borrowed  
 \_\_\_ Others

No information \_\_\_

4. *Radio in the home*

4.1 Are there any radios in the home?

Yes \_\_\_ No \_\_\_ No information \_\_\_  
 Go on to 5

4.2 How many radios are there in the home?

\_\_\_ radios No information \_\_\_

4.3 For the radio which the greatest number of members in the home listen to: identify the types of programmes which are tuned into and their regular listeners; select the types of programmes which are listened to the most every day:

Types of programmes tuned into	Regular listeners	Types of programmes most listened to each day
Educational		1 2 3
Musical		1 2 3
Sports		1 2 3
News		1 2 3
Problem page		1 2 3
Comedy		1 2 3
Radio plays and novels		1 2 3
Others		1 2 3

No information \_\_\_

5. *Television in the home*

5.1 Are there any television sets in the home?

Yes \_\_\_ No \_\_\_ No information \_\_\_  
 Go on to 6

5.2 How many television sets are there in the home?

\_\_\_ television sets No information \_\_\_

5.3 For the television set used by the greatest number of members identify the programmes which are watched and preferably state who the regular television viewers are:

Programmes	Regular viewers
1.	
2.	
3.	

No information \_\_\_

6. *Sound reproduction equipment in the home*

6.1 Are there any radiolas or tape-recorders in the home?

Yes \_\_\_ No \_\_\_ No information \_\_\_  
 Go on to 7

6.2 How many radiolas and tape-recorders are there in the home?

\_\_\_ Radiolas and tape-recorders No information \_\_\_

6.3 How many records and tapes are there in the home?

\_\_\_ Tapes  
 \_\_\_ Records No information \_\_\_

6.4 Identify the types of tapes and records to be found in the home and state for each type the regular users; classify the types according to the size of their share of the total collection:

Type of records or tapes	Regular users	Make-up of the collection
Classical		1 2 3
Folk		1 2 3
Popular		1 2 3
Others		1 2 3

No information \_\_\_

7. *The oral tradition in the home*

7.1 Are any oral traditions known to you in the home?

Yes \_\_\_ No \_\_\_ No information \_\_\_  
 Go on to 7.6

7.2 What type of oral traditions are known to you? To whom are they known?

Types of oral tradition	Members knowing them
Myths	
Legends	
Tales	
Folk jokes	
Folk-songs and poems	
Sayings and proverbs	
Riddles	
Others	

No information \_\_\_

7.3 Among the various types of oral traditions known to you, state the three (3) most used in the home:

1.  
 2.  
 3.

7.4 On what occasions do you tell or recount the types of oral tradition which you mentioned as most frequently used in the home?

\_\_\_ From time to time in daily life  
 \_\_\_ At informal gatherings  
 \_\_\_ During special celebrations  
 \_\_\_ On other occasions

1.  
 2.  
 3.

7.5 When oral traditions are recounted in informal gatherings or at special celebrations in the home, who does the telling?

No information \_\_\_

7.6 Do the members attend gatherings or celebrations outside the home, where oral traditions are recounted?

Yes \_\_\_ No \_\_\_ No information \_\_\_  
 Go on to 8

- 7.7 On what occasions are oral traditions recounted outside the home?  
 \_\_\_ At informal gatherings  
 \_\_\_ At special celebrations  
 \_\_\_ On other occasions  
 No information \_\_\_

8. Art or craft activities in the home

- 8.1 In the home, are there any implements or tools designed for use in art or craft activities?  
 Go on to 9

Yes \_\_\_ No \_\_\_ No information \_\_\_

- 8.2 Identify the tools or implements for the conduct of art and craft activities to be found in the home, and their regular users:

Implements \_\_\_\_\_ Regular users \_\_\_\_\_  
 No information \_\_\_

II. USE OF FREE TIME

For persons aged 12 and over who are in employment or studying

1. Apart from the main activity which you mentioned in form I, do you carry out any other productive or educational activities?  
 Yes \_\_\_ No \_\_\_ No information \_\_\_

Type of activity Regularity Time required

1.  
2.  
3.

No information \_\_\_

2. Excluding travelling time, how much time does your main activity take up each day?  
 \_\_\_ hours \_\_\_\_\_ minutes

No information \_\_\_

3. How much time do you spend each day in travel between your home and the place or places where you carry out your activities?

Main activity: \_\_\_ hours(s) \_\_\_ minutes

Secondary activities: \_\_\_ hours(s) \_\_\_ minutes

No information \_\_\_

4. How many hours do you sleep each day?  
 \_\_\_ hours \_\_\_\_\_ minutes

No information \_\_\_

5. Excluding the time you devote to the above-mentioned activities, how much free time do you have in the day?  
 \_\_\_ hours \_\_\_\_\_ minutes

No free time \_\_\_

No information \_\_\_

6. How much time do you have for the "weekend" rest?  
 \_\_\_ days \_\_\_\_\_

No time \_\_\_

No information \_\_\_

7. How much time do you have for annual holidays?  
 \_\_\_ months \_\_\_\_\_ days

No time \_\_\_

No information \_\_\_

(For persons having replied in the affirmative to question No. 5)

8. What do you do during your daily free time?

- \_\_\_ 1. Reads  
 \_\_\_ 2. Listens to the radio  
 \_\_\_ 3. Watches television  
 \_\_\_ 4. Listens to records or tapes  
 \_\_\_ 5. Goes to the cinema  
 \_\_\_ 6. Holds conversation  
 \_\_\_ 7. Recounts, or listens to others recounting, stories, legends, tales or traditional episodes  
 \_\_\_ 8. Does craft work:  
 \_\_\_ 8.1 Sewing or embroidery  
 \_\_\_ 8.2 Ceramics  
 \_\_\_ 8.3 Pyrography  
 \_\_\_ 8.4 Sculpture and carving  
 \_\_\_ 8.5 Other handicrafts  
 \_\_\_ 9. Does manual work  
 \_\_\_ 10. Cultivates an art:  
 \_\_\_ 10.1 Painting  
 \_\_\_ 10.2 Sculpture  
 \_\_\_ 10.3 Writing

- \_\_\_ 10.4 Dancing  
 \_\_\_ 10.5 Choir singing  
 \_\_\_ 10.6 Playing musical instruments  
 \_\_\_ 10.7 Acting and other theatrical work  
 \_\_\_ 10.8 Other artistic activities  
 \_\_\_ 11. Practises a sport  
 \_\_\_ 12. Plays  
 \_\_\_ 13. Bets  
 \_\_\_ 14. Carries out unpaid activities connected with his work  
 \_\_\_ 15. Does school work  
 \_\_\_ 16. Takes part in civic, political, cultural or religious activities  
 \_\_\_ 17. Attends recreational events  
 \_\_\_ 18. Attends artistic or cultural events  
 \_\_\_ 19. Goes to public meeting-places  
 \_\_\_ 20. Attends sporting events  
 \_\_\_ 21. Makes or receives visits  
 \_\_\_ 22. Has a drink  
 \_\_\_ 23. Does home-improvement work  
 \_\_\_ 24. Does domestic chores  
 \_\_\_ 25. Goes shopping or does errands connected with the management of the home  
 \_\_\_ 26. Does nothing  
 \_\_\_ 27. Carries out other activities

If any of these activities are carried out simultaneously, note them and put a ring round the number corresponding to the one considered as most important.

No information \_\_\_

(For persons having replied in the affirmative to question No. 6)

9. What do you do during your weekend free time?

- \_\_\_ 1. Reads  
 \_\_\_ 2. Listens to the radio  
 \_\_\_ 3. Watches television  
 \_\_\_ 4. Listens to records or tapes  
 \_\_\_ 5. Goes to the cinema  
 \_\_\_ 6. Holds conversation  
 \_\_\_ 7. Recounts, or listens to others recounting, stories, legends, tales or traditional episodes  
 \_\_\_ 8. Does craft work:  
 \_\_\_ 8.1 Sewing or embroidery  
 \_\_\_ 8.2 Ceramics  
 \_\_\_ 8.3 Pyrography  
 \_\_\_ 8.4 Sculpture or carving  
 \_\_\_ 8.5 Other handicrafts  
 \_\_\_ 9. Does manual work  
 \_\_\_ 10. Cultivates an art:  
 \_\_\_ 10.1 Painting  
 \_\_\_ 10.2 Sculpture  
 \_\_\_ 10.3 Writing  
 \_\_\_ 10.4 Dancing  
 \_\_\_ 10.5 Choir singing  
 \_\_\_ 10.6 Playing musical instruments  
 \_\_\_ 10.7 Acting or other theatrical work  
 \_\_\_ 10.8 Cultivates another artistic activity  
 \_\_\_ 11. Practises a sport  
 \_\_\_ 12. Plays  
 \_\_\_ 13. Bets  
 \_\_\_ 14. Carries out unpaid activities connected with his work  
 \_\_\_ 15. Does school work  
 \_\_\_ 16. Takes part in civic, political, cultural or religious activities  
 \_\_\_ 17. Attends recreational events  
 \_\_\_ 18. Attends artistic or cultural events  
 \_\_\_ 19. Goes to public meeting-places  
 \_\_\_ 20. Attends sporting events  
 \_\_\_ 21. Makes or receives visits  
 \_\_\_ 22. Has a drink  
 \_\_\_ 23. Does home-improvement work  
 \_\_\_ 24. Does domestic chores  
 \_\_\_ 25. Goes shopping or does errands connected with the management of the home  
 \_\_\_ 26. Attends fiestas and public celebrations  
 \_\_\_ 27. Goes walking  
 \_\_\_ 28. Does nothing  
 \_\_\_ 29. Carries out other activities

If any of these activities are carried out simultaneously, note them and put a ring round the number corresponding to the one considered as most important.

No information —

(For persons having replied to 8 and 9)

10. Among the daily and weekend activities which you mentioned, note for each list the three to which you devote the most time.

*Daily activities*

- 1.
- 2.
- 3.

No information —

*Weekend activities*

- 1.
- 2.
- 3.

No information —

11. What do you do during your annual holidays?

No information —

(For persons having replied to 10)

12. Indicate in respect of each daily and weekly preferential activity whether you usually carry it out:

- Individually
- With members of the household

- With relatives
- With neighbours
- With friends
- With work- or classmates
- With other persons

*Daily activities*      *Weekend activities*

- |    |    |
|----|----|
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |

No information —

13. Apart from the activities which you carry out during your free time, are there any others which you would like to carry out?

E N D

Yes — No — No information —  
Which ones would you like to carry out?

- 1.
- 2.
- 3.

14. What sort of circumstances have prevented you from carrying out the activities you have just mentioned?

- |                              |   |   |   |
|------------------------------|---|---|---|
| Lack of financial means      | 1 | 2 | 3 |
| Lack of time                 | 1 | 2 | 3 |
| Lack of information          | 1 | 2 | 3 |
| Lack of public installations | 1 | 2 | 3 |
| Lack of personal initiative  | 1 | 2 | 3 |
| Transport difficulties       | 1 | 2 | 3 |
| Other reasons                |   |   |   |

No information —



**Part Three**

**SELECTED ISSUES FROM REGIONAL SURVEY EXPERIENCE**



## XVII. SURVEY EXPERIENCE IN THE REGION OF THE ECONOMIC COMMISSION FOR EUROPE, WITH SPECIAL REFERENCE TO INTEGRATED HOUSEHOLD SURVEYS\*

17.1. The history of sample surveys as a means of data collection on demographic, social and socio-economic subjects in the region of the Economic Commission for Europe (ECE) is rather short compared with the history of general population censuses. Before 1930, there were only a few cases of the use of sampling, and intuitive selection methods were used. The crop estimates of the Department of Agriculture in the United States of America in the nineteenth century were constructed from intuitive samples. This was also the case with some family expenditure surveys carried out in the United States of America and the Federal Republic of Germany around the turn of the century.

17.2. In 1890, a sample survey was taken in Norway in connection with the general population census. The results and the selection methods used were presented at the fifth session of the International Statistical Institute, at Berne. The method was criticized by most delegates at the meeting, and it was not until 1926 that a committee of the International Statistical Institute recommended greater use of sampling, using either random methods or purposive selection.

17.3. It was, however, not until the 1930s and 1940s that sampling methods were developed, theoretically as well as practically, into the powerful data collection tools they are today. In most countries in the region today almost all samples used by the national statistical offices are selected as probability samples. Many private institutes, however, still use purposive selection of samples.

17.4. Early examples of practical application of probability sampling appear to be the Sample Survey of Unemployment in the United States at the beginning of 1940 and the National Food Survey in the United Kingdom of Great Britain and Northern Ireland in 1940.

17.5. In Europe, organizations for large-scale, continuous household surveys mostly developed after the Second World War. In Italy, the first labour force survey was done in 1952. Between 1962 and 1967, annual sample surveys on employment were done in France. In most of the Eastern European countries, family income and expenditure surveys started a few years after the Second World War.

17.6. The ECE Conference of European Statisticians took an initiative at its 1974 session to organize a systematic exchange of national experience on problems relating to household surveys. It invited its members to provide information on what problems they found to be most urgent in assessing and improving the quality of household surveys, how they were dealt with by national statistical of-

fices, and what aspects they would like to see selected for discussion. In order to prepare a framework for a meeting, the secretariat of the Conference, in co-operation with Statistics Canada and the National Central Bureau of Statistics of Sweden, prepared and circulated a suggested outline of points which might be covered in an eventual future meeting, and asked the national statistical offices to write about their achievements and problems and to identify issues for discussion. Most countries replied, and a meeting was held in 1978. Papers prepared by different national statistical offices were presented and discussed (112). A second meeting was held in 1981 (113). A list of documents considered by these meetings is provided in annex II to this chapter.

### A. ORGANIZATION

17.7. The degree of centralization of work on household surveys varies among the countries in the region. In the United States of America, several agencies are responsible for the planning, collection and publication of governmental household surveys. The Bureau of the Census in the Department of Commerce is the largest agency of the federal Government involved in the collection, compilation and publication of general purpose statistics. The National Center for Health Statistics in the Public Health Service of the Department of Health and Human Resources collects data on vital events, health and related matters. Data are obtained from several statistical data collection systems, including household surveys. Other major governmental agencies involved in household surveys are the Bureau of Labor Statistics, Social Security Administration and National Center for Education Statistics.

17.8. Most countries in Europe have a centralized organization for large-scale household surveys. Usually this organization is part of the national statistical office, either as an independent division or as part of the division for censuses and population statistics. The planning of a survey is usually done centrally, while the collection, preparation, and in a few countries some processing of data, may be decentralized to regional offices. In France, for instance, the Institut National des Etudes Economiques, which is responsible for all stages of survey work, has 18 *directions régionales* which carry out the collection, coding and preparation of data.

17.9. In some countries, a governmental household survey on a particular topic is occasionally undertaken by the department with responsibility for that area of social policy. For example, the National Dwelling and Housing Survey in the United Kingdom was conducted by the Department of the Environment in 1977 to 1979, while most of the government's major household surveys are under-

\* The present report has been prepared by Mr. Ib Thomsen as consultant to the United Nations Economic Commission for Europe.

taken by the Social Survey Division of the Office of Population Censuses and Surveys.

17.10. Usually the sample survey organization in a country is responsible for one or several large, continuous household surveys. Typical examples are labour force surveys, micro-censuses, and family income and expenditure surveys. In addition to such major surveys, several survey organizations are also responsible for a varying number of *ad hoc* surveys. The role of the survey organization in connection with such surveys varies from country to country and from survey to survey within the same country. Sometimes the survey organization takes full responsibility for all stages of the survey, including the original definition and clarification of the survey objectives, project design, sample selection, data collection, coding and analysis and, finally, the production of a report on the survey results. In other cases, the survey organization is only responsible for some of the operations involved, while a concerned department inside or outside the statistical office is responsible for other operations.

17.11. The organization and duties of the field force vary very much from country to country. In some countries, such as Poland and the Union of Soviet Socialist Republics, the responsibilities of the interviewers include careful checking of expenditure information by comparison with other available material and working out monthly budgets for every selected household on the basis of entries in a notebook given to all households in advance. In such countries, the interviewers are usually permanent employees of a regional office. In most countries where the responsibilities of the interviewers are more limited, the majority of interviewers is employed on a part-time, hourly wages basis. In some countries only a small part of the field force is maintained from one survey to another, while additional interviewers are hired in connection with specific surveys. Other arrangements are also used, as in Denmark, where the interviewer force is a joint service of the Central Bureau of Statistics and the National Institute of Social Research.

17.12. In some of the European countries, such as the Federal Republic of Germany, France and Hungary, the regional offices are usually responsible for recruitment and training of interviewers. In the smaller countries this is done centrally or by means of supervisors, who are experienced interviewers who have received special training and are located throughout the country. In many countries where a local office is responsible for the recruitment and training of interviewers, checks of the field work are carried out by persons from the central staff.

## B. SURVEY DESIGN

17.13. Most household surveys in the region adopt samples selected in two or more stages. One-stage samples are, however, used in some countries, for instance Sweden, where many samples are selected in one stage, and in Austria, for the regular micro-census. In other countries one-stage samples are usually only used in connection with special surveys in which the data are collected by mail. Usually the primary sampling units consist of some administratively defined geographical area such as a municipality.

17.14. In the Union of Soviet Socialist Republics and Romania, the primary sampling units are establishments

and collective farms, within which heads of households are selected. The final selection unit varies from survey to survey. It is usually the family, defined to consist of persons within a household who are related as husband or wife or as parent and never-married child by blood or adoption, or the household, defined as a housekeeping unit of individuals living together and pooling and disposing of their incomes more or less collectively. Census material is usually used for listing, or samples are based on data collected in a micro-census. In a few countries samples are selected from central or local registers. In most countries the coverage rates are reported to be very high.

17.15. For some studies of a particular sector of the population, no adequate sampling frame exists. In such cases, one approach is to carry out a preliminary sift of the general population, either by mail or by preliminary personal interviews, to locate the samples. Alternatively, samples are obtained by following up households or individuals already interviewed in a previous survey.

17.16. In most countries larger geographical administrative areas are defined as domains of study,<sup>1</sup> meaning that separate survey estimates are wanted for these areas rather than simply national totals. Within each geographical domain of study stratification is usually adopted at the different stages of selection. In the earlier stages, size is often used as a stratification variable and, in addition, a probability proportional to size selection procedure is usually used at the earlier stages in order to control the listing workload at later stages. Within a domain of study, selection in the later stages is done in such a way that the overall design becomes self-weighting. However, it is not unusual for the sample fraction to vary among different domains of study, due to large differences in sizes of domains of study.

17.17. In continuous surveys, the units, once selected, often stay in the sample for several consecutive survey rounds.<sup>2</sup>

## C. DATA COLLECTION

17.18. Most national statistical offices generally consider that the collection of the primary data is perhaps the most important step in the whole survey and that no subsequent adjustment can make up for substantial measurement error or low response rates. In many countries, the problem of securing high quality in the original data is becoming more difficult since the general public is apparently becoming somewhat less co-operative in replying to questionnaires.

17.19. Essentially three data collection methods are used for household surveys in the ECE region:

(a) Personal interviews, in some countries combined with prior notice by letter or telephone call;

(b) Mailed questionnaires, sometimes combined with follow-up by interviewers;

(c) Telephone interviews.

17.20. In most countries, data collection in household surveys is generally carried out by personal interview with the head of the household or another responsible member of the household, who provides the information for all

<sup>1</sup> See paras. 4.6-4.7 above for the definition of "domain of study".

<sup>2</sup> See the discussion of sample rotation in paras. 4.72-4.74 above.

household members. However, some surveys, such as surveys of opinions and attitudes, health or fertility, require that the interview be held with a designated person, and proxy interviews are not allowed.

17.21. Commonly, interviewers are required to make a minimum number of calls, usually three or four, if necessary, to make contact or to establish that the household members will be absent for the entire field work period. Beyond that, interviewers are expected to make as many calls as they can while they are in the area.

17.22. Some sectors of the population are more elusive than others. For example, those in full-time employment and teenagers usually present particular difficulties of this kind in most countries. It is therefore often necessary, when direct interviews are called for, to conduct a considerable number of interviews in the evening, and this severely reduces the size of the assignment which an interviewer is able to undertake within a given period. In the United Kingdom, for instance, in the General Household Survey, interviews are required with all adult members of a household. Work quotas are set at 20 to 25 households per month. In the National Food Survey, interviews are sought with homemakers only, and interviewers are asked to try for 20 interviews in three days.

17.23. The main problem with mailed questionnaires is that response rates are often very low, especially if the questionnaire is long. However, in cases where the sample is selected from a particular section of the population and the interest level in the subject is high, mailed questionnaires can be very effective. In Norway, several mail surveys are done among young people who are usually very hard to contact for interviews. The response rates in these surveys are well over 80 per cent.

17.24. In most countries telephone interviews are used only in special cases. Two exceptions are Sweden and the United States of America. Studies have been undertaken to establish the efficiency of data collection using telephone interviews. In Sweden, these studies indicate that this method compares favourably with personal interviews, even with rather large questionnaires. In the Swedish Labour Force Surveys most of the interviews are done by telephone.

#### D. DATA PROCESSING

17.25. As early as 1957 the ECE Conference of European Statisticians organized systematic exchanges of national experiences in the field of statistical data processing. This has had considerable influence on the practices of national statistical offices. The exchange has been conducted by the Conference's Working Party on Electronic Data Processing, which meets approximately once a year. These meetings deal with data processing in connection with all official statistics, but much attention has been given to the processing of survey data. The subjects mainly discussed have been (a) general issues concerning computer systems for surveys, (b) computer systems for editing and their efficiency, (c) computer systems for coding and their efficiency, (d) construction of models to correct data in various surveys, (e) systems for imputations of quantitative and qualitative data, (f) methods for control of coding and punching.

17.26. In most countries the quality of data is checked at the operational level both by manual and by computer

edit checks. In some countries a substantial amount of manual checking is done by the interviewer or by regional offices. The amount of editing varies from survey to survey. Usually it is very intensive on the family expenditure surveys. Preliminary checks are made on all budgets to ensure that the household records are complete and serial numbers accurately recorded. The next stage is to code and edit each budget in detail. The edit procedures detect omissions and inconsistencies, which may then be referred by post directly to the informant for clarification. After this manual coding and editing, the data are checked by computer for data inconsistencies and for values lying outside predetermined acceptable ranges. These "outliers" are then checked against the questionnaires to see whether they result from coding or punching errors. If they do not they are accepted as the value entries.

17.27. Less checking is usual on other surveys because the data are less detailed and therefore less error prone. In most countries, surveys are subject to manual coding and editing and automatic control. In some of the larger survey organizations the editing is automatic for some surveys, and in a few cases coding of some variables is done automatically.

17.28. The use of statistical imputation techniques to compensate for incomplete data varies very much from country to country and from survey to survey. In many countries automatic imputation techniques are not used at all, while in Canada, for example, the labour force surveys undergo strict editing and imputation before tabulation. Information on these procedures in Canada is provided in annex I to this chapter.

17.29. Tabulations are usually carried out by the computer. In connection with large, continuous surveys, most statistical offices use programs that are tailor-made for a specific survey series. Such computer programs are often very complex and include weighting and imputation. For most *ad hoc* surveys, the estimation procedure is usually much simpler, and therefore general table programs can produce most tables.

17.30. In many countries users of statistics inside and outside the national statistical offices have been urging more effective dissemination of data collected in household surveys. Often, a copy of a file on magnetic tape is sought by users, as well as special extracts and tabulations. In many countries high priority is therefore placed on making data files available for further analysis. This work includes development of standards for cataloguing and documenting existing files.

#### E. NON-RESPONSE

17.31. In most countries in the region, non-response is recognized as one of the most important methodological problems in household survey work. The importance of the problem varies from country to country. In the Union of Soviet Socialist Republics, for instance, the practices followed ensure full coverage in the collection of information in accordance with the sample frame. In other countries, substantial efforts are made to increase relatively low response rates or to maintain them at a satisfactory level. Generally, response rates vary among different kinds of surveys within the same country. It is often found that surveys which include questions which may be interpreted as being of a private nature meet with a relatively

pronounced reluctance to participate in the survey. For instance, in the United Kingdom, the Family Expenditure Survey, which requires detailed information on income from each household member, has a response rate around 70 per cent, while some *ad hoc* surveys, where the sample consists of a particular sector of the population and the interest level in the subject is high, obtain response rates well over 90 per cent. In addition to lack of interest, non-response is often caused by temporary absence from home during the collection period.

17.32. To increase response rates, most countries give close attention to the selection, training and motivation of interviewers, developing clear and acceptable explanations of why the survey is being carried out and giving informants as much assurance as possible that confidentiality will be safeguarded. One would expect that personal characteristics of interviewers should influence response rates, and in some countries efforts have been undertaken to study this problem. However, these investigations have not yet led to conclusive results which can be used when recruiting interviewers.

17.33. In addition to giving much attention to the selection, training and motivation of interviewers, methods are usually developed to support the interviewers in the objective of reducing non-response. In many countries it is common to send letters of introduction to the informants before the interviewer visits a household. The mass media are also used to inform people about the need for and objectives of the survey. However, the direct effects of these two last efforts on response rates are not clear in all countries, and in at least one country it is considered that advance publicity may even be harmful to response rates. In a few surveys, such as family expenditure surveys, response is promoted by offering an inducement. Households are paid a small amount of money (often about \$US 20) if all household members co-operate. The rationale for this is that it is a token recompense for the effort involved in keeping detailed diaries of day-to-day expenditure for a period of one or two weeks. It is believed that the level of payment is much less important than the fact that payment is made at all. While this procedure adds considerably to the total survey costs, it is felt that it has had a positive impact on response rates in some countries. Such an incentive may succeed in enforcing the position of the interviewers in their contacts with sample units. In a survey carried out in Denmark, an incentive in the form of participation in a special lottery confined to co-operating respondents contributed to an improvement of the response rates of low-income strata in the population, such as pensioners, but appeared to have very little effect on the response rates in high-income strata, where they are usually especially low.

17.34. One commonly used approach to reduce non-response rates is to revisit selected households. In some countries revisits are done by specially trained interviewers or by telephone. Such techniques are naturally only used if the time schedule of the survey operation permits. It may also be found that the benefits of revisits are outweighed by the costs involved.

17.35. In addition to efforts made to reduce non-response rates directly, some countries have carried out studies to estimate the effect that non-response has on survey results. In Norway, studies show that the effect of non-response sometimes varies substantially from one vari-

able to another within the same survey. The variables on which the effects have been studied are income, education, fertility, age and sex. Different methods have been applied, but the main one has been to find information about non-respondents from central registers: For all the variables studied, the not-at-homes were shown to have greater biasing effects than the refusals. In the United Kingdom, comparisons have been made between the characteristics of respondents and non-respondents for several surveys by using the 1971 census data for households in the respective samples around the time of the census.

17.36. Even when substantial efforts are made to maximize response rates, most countries have a hard core of non-respondents, and many countries use different techniques to reduce the bias introduced. Very few countries use substitutions in their efforts to reduce non-response bias. The two most commonly used procedures are re-weighting and imputations.

## F. EVALUATION

17.37. Some examples of evaluation or measurement of survey errors are the following:

- (a) Studies of response biases and response variances in different surveys and censuses;
- (b) Estimation of sampling errors;
- (c) Evaluation of the magnitude and effect of coverage errors;
- (d) Validation of survey data against other sources.

17.38. In almost all countries of the region, some quality control and evaluation is done in order to provide a basis for allocating resources, for securing the best quality of data feasible, and for providing information on quality to users. In some national offices control and evaluation programmes are a permanent component of the process of statistical production. In Spain, for instance, an evaluation programme is included routinely in all major surveys. Such evaluation covers coverage errors and sampling and non-sampling errors. Sampling errors are estimated by a replicated sampling scheme. Response biases and variances are estimated by reinterviewing a subsample of the main sample. In most countries, however, evaluation studies are less frequent, and are done only in connection with large continuous surveys like a labour force survey or a micro-census. There is a feeling in many countries that such studies give interesting results on the total quality of the survey, but many countries report some difficulties concerning the interpretation of the results.

17.39. Many countries have estimated sampling variances in connection with various surveys, but only in a few countries are such estimates calculated regularly. The reasons for not calculating sampling variances in connection with each survey are not only lack of resources but also the fact that many countries have found that sampling variances remain relatively constant during successive surveys in the same basic survey programme. Consequently, sampling variance for survey results can be assessed approximately by using estimates from previous surveys.

17.40. Generally speaking, many countries feel that they have a pretty good picture of sampling variances but that knowledge concerning non-sampling errors is very poor. Some countries have been able to compare information collected in a survey with information from other

sources at the individual level. These kinds of studies seem to be more useful than comparison at the macro-level when the aim is to find the directions and magnitude of different kinds of errors and when this information is used to change some procedures in the survey, and in a few cases to change the questionnaire. However, even when comparisons are made at the individual level, it may be difficult to draw any final conclusions from such quality checks. In France, income reported in the 1963 household budget survey was compared with income declared to the tax authorities. The main conclusions were:

(a) Differences found between the two sources of information varied. For salaried workers there was good overall agreement. For agricultural workers and self-employed artisans, the differences were much larger;

(b) Where the differences were large, it was not possible to ascertain the true income level, nor even to decide which of the two sources was the most reliable.

17.41. The overall quality of survey data collected in many countries is checked by validating the final results against other sources. Such studies provide useful yardsticks of overall quality for some basic marginal totals describing the sample population. Typical comparative sources include the population census and administrative statistics and registers. In many countries, results from the household expenditure survey are compared with national accounts data. Several countries have found large understatements in household expenditure surveys for expenditures on various goods, in particular on tobacco and alcohol.

#### G. PRESENTATION OF INFORMATION ON THE QUALITY OF THE DATA

17.42. Most national statistical offices report a substantial and growing demand from at least some users for information on the quality of the statistics. Although provision of such information is becoming more common, it appears that it is available only to a limited extent, and some statistical offices express doubts whether the consumers can make effective use of information of this kind.

17.43. There is considerable variation in the kind of information provided and in the method of presentation. Some countries do not report errors or give quality assessments at all. In some cases, doubtful figures are put in brackets. Other methods in use are keyed quality codes, generalized tables and graphs. The reports of some surveys include the conclusions of an evaluation study or a more general quality description and assessment.

17.44. In some countries, for example Sweden and the United States of America, attempts have been made to develop standards for the presentation of information on the quality of statistics. At its twenty-seventh plenary session, the Conference of European Statisticians agreed that problems concerned with the presentation of guidelines for the presentation of the quality of survey results should be studied by the Conference.

#### H. HOUSEHOLD SURVEYS ON INCOME, CONSUMPTION AND EXPENDITURE

17.45. Most countries in the region perform surveys involving collection of data on income, consumption and

expenditure. The sample size varies very much from one country to another, reflecting the different position the surveys have in the national statistical systems. In the Federal Republic of Germany, the history of household budget surveys dates back to the turn of the century. The questionnaire programme and the survey apparatus have been continually improved, with the result that the income and consumption sample surveys have been built up into an official statistical instrument providing information on the relationships between income, consumption and savings formation, on the one hand, and important socio-economic household characteristics, such as social position and age of the head of household and size of household and type of household, on the other. The surveys are done every five years with a sample size of about 55,000 households.

17.46. In France, a series of annual household budget surveys was carried out from 1965 to 1972, then discontinued. A new survey with approximately 18,000 households was then carried out in 1978/1979. In the United Kingdom, the Family Expenditure Survey has been running continuously since 1957. In 1967 the sample was substantially enlarged and now a sample of nearly 11,000 households is being selected each year to be invited to take part. In most Eastern European countries, income and expenditure surveys started a few years after the Second World War and are today an important component of statistics on the standard of living in these countries. In the Union of Soviet Socialist Republics, 62,000 families are included in the sample. In the smaller countries, such as the Netherlands, Belgium, Luxembourg and the Scandinavian countries, household budget surveys are conducted approximately every five years and the sample size varies between 2,000 and 3,000 households.

17.47. Data from surveys on income and expenditure are used for many purposes, usually including one or several of the following: (a) to provide up-to-date weights for the consumer price index, (b) to monitor the effects of the distribution of income and of changes in taxation and social security regulations, (c) to calculate consumer expenditure on food for national accounts purposes and (d) to monitor the elasticities of demand for use in forecasting demand for different goods.

17.48. The two major problems in almost all countries of the region are low response rates and response errors. The design of the survey varies very much from country to country in response to these two problems. Some countries choose a relatively short reference period, such as one or two weeks, in which households are asked to register all expenditures and income. In addition, a retrospective interview is done covering a year to get information on selected items which are of particular importance for the household budget because of their size or because they occur relatively rarely and irregularly. In these surveys, response rates are about 70 per cent.

17.49. In other countries, the reference period is much longer, up to one year. In Belgium, each household is asked to take part in the survey for a whole year. The response rate in this survey is about 30 per cent. In the Federal Republic of Germany, the reference period varies from one item to another. Each household is allocated a month in which detailed entries are to be recorded, in accordance with a rotation system which guarantees that in each month one twelfth of the households are surveyed. In this way care is taken to ensure that the results take into

account the considerable seasonal variations that exist, in particular with respect to purchases of food, drink and tobacco. During the remaining 11 months of the calendar year, the households make a record of all receipts just as in the detailed entries month, so that annual income can be calculated. However, only selected outgoings are recorded on the expenditure side.

17.50. In the Union of Soviet Socialist Republics, many families stay in the sample for several years and are visited twice every month by an interviewer. In order to ensure that the data are absolutely complete and reliable, a combined method incorporating elements of both the personal interview method and the self-recording method has been developed in which a family records on special forms, day by day and in chronological order, all information pertaining to its income, expenditure and consumption. The data are collected by highly trained interviewers, and the information is checked by interviewing all adult members of the family. Information given by the family is also checked with information from other sources, such as pension books, receipts for rentals or public services, and the like.

17.51. In almost all countries some modest compensation is offered to families who co-operate. Usually each family is offered around \$US 20 and/or participation in a lottery confined to the co-operating families.

#### I. LABOUR FORCE SURVEYS

17.52. Many countries in the region conduct labour force surveys either as an independent survey or as part of a general household survey. In the United States of America, the sample survey of unemployment was put into operation at the beginning of 1940. Later the survey was extended beyond the field of labour and was renamed the Current Population Survey.

17.53. In Canada, 1,200 interviewers contact about 55,000 households each month by personal visits or by phone. Each selected dwelling stays in the sample for 12 consecutive months. In the Federal Republic of Germany, an annual sample survey on the population and labour force has been conducted since 1957. The sample has consisted of approximately 230,000 households each year.

17.54. In Italy, the first labour force survey was carried out in 1952, then repeated each year up to 1958. Since 1959, the Italian survey has been conducted at three-month intervals. Since 1973, each sample has consisted of approximately 83,000 households. In Spain, labour force surveys started in 1964 and were redesigned in 1970. The sample consists of 60,000 dwellings, each of which stays in the sample for six months. One sixth of the sample is substituted in the following month.

17.55. Since 1973, the Statistical Office of the European Communities has organized a series of labour force surveys at regular two-year intervals. The technical aspects of implementation of the surveys are established in agreement with the national statistical offices. On the basis of proposals from the Statistical Office of the European Communities, the Working Party on the Labour Force Sample Survey determines the broad content of the survey by producing a common coding document, but it is left to individual countries to devise their own questions. The statistical offices are responsible for selecting the sample, preparing the questionnaire, conducting the direct inter-

views among households, and forwarding the results to the Statistical Office of the European Communities in accordance with the standard coding scheme. The Statistical Office of the European Communities then devises the programme for analysing the results and is responsible for processing and disseminating the information forwarded by the national statistical offices.

17.56. Detailed contents and definitions in labour force surveys in the region differ from country to country, but the main outline is usually as follows.<sup>3</sup> In addition to recording individual characteristics, such as sex, date of birth, marital status, nationality, region of residence and relationship to head of household, the survey determines the usual position with regard to economic activity of all persons above the statutory minimum school-leaving age. Each person interviewed is requested to place himself or herself in one of the following categories:

- (a) Persons normally engaged in the production of economic goods and services during the reference period;
- (b) Unemployed persons;
- (c) Economically inactive persons.

The labour force comprises persons in categories (a) and (b). Unemployed persons are usually defined as all persons declaring themselves to be unemployed and seeking employment. The category of inactive persons usually comprises persons such as homemakers, students, pensioners, and the like who are not engaged in any economic activity.

17.57. Depending on the type of information required, different reference periods are used for recording the characteristics of the persons interviewed. A reference day is usually used for recording individual characteristics. This date corresponds to the date of the interview or to a given day in the reference week. A reference week is usually used for the purpose of determining activity status (employed, unemployed, inactive) and for recording characteristics of activity, such as principal occupation, occupational status, sector and branch of activity, hours worked. The reference period comprises a normal week. In some countries, the reference week is the one preceding the week of the survey and, as the survey extends over a period of time, the moving reference week method is used.

#### J. OTHER TYPES OF SURVEY

17.58. In addition to the types of survey discussed above, many other kinds of household surveys are conducted in the region. A short summary of experience in micro-censuses, health surveys and time-use surveys follows.

##### 1. Micro-censuses

17.59. Several countries in the region conduct current, continuous household surveys, such as the Current Population Survey in the United States of America. In Europe, current surveys are often named micro-censuses, as they are often used to update the results of a previous general population census.

<sup>3</sup> Detailed information on concepts, classifications and definitions for labour force data in surveys is provided in part two of the present Handbook.

17.60. In Austria, such surveys have been conducted quarterly since 1968. In Czechoslovakia and Hungary, similar surveys are conducted every three to five years. In the Federal Republic of Germany, one micro-census is taken every year. Usually these surveys consist of two parts. A constant basic programme provides data on important demographic and socio-economic indicators and housing and a variable portion covers themes which change from survey to survey. Examples of such additional topics are health, labour conditions, tourist traffic and income. Usually micro-censuses are multi-subject surveys. One important purpose is to ascertain the changes that occur during the 10-year interval between population censuses. They may also permit longitudinal analysis, while the population censuses generally only allow broad cross-section analysis.

17.61. In most countries that perform micro-censuses, the results and the structure of this kind of survey have proved to be very successful.

## 2. Health interview surveys<sup>4</sup>

17.62. Health interview surveys are performed in a few countries in the region, either as independent surveys or as part of a general household survey. The main purpose of such a survey is to provide national data on the incidence of illness and accidental injuries, the prevalence of diseases and impairments, the extent of disability, the utilization of health care services and other health related topics.

17.63. In the United States, health interviews are conducted each year throughout the year in a probability sample of households. The interviewing is performed by a permanent staff of highly trained and supervised interviewers of the Bureau of the Census, using detailed specifications of the National Centre for Health Statistics. As in all continuing surveys conducted by the Bureau of the Census, there are extensive quality control activities throughout the data collection and processing process. Each interviewer edits his or her complete work before sending it to the regional supervisor. In addition, a sample of each interviewer's households is reinterviewed by a supervisor or senior interviewer for a portion of the questionnaire.

17.64. In most countries in Europe questions concerning health form part of a general household survey or of a living conditions survey.

## 3. Time-use surveys<sup>5</sup>

17.65. In a few countries in the region, time-budget surveys have been conducted. For example, in 1959, 1970/1971 and 1976/1977 information on time budgets was collected in a sample survey in Bulgaria. All persons over six years of age in 2,500 households were interviewed. Similar surveys have been conducted in Hungary, Norway and the Union of Soviet Socialist Republics.

17.66. The purpose of time-use surveys is to gather information on the budgeting of time in an attempt to determine the pattern of time allocation among various activities. Collection methods vary among countries. In Bulgaria and Norway, data on time-use were collected by means of a time diary. Persons selected in the sample were assigned particular days on which to fill out their time diaries. Each of the diaries covered either two or three days, and diary periods all together covered the whole year. In Hungary, each enumerator visited four households on two successive days, then after a lapse of 10 days interviewed another four households on two successive days. During six cycles of this kind, the enumerator interviewed assigned households, then repeated the whole cycle with the same sample. Thus, the enumerator visited every household included in the sample six times a year, at intervals of 60 days.

17.67. Studies based on keeping a diary are especially prone to measurement errors. Some types of activities are more easily forgotten than others, or are more likely to be regarded as secondary activities. Discrete activities and tasks, such as going to work or cooking, are probably more faithfully reported than more continuous or less action-oriented activities, such as child care or conversation. Activities of a duration under eight minutes are seldom registered in time activities. This accounts for under-representation of certain activities. An additional source of error in Norway was the low response rate, about 60 per cent.

## ANNEX I

### Editing of the labour force survey in Canada

The edits for the labour force survey in Canada can be grouped into the following classes:

(a) Logical sequence of questions. This is a check to see that the sequence of questions has been properly completed;

(b) Subject-matter logic edits. These edits ensure that a logical sequence of questions is correct and the responses within those questions are consistent with one another according to the dictates of the subject-matter. For example, if a respondent claims going to school as a reason for working part time, then the same respondent must also report subsequently that he was attending school in the reference week;

(c) Valid response fields. In many of the questions the respondent's reply is assigned a value from a code list by the interviewer and this code value is recorded on the questionnaire. These edits ensure that the code value entered for a given question is within the list's valid values for that question. In addition, valid responses have a range of possible values, for example, the hours worked in the reference week cannot exceed 126.

The first edit phase classifies the questionnaires of the respondent households into three categories:

(a) Complete and consistent;

(b) Unusable and/or inconsistent;

(c) Partially complete and consistent.

The households falling into category (a) require no further action prior to the estimation stage. Information for the households in category (b) and the non-response households is imputed in the following manner. A search is made of the previous month's labour force survey computer file for the same household. If the household had previously responded, then most of the information from the previous month is assigned to the current month except for the characteristics that can be updated due to the time lag between the two interviews, such as the number of weeks unemployed. Most of the non-respondent households are imputed for in this way. The remaining non-respondent households for which there is no previous information are in effect imputed for on the basis of the average value for all respondent households within the same primary sampling units and type of area. This is done by adjusting the sampling weight of the number of households that responded.

<sup>4</sup> Further information on the use of surveys to collect information on this topic is provided in part two of the present *Handbook*.

<sup>5</sup> Additional information on time-use surveys is provided in (110).

## ANNEX II

### Documents considered by the Economic Commission for Europe, Conference of European Statisticians meetings on problems relating to household surveys\*

#### A. MEETING HELD IN GENEVA, 20-23 MARCH 1978

1. The allocation of resources to production and control steps in the statistical process, prepared by the National Central Bureau of Statistics, Sweden (CES/AC.48/2).
2. Methods of measuring and improving the quality of data collected in the family budget inquiry and the work of investigators, prepared by the Central Statistical Board, Romania (CES/AC.48/3).
3. Organization of family budget surveys and practice adopted by statisticians to ensure full coverage in the collection and processing of survey forms in the Union of Soviet Socialist Republics, prepared by the Soviet Union (CES/AC.48/4).
4. Methods of reducing non-response and its effect on the quality of statistics, prepared by the Office of Population Censuses and Surveys, United Kingdom (CES/AC.48/5).
5. Imputation for household surveys in Statistics Canada, prepared by Statistics Canada (CES/AC.48/6).
6. Assessment and presentation of the quality of statistics, prepared by the Institut National des Statistiques et des Etudes Economiques, France (CES/AC.48/7 and Add.1).
7. Some thoughts concerning sampling errors, prepared by the Federal Statistical Office, Yugoslavia (CES/AC.48/8).
8. Clusters: a package programme for computation of sampling errors for clustered samples, prepared by the World Fertility Survey, London (CES/AC.48/9).

In addition to these discussion papers, the meeting also had before it papers prepared by the following countries: the Ukrainian Soviet Socialist Republic, Spain, Czechoslovakia, the Federal Republic of Germany and Hungary (CES/AC.48/10 and Add.1 to 5, circulated in the language in which they were submitted only). A note on the dwelling and housing survey in the United Kingdom was circulated during the meeting.

#### B. MEETING HELD IN GENEVA, 1-4 JUNE 1981

1. Summary and discussion of the comments received on "Guidelines for presentation of the quality of statistics", prepared by the National Central Bureau of Statistics of Sweden (CES/AC.48/13).

\* For the reports of the meetings, see (112, 113).

2. Practice and experiences of the Hungarian household budget survey, prepared by the Central Statistical Office of Hungary (CES/AC.48/14).
  3. Use of rotating sampling schemes in household budget surveys in Bulgaria, prepared by the Committee on the Unified Social Information System of Bulgaria (CES/AC.48/15).
  4. The non-response problem in the Netherlands, prepared by the Central Bureau of Statistics of the Netherlands (CES/AC.48/16).
  5. Precision for various estimators for simple random and single-stage cluster samples, prepared by the Central Bureau of Statistics of the Netherlands (CES/AC.48/17).
  6. Spanish experience on the estimation of some components of the total error, prepared by the National Institute of Statistics of Spain (CES/AC.48/18).
  7. The methods, organization and evaluation of sample surveys of the population in Czechoslovakia, prepared by the Federal Statistical Board of Czechoslovakia (CES/AC.48/19).
  8. Family budget surveys in Poland, prepared by the Central Statistical Office of Poland (CES/AC.48/20).
  9. Treatment of non-response in Finland, prepared by the Central Statistical Office of Finland (CES/AC.48/21).
  10. A survey of non-response terms, prepared by the National Central Bureau of Statistics of Sweden (CES/AC.48/22).
  11. Several evaluation procedures used in Spanish population surveys, prepared by the National Institute of Statistics of Spain (CES/AC.48/23).
  12. Problems of non-response in the Federal Republic of Germany's micro-census, prepared by the Federal Statistical Office of the Federal Republic of Germany (CES/AC.48/24).
  13. Household surveys in Great Britain, prepared by the Office of Population Censuses and Surveys of the United Kingdom (CES/AC.48/25).
  14. Current household survey, prepared by the Federal Statistical Office of Yugoslavia (CES/AC.48/26).
  15. Causes and treatment of incomplete data in household surveys, prepared by Statistics Canada (CES/AC.48/27).
  16. The experience of Italy in the evaluation of data recorded during family budget surveys, prepared by the Central Statistical Institute of Italy (CES/AC.48/28).
  17. Some methods for evaluating non-sampling error in household censuses and surveys, prepared by the Bureau of the Census of the United States (CES/AC.48/29).
- In addition to these documents, the report "Labour force survey: technical report: design of the survey and quality evaluation of the data", prepared by the National Institute of Statistics of Spain, was distributed at the meeting.

## XVIII. SURVEY EXPERIENCE IN THE REGION OF THE ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC, WITH SPECIAL REFERENCE TO INTEGRATED HOUSEHOLD SURVEYS

18.1. The household survey as a means of data collection on demographic, social and socio-economic subjects is largely a post-Second World War development in Asia. Up until 1950, household surveys conducted in Asian countries were mostly *ad hoc*, sporadic and often confined to such subjects as family budgets. The successful experience of some of the developed countries, especially the United States of America and Canada, in organizing surveys for the collection of data on employment and unemployment led some of the Asian countries to experiment with that approach during the 1950s and such surveys became a regular feature in several countries during the 1960s. Some others followed this example during the 1970s. Rapid increases in population and the spotlight on family planning during the 1960s and 1970s also generated new interest in demographic surveys, especially in countries where civil registration systems were seriously deficient. The World Fertility Survey undertaken by the International Statistical Institute as a global research programme added a further impetus to the promotion of demographic surveys in Asian countries.

18.2. The flexibility of the household survey approach and its immense potentialities have encouraged many Asian countries to undertake from time to time surveys on other social and socio-economic topics, such as housing, food consumption and nutrition, health and morbidity, family planning, education, recreation and culture, basic needs and access to social services, landholdings, agriculture and household economic activities.

18.3. Most of the developed and developing countries of Asia and the Pacific, except some of the smaller countries, have had some experience with household surveys over the last three decades. According to the first annual report on sample surveys in the region (108), which covered surveys conducted during 1958-1959, India and Japan had even then well-developed sample survey systems. The Philippines had an established statistical survey of households and the Republic of Korea had a current labour force survey. Burma, Cambodia, Indonesia, Malaya, Pakistan, Singapore, Thailand and others also reported some sample surveys. Since then, Indonesia, the Republic of Korea, Malaysia, the Philippines, and Thailand have developed strong sample survey systems, and Australia and New Zealand have likewise emerged with well-developed sample survey programmes. Afghanistan, Bangladesh, the Islamic Republic of Iran, Nepal, Pakistan and Sri Lanka have also gained considerable experience, and Fiji, Hong Kong, Samoa, Singapore and Papua New Guinea are among the smaller countries which have had some experience with household surveys.

18.4. Most countries of the region have regular popu-

lation and housing censuses. Most of these are decennial, but a few are quinquennial. In some countries, decennial censuses are supplemented by mid-decade sample censuses. Sampling is often used either at the enumeration stage or at the tabulation stage or at both stages for the collection and/or processing of some of the more complex data. Sampling is also used in some countries for continuous registration of vital events, sample checks on administrative records, programme or project evaluation studies and small-scale research studies, using the household as the unit of inquiry and household survey methodology as the operational technique.

18.5. The present review deals broadly with regional survey experience in the last three decades, with special reference to integrated household surveys and survey programmes.

### A. INTEGRATED HOUSEHOLD SURVEY PROGRAMMES

#### 1. Coverage

18.6. The first major attempt to establish an integrated household survey programme was made in India. The National Sample Survey (NSS) of India, set up in 1950, was designed as a multi-subject sample survey system. To start with, it was confined to rural areas, but it was soon extended to the urban areas. Apart from household surveys, the programme included crop surveys and was later extended to cover establishment surveys, but the latter were never integrated with the others except in organization. Household surveys and crop surveys were integrated to some extent in so far as the sample of villages for the two types of surveys was often the same. The household surveys were more closely integrated *inter se* but the extent and nature of integration varied over the period.

18.7. At first, when the subject coverage was limited, all information was collected from the same sample of households. As the subject coverage widened, different household samples were selected for different subject schedules but from the same villages and urban blocks. The number of households selected for each subject also varied depending on precision requirements. This approach was pursued to the extent of splitting up the subject coverage of certain conceptually integrated surveys, such as the agricultural labour inquiry of 1956-1957, the subsequent rural labour inquiries, and the working class and middle class family living surveys of 1958-1959, into two conveniently related sets, each to be investigated with a different sample of households so as to reduce the burden on the respondent households. The integration in that

phase of NSS was essentially in sampling and field operations.

18.8. During the 1960s, NSS reverted to the original concept of an integrated household schedule covering all aspects of the household, to be canvassed through a single schedule for a common sample of households. This approach was steadfastly pursued for several years, but it was later given up as it gave rise to certain operational difficulties. In recent years NSS has been following a completely different approach. Each round is confined to a single predetermined subject or set of a few related subjects. A long-range programme establishes the main subject coverage for each round. In selecting the subjects for each round the need for interrelated data on socio-economic topics, such as employment and consumer expenditure, or on demographic topics, such as fertility, mortality, morbidity, family planning, and maternal and child care, is kept in view and a limited degree of integration is attempted.

18.9. Household survey programmes in some of the other developing countries of Asia, for example, Indonesia and Malaysia, were at one stage organized more or less on the Indian model but were later reorganized to suit national needs, conditions and constraints. In Indonesia, for instance, a national sample survey was initiated in 1963–1964 for obtaining statistical information on a variety of socio-economic topics, such as demographic particulars, employment and unemployment, household enterprises, household consumption, income and expenditure, savings and investment, village statistics and rural prices, and it continued in that form for several years. It was then discontinued and a new National Socio-Economic Survey, including an agricultural survey, was initiated in 1969. The integration between the socio-economic and agricultural surveys was essentially in sampling and field operations. After the first two quarterly rounds, the socio-economic part of the survey was dropped and the survey remained primarily an agricultural survey. In 1975, a labour force survey was initiated as a specialized survey and continued as a distinct activity. Later, in 1978, it was integrated with the National Socio-Economic Survey, using the same sample of households. In 1980, the National Survey again took the form of a multi-subject survey covering demographic particulars, labour force, consumption expenditure, land ownership, agriculture, animal husbandry, and household enterprises' assets and liabilities, with all data to be collected from the same households.

18.10. In Malaysia, the Socio-Economic Survey of Households was initiated in 1967. It covered in its first round employment and unemployment, migration, fertility, housing, income and other socio-economic topics and was envisaged as an annual activity with a different emphasis each year in terms of subject coverage. But the emphasis remained primarily on labour force and only a few related topics were covered in the subsequent rounds. It was, however, found after three rounds that the survey was not giving satisfactory results especially on unemployment, and so the survey was discontinued. A new labour force survey was launched in 1972 as a biannual activity. It became a quarterly activity in 1975. Data on income are collected occasionally through an additional schedule from the same households. Household expenditure surveys are independently conducted from time to

time. A fertility survey was conducted in 1974, also independently.

18.11. The Philippines had an integrated Statistical Survey of Households beginning in 1956. It was redesignated as the BCS (Bureau of Census and Statistics) Survey of Households in 1965 and as the National Sample Survey of Households in 1974. Up to 1978 it continued as a biannual survey carried out in May and October every year, and became a quarterly survey in 1971. Although the subject coverage varied from round to round, labour force remained the main focus. Family income and expenditure data were collected in 1957, 1961, 1965 and 1971 along with labour force data. Beginning in November 1976, the National Sample Survey of Households was replaced by a new Integrated Survey of Households sponsored jointly by the National Census and Statistics Office and the Bureau of Agricultural Economics. The Survey provides information not only on employment and unemployment, but also on employment generation, family-operated agricultural and non-agricultural activities, production, productivity and income.

18.12. Partially integrated household surveys have also been attempted in Pakistan, the Islamic Republic of Iran and Bangladesh. In Pakistan, a multi-subject National Sample Survey was initiated in 1959 and information was collected in its first round on household composition, expenditure and economic status, prices and general conditions in rural areas. In the second round, information was collected on household income and expenditure. The Survey was later transformed into a quarterly survey of current economic conditions with emphasis on labour force, income and expenditure. In the Islamic Republic of Iran, a multi-subject household survey commenced in 1965 to collect data on demographic particulars, labour force, consumer expenditure, agriculture and livestock. Later it was developed into a monthly survey. Separate labour force and consumer expenditure surveys were also conducted. In Bangladesh, a nation-wide household survey was launched in 1976 to collect data on the resources and economic activities of the household sector, household income and expenditure, nutrition and levels of living.

18.13. In Sri Lanka, the Socio-Economic Survey of 1969–1970 gathered information on a wide variety of topics, such as housing, fertility, morbidity, education, employment, recreational, cultural and religious activities, and household income and expenditure. The Labour Force and Socio-Economic Survey of 1980–1981 integrates surveys on labour force, household income and expenditure, housing and access to amenities.

18.14. The Population Survey of Australia initiated in 1963–1964 was primarily meant to provide quarterly estimates of labour force, employment and unemployment. Over the years it has developed into a multi-subject survey. Supplementary schedules on a variety of subjects, such as school leavers, multiple job holders, superannuation, internal and international migration, labour mobility, income, illness, health care and child care, have been added from time to time depending on current needs. New Zealand has also developed a continuous household survey, starting in 1973, to provide information on the income distribution, expenditure pattern and economic status of households. It also provides revised weights for the consumer price index from time to time.

18.15. In Japan and the Republic of Korea, household surveys continue to be basically specialized surveys. The extent of integration in household surveys in the countries of the Asian region thus varies considerably from specialized surveys, such as those in Japan and the Republic of Korea, to completely integrated multi-subject surveys, like the one in Indonesia. In between there are instances of partial integration either in subject coverage or in sampling and field operations. In most cases, however, there is evidence of organizational integration in so far as most national household surveys are conducted by the same organization.

## 2. Organization

18.16. Many of the large- and medium-sized countries of the region have centralized organizations for conducting large-scale household surveys. That does not however preclude other official or non-official agencies from conducting similar surveys, large or small. The smaller countries, except Hong Kong and Singapore, are yet to establish such organizations. In most of the countries which have sample survey organizations, these are part of the national statistical offices, but in a few they are distinct entities. In India, for instance, the National Sample Survey Organization is a distinct body in the Department of Statistics and is separate from the Central Statistical Organization. It has its own governing body under a non-official chairman and has direct dealings with the State Bureaus of Statistics. It has a co-ordinating office under a Chief Executive Officer and separate divisions for design and survey research, field operations, data processing and economic analysis. It has its own field staff under the supervision of regional offices. In Japan, most of the household surveys are conducted by the Bureau of Statistics which is in the Office of the Prime Minister and is distinct from the Office of Statistical Standards, which is a part of the Administrative Management Agency.

18.17. The structure of field organizations varies. In most countries of medium size, with unitary constitutional structures, the field organization forms a part of the provincial, prefectural or district statistical machinery, which is often used not only for conducting household surveys but also for collecting other statistics and updating household and establishment frames. In Japan, for instance, the statistical machinery at the prefecture level handles all statistical operations. In Indonesia, the Central Bureau of Statistics has full-fledged regional offices at the provincial and regency headquarters, and at the lowest level there is one full-time statistical worker in each sub-district who carries out the statistical programmes. In Malaysia, there is a permanent field machinery of 128 full-time investigators located in different parts of the country. Bangladesh likewise has a permanent field organization comprising 30 supervisors and 160 primary enumerators. Pakistan has a similar field organization with a number of regional offices. Thailand has a field organization with 12 regional offices, 71 provincial offices and about 450 full-time primary enumerators controlled centrally by the field operations division of the National Statistical Office.

18.18. In India, which has a federal structure, the National Sample Survey Organization of the central Government is supplemented by similar organizations at the state

level working in close collaboration with the central organization. A sample survey programme approved at the national level is implemented simultaneously by the central and state organizations, using the same schedules and instructions but with different interpenetrating subsamples. While the National Sample Survey Organization has a field agency controlled through its own regional and subregional offices, the state counterparts are controlled by the state Governments through their District Statistical Offices.

18.19. In some of the large countries, such as India, Indonesia, Pakistan and Bangladesh, primary investigations are conducted by the regular staff of the sample survey organization. In some of the smaller countries, such as Thailand, Malaysia and Sri Lanka, however, temporary interviewers are appointed for each survey to assist the permanent field staff. The main advantages of a permanent field staff are that this arrangement helps to make the best possible use of the experience gained and facilitates proper programming of surveys. On the other hand, the main difficulties which have been noted are that unless a continuous survey programme is envisaged it may be difficult to keep the field staff fully engaged and to provide career prospects for the primary investigators, especially if they are below the minimum educational standard prescribed for entry into government service. The type of staff required depends to an extent on the type of surveys envisaged. If the surveys call for continuous field work spread over the year, a permanent field staff can well be kept fully engaged, but if the surveys entail field work in one specified week, as in some labour force surveys, it is obviously difficult to keep them fully engaged. Further, if the surveys are sporadic and *ad hoc*, there is no need for a permanent field staff, but if there is a continuous programme of surveys, a permanent field staff can be advantageous. Providing career prospects for field staff is perhaps less of a problem if the minimum entry qualifications are also prescribed for the interviewers. This should also ensure work of better quality.

18.20. A problem often faced by survey organizations is the composition of the field staff in terms of (a) educational standards, (b) age and sex, (c) ethnic and linguistic characteristics. Some countries, for example India, prescribe a university degree in an appropriate subject, such as statistics, mathematics, economics, commerce or social science, as the minimum qualification and succeed in getting even post-graduate degree holders as investigators because of the large educational base. Many others, however, prescribe only secondary education as the minimum standard and sometimes employ persons with lower qualifications. Several considerations are involved in making the choice, such as stability of the field force, quality of work and career prospects. In terms of age, younger persons are often preferred because of the arduous nature of the field work, which also often determines the sex composition of the field force. Nonetheless, the need for female investigators to carry out interviews with female respondents on such intimate matters as fertility and family planning has often led to the employment of female staff either on an *ad hoc* basis for *ad hoc* surveys or even on a regular basis in appropriate proportions. In multi-ethnic and multilingual societies, such as Malaysia, Singapore and Sri Lanka, the ethnic and linguistic composition of the

field force has also been a matter for consideration. In larger multilingual countries, such as India, where the different linguistic groups are identified with the different states, the problem is solved by recruiting the field staff locally in each state. In countries where the various ethnic and linguistic groups are not geographically distinct, a team approach is generally adopted, the composition of the teams being multilingual.

### 3. *Sample design*

18.21. Generally, household surveys in Asia have adopted multi-stage sampling. Multi-phase sampling has also been adopted occasionally. Cases of single-stage sampling based on census house lists have been reported but they are rare. Some of the earlier designs are based on three-stage sampling and occasionally even four-stage sampling, but later designs seem to use two-stage sampling with census enumeration blocks and/or villages as the primary sampling units and housing units or households as the ultimate sample units. The choice of a sampling design depends to a large extent on the availability of sampling frames. In the initial stages, as the material available for sampling purposes was inadequate, some countries had to adopt three- or four-stage sampling with some administrative divisions as the primary sampling units. As more material became available, attempts were made to eliminate some of the earlier stages of sampling and thus improve the efficiency of the design. An additional stage of sampling at the final stage is sometimes used where the ultimate sample unit for which a frame is available happens to be too large to be completely listed for the ultimate selection of the units of inquiry. In such cases, convenient sub-units are formed and one sub-unit is selected at random.

18.22. Stratification is adopted at different stages in many of the designs. At the primary stage the stratification is usually geographical. In India, geographical stratification has been extended to such an extent that in the thirty-second round (1977-1978) of NSS there were in all 516 rural strata and 386 urban strata. At the ultimate stage the stratification is generally intended to categorize the households or housing units on the basis of some characteristics related to the subject of inquiry. The ultimate stratification procedure is usually based on data collected through an on-the-spot listing of the households or housing units in the selected penultimate sampling units.

18.23. Size stratification is sometimes used at the earlier stages of sampling where such units as towns or some administrative units which vary in size are used for sampling. The technique of selection with probability proportional to size (PPS) has been more commonly used to control the variation in size except where the units are by construction more or less of equal size. With or without PPS selection, efforts have often been made to make the designs self-weighting to facilitate tabulation and analysis. With PPS selection at the earlier stages of sampling, this design also makes the workload more uniform at the ultimate stage. While random numbers are occasionally used for the selection of samples, systematic sampling, either linear or circular, is often preferred.

18.24. As the sample survey moves more and more away from the census chronologically, census based sampling frames become more and more unusable. Efforts

have therefore been made in several countries to update the sampling frames or construct new sampling frames, especially in urban areas. In Malaysia, for instance, when the Malaysian Socio-Economic Survey of Households was initiated in 1967 a completely new frame known as the National Household Sampling Frame had to be constructed.

18.25. While most countries have adopted the household as the unit of inquiry, some, for example Indonesia, Malaysia, Sri Lanka and Singapore, have adopted the census houses, housing unit or living quarters as the ultimate sample unit and enumerated all households found in the selected units.

### 4. *Data collection and processing*

18.26. Data collection in household surveys is generally carried out by personal interview with the head of the household or another responsible member of the household. In some cases, for example collection of data on fertility and family planning, the interviews are held with the women concerned or with their husbands. The method of self-enumeration generally adopted in the developed countries has also been tried in some of the developing countries where literacy rates are high, such as Malaysia and the Philippines, but in such cases, mailed or hand-delivered questionnaires are generally followed by personal visits for the collection of completed questionnaires or to seek supplementary information. In income and expenditure surveys, account books are used in several countries for recording information on all items of expenditure or at least on some items such as food, beverages and tobacco. The account books are to be maintained for periods varying from one week to one month. In many such cases investigators visit the respondent households occasionally, check the entries and help the respondents in keeping the accounts. In countries where literacy rates are low, information is collected on all topics by interviews supplemented wherever feasible and necessary by probing questions. In recording incomes, especially from household enterprises, the questionnaires are supplemented by informal work sheets in which the relevant details are noted by the investigator to facilitate the assessment but are not recorded in the main schedules. The method of direct observation is adopted in some inquiries, such as food consumption and nutrition, housing, health and morbidity and physical disabilities. Food consumption and nutrition surveys are often carried out by observation, weighing foods consumed, and clinical observation of individuals. Health and morbidity surveys sometimes use on-the-spot diagnosis of persons reporting illness. Housing surveys sometimes involve measurement of floor area, if not in square feet or square metres, in larger units, for example, tatami in Japan.

18.27. The instruments of data collection used in household surveys include (a) questionnaires in which a series of probing questions is addressed to the respondent, as in demographic and labour force surveys, (b) structured schedules in which data are recorded in prescribed tabular forms, as in income and expenditure surveys, (c) check-lists in which some points for the interview are merely listed, leaving the format for questioning, examination and recording of data flexible, as in some research and evaluation studies. Data are sometimes recorded in quantitative

figures, sometimes in predetermined codes and sometimes merely in positive or negative terms, depending on the nature of the information sought. Recording of descriptive replies to be coded later is rare in large-scale surveys.

18.28. Processing of the data involves field scrutiny, sample checks, rectification and reconciliation, editing, coding and tabulation. The field staff engaged in household surveys is often supervised at different levels and generally there is at least one supervisor for every four or five investigators, interviewers or enumerators. Where the primary investigators are *ad hoc* recruits, supervision is generally exercised by the regular staff of the survey organization.

18.29. Tabulations are carried out in most countries with established sample surveys either by computer or on unit record systems. In small-scale surveys, manual tabulations are not uncommon, but even in large-scale nationwide surveys, such as the National Sample Survey in India, manual tabulations are still carried out to relieve the accumulated pressure on the machines and to produce quick preliminary results. The manual tabulations in such cases are decentralized in order to make them manageable. Now consideration is being given to installation of mini-computers or micro-data-processors. In some of the smaller countries which do not have adequate data processing facilities, tabulations are sometimes carried out on the facilities available in neighbouring or other countries.

## B. SURVEY EXPERIENCE IN SPECIFIC FIELDS

### 1. *Income, consumption and expenditure*

18.30. Family budget surveys involving collection of data on income, consumption and expenditure of families are among the earliest surveys ever conducted in the developing countries of Asia. However, the early surveys were mostly confined in scope to wage-earning families, for which data collection on income, consumption and expenditure data was fairly simple and easy. As the scope of the surveys was extended to cover other sections of the population, such as the salaried classes and the self-employed, the surveys began to present difficult problems. Even so, household expenditure surveys have been conducted periodically in several countries of the region. In Japan, they are a monthly activity. In Pakistan, the Quarterly Survey of Economic Conditions includes incomes and expenditures. In the Republic of Korea, they are conducted annually. In India, consumer expenditures surveys were at one time an annual topic of the National Sample Survey but at present they are conducted only once every five years.

18.31. Income surveys are less common than consumption and expenditure surveys and the problems involved in collecting reliable income data are generally recognized. In India, the National Sample Survey has generally refrained from collecting income data, and even when they are collected they are not processed and published except in the case of family living surveys confined to rural labour, industrial workers, and urban non-manual employees. Recently, however, more and more countries have ventured to collect income data through household surveys, including Indonesia, Malaysia, Thailand, the Philippines, the Republic of Korea, Sri Lanka, Pakistan,

the Islamic Republic of Iran, Singapore, Hong Kong and Fiji.

18.32. The frequency and periodicity of income, consumption and expenditure surveys vary from country to country. While in some, such as Japan, the Republic of Korea and Pakistan, they are continuous on a monthly, quarterly or annual basis, in others they are conducted at longer intervals, such as 5 or 10 years. In general, surveys on which consumer price indices are based are more regular than those meant mainly for level of living or economic studies.

18.33. The reference periods used for the collection of data vary not only from country to country but also from survey to survey and within a survey from item to item. Information on income is generally gathered for reference periods varying from one week to one year. In some surveys confined to wage-earner families, income data, especially on wage incomes, have been in respect of one week. Otherwise, information on wages and salaries is generally collected for one month. Information on other incomes, such as income from agriculture, businesses and professions, is often gathered for a year. Some surveys have used reference periods varying from two to six months. In some, the concept of average monthly income has been used and the investigator has been instructed to derive the average on the basis of the net income for a whole year or for a shorter period such as six months. Information on expenditure is likewise collected for periods varying from one week to one year. Information on food and some related items such as beverages and tobacco is collected in most surveys for one week. Information on durable goods, on the other hand, is often collected in respect of one year and sometimes for a shorter period such as six months. The reference periods for the other items of expenditure vary from one month to four months. In some surveys, more than one reference period has been used for the same set of items for comparison and ultimately one of them has been selected on the basis of the results. Scientific investigations to establish the optimum reference period for each item or group of items are much in evidence, but it is generally recognized that information collected in respect of long reference periods suffers from high recall lapses. On the other hand, it is also noted that data collected in respect of short reference periods may suffer from relatively large border effects. It has also been noted in some countries that estimates based on shorter reference periods tend to be higher than those based on longer reference periods. On the other hand, some others have noted cases where estimates of expenditure on durable goods based on longer reference periods were higher than those based on shorter reference periods. In India, after a great deal of initial experimentation and study, one month (the last 30 days) has been adopted as the standard reference period for all items of expenditure.

18.34. The existence of seasonality in income, consumption and expenditure has been widely recognized. It is in order to eliminate seasonality that some surveys have adopted one year as the reference period for both income and expenditure, notwithstanding doubts about the practicability of collecting reliable data for the year. Some others have adopted the technique of staggering the sample uniformly over the year either in terms of quarterly or monthly subsamples or as a flexible, continuous operation. In combination with this technique, some adopt a moving

reference period, such as the last 30 days preceding the date of interview, while some others define the reference period as the preceding calendar month or the preceding calendar week. Some adopt a fixed reference period for each subsample. More and more countries are recognizing the need for spreading the survey over a year but some still stick to shorter survey periods either because of operational difficulties or because of resource constraints. Very few countries have adopted the technique of repeat visits to a sample household except when the survey is conducted as a monthly or quarterly activity with a fixed sample of households.

18.35. The concept of household used in income, consumption and expenditure surveys generally conforms to the standard international concept recommended for censuses and surveys. Emphasis is placed on common house-keeping arrangements rather than on relationship or living together. Some surveys have emphasized the pooling of incomes and sharing of expenditures as the primary criterion. The problems arising from the inclusion in households of domestic servants and paying guests have generally been recognized but the way these problems have been solved is not always clear. Some surveys have introduced the concept of spending unit, comprising those who share major items of expenditure, while some others have treated each such unit as a different family, defined as a socio-economic unit whose incomes are pooled and expenditures are shared. In such cases the payments made to the domestic servants and the payments received from the paying guests have been explicitly recorded and the expenditures have been adjusted so that they correspond to the incomes. The *de jure* concept of the household is generally preferred to the *de facto* concept and various devices are used to conform to the former. The length of stay during the reference period is sometimes used to determine whether a person should be included or excluded.

18.36. The concept of income used in Asian countries generally includes incomes in kind, and although some of the earlier surveys were not quite explicit on that point, recent surveys have been. Under this category are included the value of goods and services received free, the value of consumption out of own production, and the value of owner-occupied housing. Services provided by the Government free of cost are, however, not included and the position relating to concessional supplies is not always clear. Incomes usually reflect the amounts received during the reference period rather than the amounts receivable or the benefits that may have accrued during the period. Remittances, gifts and other transfer payments are generally included as income but other receipts, such as withdrawals from savings and provident funds, amounts realized from sale of property, borrowings, lottery winnings, and other windfall receipts, are generally excluded. Some variations have, however, been noted in the treatment of insurance proceeds. Incomes from agriculture, businesses and professions are often summarily recorded, but sometimes great care is taken to note down the details of inputs and outputs to arrive at the net income. Few surveys provide for recording all the requisite detail in the schedules. While in most surveys income data are collected in exact figures, in a few cases, where such accuracy is not required, information is recorded in income groups. Such data may be usable for classificatory purposes but cannot

be used for the derivation of income distributions and related analysis.

18.37. The concept of expenditure generally includes the value of goods and services received as part of wages and salaries and as current transfers, the value of consumption out of own production and the value of owner-occupied housing. Services provided by the Government free of cost are not, however, included. The expenditure data usually reflect consumption expenditure and exclude expenditure incurred on household enterprises and purchases of capital assets such as land and building. Transfer payments such as direct taxes, insurance premiums and provident fund contributions are also excluded from the concept of consumption expenditure.

18.38. Attempts are often made to balance receipts and disbursements, but it is generally found impracticable. Sizeable discrepancies are, however, usually taken as indications calling for further probes. Even after probes, the experience is that expenditures are generally exaggerated and incomes understated and the balance is often negative, especially at the lower income levels. Comparisons of household survey data with data available from other sources have often revealed substantial differences even in regard to personal consumption expenditure. Nonetheless, expenditure data based on household income, consumption and expenditure surveys are often preferred to income data for purposes of economic analysis and the study of income distribution. On the whole, the methodology of income, consumption and expenditure surveys is still being developed in most countries, although on the conceptual level differences are not great.

## 2. Labour force

18.39. Surveys of the labour force, employment and unemployment have been conducted in some form or another in most of the large- and medium-sized countries of Asia and even in some of the smaller countries, for example, Hong Kong and Singapore. Statistics of the economically active population are a common feature of most of the population censuses, but they do not usually provide an accurate and detailed account of the unemployment situation. It is therefore more often for obtaining information on unemployment and underemployment that such surveys are conducted periodically than for obtaining intercensal estimates of employment. The frequency of such surveys varies at present from once a month in Japan to once in five years in India, with some countries conducting the surveys quarterly, some biannually and some annually. In Japan, the monthly labour force survey is supplemented by a more comprehensive annual survey and a still more comprehensive employment status survey once in three years. In some other countries, where a regular labour force survey is yet to be established, such surveys are conducted on an irregular, *ad hoc* basis.

18.40. The labour force surveys conducted in the countries of Asia, both developed and developing, were initially inspired to a large extent by surveys conducted in the United States of America and Canada. They later used as their basic guidelines the relevant recommendations of the International Conference of Labour Statisticians (see chapter XI above). However, some of the developing countries, for example India, soon developed misgivings

about the applicability of the western approach and of the international recommendations based on that approach to the conditions obtaining in the developing countries of Asia whose economies were largely governed by agriculture, household economic activities, small-scale enterprise and own-account employment. It was soon recognized that the basic problem of the developing countries was more one of underemployment than unemployment. It was realized, in particular, (a) that the determination of the activity status of a person on the basis of his or her activity during a short reference period such as a week would not reflect the year-round activity pattern, (b) that the classification of individuals as employed or unemployed would be unrealistic since most of them suffered from underemployment, visible or invisible, (c) that the exclusion of young persons from the labour force in terms of an arbitrary minimum age limit was unwarranted since many young persons were to some variable extent engaged in economic activities in the information sector, (d) that the determination of unemployment in terms of an active search for jobs was unlikely to capture much of the real unemployment, and (e) that underemployment would have to be measured not merely in terms of time worked but also in terms of earnings. Accordingly, a good deal of experimentation was carried out with concepts such as usual status and labour-time disposition, various reference periods such as a day, a week, a month and a year, different minimum age limits for inclusion in the labour force, terminology such as availability for work to supplement seeking or looking for work, assessment of visible underemployment in terms of hours actually worked and hours additionally available for work, collection of data on earnings corresponding to the quantum of work time, and measurements of seasonal unemployment by staggering the sample of households over a year and gathering data on activity status with a moving reference period.

18.41. An expert committee set up by the Indian Planning Commission rejected the idea of classifying individuals as employed and unemployed as unproductive and serving no useful purpose, and a single measure of unemployment based on current activity as meaningless as it confounded persons totally unemployed with those seasonally unemployed. Following the recommendations of that committee, subsequent Indian surveys adopted a three-pronged approach: measuring employment and unemployment by usual status based on the predominant activity pattern over the year, current status based on a moving week, and person-day unemployment based on daily labour-time disposition summed up over the moving reference week. Separate estimates are provided for quarterly sub-rounds.

18.42. Some of these conceptual and methodological experiments have also been carried out in some other developing countries, for example Indonesia, Malaysia and Sri Lanka, with their own definitions and procedures. In Indonesia, for instance, the labour force survey of 1976 counted persons working for at least two months out of the preceding 12 months as working and found that the estimates so obtained were not much different from the current status estimates. In Malaysia, the initial surveys of the late 1960s included a section on labour-time disposition. In the Philippines, information has been collected since November 1976 with the past quarter as the refer-

ence period, and persons have been classified as fully employed, partially employed, totally unemployed or not in the labour force. Those who worked eight hours per day for at least 65 days or a total of 520 hours during the quarter were classified as fully employed. In Sri Lanka, the first survey of employment and unemployment (1959–1960) used what it called “current usual status”, which was determined in terms of the individual’s past experience as well as his expectation of the future. In that country’s labour force survey of 1968–1969, as well as its labour force and socio-economic survey of 1980–1981, activity data have been collected in respect of the preceding week as well as the preceding year. The latter would include any person who had done any work at all during the preceding year as employed. The consumer finance surveys of Sri Lanka adopted different reference periods—one week, one month and two months—for recording information on employment and unemployment.

18.43. Some countries have adopted a minimum hours worked criterion for the inclusion of unpaid family workers in the labour force more or less in accordance with international recommendations. Some have extended the criterion to other workers also. Some others have withdrawn the minimum criterion even in respect of unpaid family workers. A few have extended the concept of unpaid work to cover unpaid work done for non-family enterprises and have coined the term unpaid helpers. Some of these countries have also tried to extend the scope of unemployment data by including those who did not seek work or look for work for certain acceptable reasons—such as the so-called “discouraged workers”. Questions on availability for work have also been asked in some surveys of persons who have been classified as employed and even of persons who have been classified as outside the labour force.

18.44. Most of the developing countries of Asia have recognized the existence of seasonality not only in employment and unemployment but also in labour force participation. Their responses to the problem, however, differ. Some countries prefer to spread the inquiry over a period of a year with the sample uniformly staggered. Some have preferred to conduct surveys in different seasons or at two points of time synchronizing with the busy and slack seasons. A few have monthly or quarterly surveys. A crucial question that arose in this connection was the interpretation of the “with-job-but-not-at-work” category and the seasonally employed own-account workers. While some countries have treated the latter as with job but not at work and hence employed even in the off-season (subject to certain conditions), some others have treated them as unemployed or outside the labour force depending on their availability or non-availability for other work.

18.45. Apart from data on hours actually worked and hours additionally available for work, efforts have also been made occasionally to collect data on the number of days worked, usually in a longer reference period than a week, for example a month, two months, or three months, the number of weeks or months worked in a year, the duration and timing of seasonal unemployment, and so forth. Questions have also been asked in some surveys in regard to registration with employment exchanges, search for better jobs, and the like, in respect of persons already in employment.

18.46. While the importance of data collection on

earnings for the measurement of invisible unemployment has been recognized, efforts to collect such data have not generally been successful. There is an increasing realization that data on earnings related to the quantum of employment can be collected through labour force surveys only in respect of employees. Data collection on the earnings of self-employed persons generally call for a longer reference period and detailed accounting of receipts and disbursements connected with the enterprise.

18.47. The labour-utilization approach has been tried out in some countries, for example, Indonesia, Malaysia and Thailand. This approach seeks to classify persons in the labour force as adequately utilized and inadequately utilized, with the latter further subdivided into wholly unemployed, inadequately utilized as determined by hours of work, inadequately utilized by income and inadequately utilized as determined by mismatch between education and occupation. The data on which the analysis is based are basically those collected by the usual labour force approach, supplemented by data relating to household income, collected through a supplementary schedule. The available results of such studies show certain inadequacies in the conceptual framework as well as in its application. First, the income data are not closely related to the quantum of employment and hence do not reflect the adequacy of employment. Secondly, a low income does not necessarily mean an inadequate utilization of labour. Thirdly, the income criteria used for the assessment of adequacy are often arbitrary and sometimes not quite appropriate. Fourthly, the education-occupation mismatch, which is again based on arbitrary assumptions, is not applicable to the large section of the labour force in the developing countries which is illiterate, uneducated or has had merely some elementary education. Finally, the assumption that the rest are adequately utilized does not seem to be justifiable. On the whole, the labour-utilization approach seems to have produced results of limited usefulness. Some countries have also attempted other approaches, but the results are not generally available.

18.48. Finally, the concept of work has come under closer scrutiny. In the Philippines, certain categories of work not previously considered as economic activity have been specified for inclusion in the labour force. In India, in the 1977-1978 survey, persons who attended mainly to domestic duties but were also engaged in gathering goods such as vegetables, roots, firewood and cattle feed, or in sewing, tailoring, weaving, and the like for household use were identified in a separate category outside the labour force. It was found that the inclusion of such persons in the labour force would push up the labour force participation rate, especially of women in rural areas, very substantially.

### 3. Demographic surveys

18.49. Demographic sample surveys are of particular relevance to the Asian and Pacific region, which contains almost three fifths of the world's population. Various types of demographic surveys have been conducted in the countries of the region. However, no single survey methodology has been found to be suitable for all countries. Apart from the objectives of the survey, which may vary, the suitability of a particular approach to a given country depends as in other surveys on such factors as the level of

development of the country, the literacy rate of the population, the strength of the civil registration system and the socio-cultural background of the society.

18.50. In many countries of the region, civil registration is incomplete, or in some cases non-existent, and hence household surveys are the only method available to obtain estimates of birth and death rates and thereby to estimate rates of population growth. In addition, largely as a result of high rates of population growth and concern over increasing population size, many countries of the region have developed active family planning programmes which require regular monitoring and evaluation through sample surveys. Family planning surveys usually focus their attention on knowledge, attitudes and practice of contraception among married couples, and some include a pregnancy history component in the questionnaire. In countries with relatively reliable civil registration systems, the main focus of demographic surveys is on the factors affecting trends and patterns of fertility. Such surveys may also contain questions on family size expectations, the results of which may be taken into consideration in formulating the parameters for national population projections, for example.

18.51. Different survey techniques have been used to try to establish annual estimates of birth and death rates on a continuous or regular basis. One such ongoing survey is the Sample Registration Scheme (SRS) in India which employs a dual record methodology in an attempt to ensure that vital events are recorded accurately and completely. In SRS all vital events occurring to usual residents of sample areas are recorded on a continuous basis by part-time enumerators (in the case of rural areas) who use a local informant network to obtain preliminary information, and by full-time enumerators (in the case of urban areas) who are required to visit every sample household regularly. This continuous system of registration is coupled with a six-monthly retrospective survey of sample areas, conducted by a supervisor. The information obtained through these two methods of data collection is subsequently matched. The key item used in matching the records is the unique number assigned to sample households. Unmatched or partially matched events are reverified in the field in an attempt to optimize the count of events in each sample area. No attempt is made, however, to estimate the number of missed events.

18.52. Variants of this dual record method of collecting demographic data have been employed in several other countries of the region during the 1970s, notably Indonesia, Thailand and the Philippines. In some countries, the dual record method, with its built-in mechanism for improving the coverage and quality of data ordinarily collected through a single-round survey, has been relatively successful in achieving its objective of obtaining reliable information on birth and death rates. However, in other countries difficulties have been encountered with the dual method, leading in some cases to uncertainties in the resulting estimates. These have included difficulties in matching the information recorded in the two systems of data collection as a result of, for example, discrepancies in the date of birth of a child, non-independence in the recording of events in the two parts of the survey and reluctance among some respondents to co-operate in the regular interviews, coupled with poor interviewer performance stemming from the monotony of routinely

surveying the same sample areas over a long period of time. Some countries have also found this approach to be inefficient in terms of cost-effectiveness.

18.53. Single-round and multi-round retrospective surveys also play a key role in the collection of demographic data. Many countries in the region participated in the programme of surveys (multi-purpose, single-round retrospective inquiries) conducted as part of the World Fertility Survey. These surveys gathered a wide range of data relating to fertility and contraceptive behaviour, much of which is internationally comparable. In some cases, Fiji and Sri Lanka for example, the WFS inquiry was the first major demographic inquiry conducted by the countries. Most of the interviewing of those sampled (that is, ever-married women of given ages) was carried out by female interviewers. This was an important approach in many countries of the region, where in most previous surveys male interviewers were employed to carry out the field work. This was done in order to try to get more reliable and fuller information on pregnancy histories and contraceptive behaviour. In spite of the higher illiteracy rates among females than among males, it was generally felt that in the main this objective was achieved. Nevertheless, even though the WFS data for some countries are the best available, it must be recognized that they are far from perfect. Apart from missing some vital events, particularly where babies died soon after birth, a major difficulty was found with respect to age reporting. This was not surprising since many people, particularly among the illiterate rural population, do not know their precise age.

18.54. The Continuing Demographic Sample Survey (in the field since 1971) in the Republic of Korea and the Demographic Sample Survey of Nepal (1974/1977) are illustrations of multi-round retrospective inquiries. One of the important aims of this type of methodology is to overcome reference period errors which often affect single-round retrospective inquiries. Asking respondents on a single occasion to recall events that occurred in the previous 12 months (and sometimes in the previous six months) can often give rise to intolerable margins of error. This phenomenon is often associated with fertility and mortality questions asked in censuses of population, or one-time surveys linked to them, such as the 1974 Bangladesh Retrospective Survey of Fertility and Mortality. In the case of the Republic of Korea Continuing Demographic Sample Survey, an annual baseline survey is supplemented with quarterly visits (monthly since 1977) whereby an enumerator calls on the household to update household composition information and record any events that occurred to household members in the previous quarter (now month). With such frequent visits and a question on the schedule asking if any married woman in the household is pregnant, the likelihood of missing or misplacing events is minimized. However, a difficulty with this strategy is that the burden on the respondent grows unless there is some rotation in the sampling scheme, particularly if the same respondents are also asked to co-operate in another survey linked to the demographic inquiry. Moreover, over time the sample may become increasingly unrepresentative, as a result of migration, for example. A more detailed and comprehensive review of the advantages and disadvantages of the different types of demographic sample surveys in Asia and the Pacific can be found in (107).

18.55. Surveys conducted to monitor and evaluate family planning programmes have become a regular feature of survey activity. Thus, for example, the Republic of Korea Institute of Family Planning has conducted the National Family Planning and Evaluation Survey every one or two years since the early 1970s. Similarly, Singapore has undertaken two National Surveys on Family Planning (1973 and 1977). In India, the Registrar-General, the Programme Evaluation Organization and the Operations Research Group conducted such surveys during the early 1970s. Despite some concern over possible adverse public reaction to being asked questions on potentially sensitive topics like contraceptive use, response rates in family planning surveys have generally been well over 90 per cent. One particular limitation is in the analytical assumptions of many of the family planning surveys. They seldom directly relate increases in contraceptive acceptors/users to changes in the level of fertility but instead tend to assume a direct relationship which may not always be true.

18.56. Detailed studies on fertility and family planning in terms of spatial differentials and other constraints may require special sampling designs and field organization. This can make them difficult to accommodate in multi-subject integrated surveys, as the experience of the twenty-eighth round (1973-1974) of the Indian National Sample Survey proved. However, given proper planning and adequate training of field staff coupled with the suitability of the sample design, a limited set of questions on fertility or mortality, or some other allied subject, can quite usefully be added to a related ongoing survey, as for example was done in the 1979 Labour Force Survey in Indonesia. This method of data collection, if carefully employed, may be cost-effective, as it is possible to utilize other information asked on the schedule in deriving cross-classifications.

18.57. The use of multi-subject surveys for obtaining demographic data has been particularly successful in the more developed countries of the region. For example, the monthly Population Survey in Australia includes a supplementary questionnaire in most months on various social and economic topics. Thus, for example, in November 1976 it added a supplement on family size and birth expectations. Given their relative efficiency, it can be anticipated that multi-subject surveys and linked surveys will be a growing phenomenon in the 1980s for developed and developing countries alike.

#### 4. Household enterprises

18.58. Most household enterprises in the region belong to traditional and unorganized sectors of the economy. They may be broadly classified as agricultural and non-agricultural, important ones among the latter being household industry (manufacturing), trade, transport, money lending, and personal services. Household enterprise surveys generally relate to various aspects of organization and functioning of such enterprises. They not only collect data on receipts, expenditures and the net income from the enterprise, but also capital assets, employment, raw materials used, the sources of their supply, activities relating to production and marketing, and so on.

18.59. In some countries in the region, especially India, household enterprise surveys have collected extensive

data on rural investment and finance, agricultural and livestock production, cost of cultivation, and marketing. Data have also been collected on non-agricultural enterprises such as handicrafts and cottage and village industries. The National Sample Survey collected data on all household enterprises almost annually between 1951 and 1956 and thereafter at periodic intervals. The last such survey was undertaken in 1974–1975 (twenty-ninth round). In 1978–1979 (thirty-third round), another survey of unorganized manufacture including own-account enterprise was undertaken. The forty-third round (1979–1980) included surveys on own-account enterprise in trade, transport, warehousing, hotels, restaurants, and services.

18.60. Several other countries, for example, the Philippines and Malaysia, have also collected data on household agricultural enterprises and in some cases non-agricultural enterprises. In particular, in the Philippines integrated household survey data have been collected annually on receipts from the operation of various kinds of

economic activities, as well as receipts from other sources. The sample design and approach adopted in the Philippines enables aggregates to be obtained for operating account, profit and loss account and labour disposition, separately for agricultural and non-agricultural household enterprises, by rural and urban areas. In Indonesia, a comprehensive survey of all household enterprises was undertaken in 1980.

18.61. Attempts have been made in some of the income, consumption and expenditure surveys to obtain data on incomes from household enterprise in a summary manner. The results, however, have not always been satisfactory. The methodology of surveys on household economic activities is, on the whole, still inadequately developed and remains to be standardized and streamlined. It is to be hoped that once integrated household surveys are more commonly employed in the region, further data on household enterprises will become available.

## XIX. HOUSEHOLD SURVEYS IN THE REGION OF THE ECONOMIC COMMISSION FOR LATIN AMERICA: A REVIEW OF MAJOR ISSUES

19.1. In the appraisal of the International Development Strategy submitted by the Economic Commission for Latin America at Quito in 1973, the fact that economic growth and the welfare of society were out of step was cited as one of the fundamental contradictions of Latin American development (99). It was stated on that occasion that growth in economic terms has frequently failed to bring with it changes of equal importance in human well-being and social justice. This is shown by the continued existence of serious problems such as mass poverty, the incapacity of the system of production to provide employment for the growing labour force and the lack of economic and social participation by broad strata of the population. This reference to the imbalance between economic growth, welfare and social justice was repeated in subsequent evaluations.

19.2. The countries of the region have also, in recent decades, experienced high population growth rates combined with large-scale population movements, one of the most important consequences of which has been rapid urbanization, particularly affecting metropolitan centres. While the rural population decreased in relative terms—and even in absolute terms in some countries—Latin American cities experienced growth rates unprecedented in their history, and as a result there was a considerable increase in the demand for urban public services, education and housing. Housing problems became especially acute in the large metropolises whose accelerated growth exceeded the average for all urban areas.

19.3. The combination of a "concentration-based" style of development and sizeable population movements from rural to urban areas, particularly to large metropolises, brought into sharp focus the gravity of such problems as poverty, failure to satisfy basic needs, underemployment and unequal income distribution. At the same time, the accumulated evidence refuted the assumption of an automatic and positive relationship between economic growth and the improvement of the living conditions of the entire population and helped to make Governments more willing to adopt policies aimed at alleviating or remedying the situation of the most disadvantaged groups in society. As a result, in recent decades, there has arisen a demand for systematic and reliable statistics on changes in the size and geographical distribution of the population and on its living and working conditions, together with renewed interest in considering the potential offered for such purposes by the various statistics sources, among which household surveys occupy a strategic position.

19.4. This chapter summarizes the main problems encountered in household survey investigations of some of the more crucial aspects of the socio-economic realities in Latin American countries, as well as the areas of sampling design and measuring techniques which present the greatest challenges.

### A. MEASUREMENT AND ANALYSIS OF SOCIO-ECONOMIC CHARACTERISTICS BY MEANS OF HOUSEHOLD SURVEYS

#### 1. *Investigation of demographic topics*

19.5. Knowledge of a country's demographic situation and of its year-to-year development is a crucial tool for a wide range of governmental activities, including plans relating to health, housing, education, social welfare and the like, especially in countries with rapid population growth and large-scale population movements. Much of this knowledge can be provided by demographic surveys, the principal purpose of which is to estimate the vital rates which make up the population growth equation. Depending on a country's stage of statistical development, such surveys in some cases complement the data collected by means of censuses and vital records and in others are the principal source of data for computing these rates.

19.6. Series basic to a knowledge of the demographic situation concern the birth rate, mortality rate and migration, population growth being a function of these variables. In the Latin American countries, information on these variables is far from satisfactory. There are long delays in publishing basic data, which are usually incomplete and frequently not sufficiently detailed for the purposes of demographic studies. What is more, they may also be defective in quality (424). Household surveys, whether they are specifically designed to estimate demographic rates or whether they merely include questions on that subject in multi-subject questionnaires, are an effort to correct these defects, and to achieve an acceptable degree of accuracy in such estimates.

#### (a) *Timing of demographic surveys*

19.7. The usefulness of a demographic survey will depend on the state of census and vital records statistics in the respective countries. In Latin America, most countries take censuses regularly and all have done so for the 1970s. In these cases, demographic surveys can collect a wider range of information than surveys designed solely for the purpose of obtaining mortality, fertility and migration estimates. In those regions of the country where statistics from vital records are particularly defective, in order to ascertain the true demographic situation the investigators may combine information obtained from civil registers in areas where records are presumably good with information obtained from a survey of the areas with deficient registers. In countries which have good registers, demographic surveys may be useful for a more thorough study of certain variables or to include variables not recorded in traditional data sources, as is the case with migration.

19.8. Decisions with respect to the periodicity of survey data collection must take into consideration cost, the dynamics of the country's demographic situation and the

country's level of statistical development, which will determine whether or not information obtained from the survey and information from sources such as censuses and registers of vital events can be combined. In general, it is advisable to hold a survey as often as is necessary to update demographic estimates, which means at least once every five years. In those cases in which population censuses include the necessary questions for obtaining data on the demographic situation, special surveys may be conducted at the mid-point of the inter-census period, thereby establishing a 10-year periodicity. However, other surveys on more specific aspects not contemplated in the censuses, such as the World Fertility Survey or surveys of the knowledge, attitudes and practices (KAP) type will be conducted with their own periodicity.

19.9. Large samples are generally required to investigate the demographic situation, owing to the fact that many of the rates to be estimated have a very low relative annual frequency, making it necessary to observe a large group of individuals. The size must take account of whether or not the objective is to estimate specific rates with a high degree of disaggregation. For obtaining national estimates, it has been suggested in the demographic surveys promoted in the region by the Latin American Demographic Centre (CELADE) that, in general, the size of the sample should be about 50,000 people. Those countries which have joined the World Fertility Survey programme used samples of 3,000 to 7,000 observed cases.

#### (b) *Methods of investigation*

##### (i) *The prospective method*

19.10. The Centre has worked out a method to evaluate the demographic situation of a country, a basic feature of which is that it seeks to establish the values of average fertility, mortality and migration rates by direct observation of events and, except for immigration rates, of the lifespan of a representative sample of the population, on the basis of registration data. Observation is carried out by means of repeated visits to the homes of the people studied. This method is called "prospective", as opposed to the so-called "retrospective" methods, which gather information on past events by means of a single visit.

##### (ii) *Dual-record systems*

19.11. Another procedure which uses continuous investigation of the population by obtaining information about births and deaths, generally from two sources, consists of surveys known by various names such as "dual-record system" or "PGE system". The aim of these investigations is to determine fertility and mortality rates and, frequently, estimates of the number of births and deaths in the population being studied. In order to achieve this objective, the dual-record procedure uses two independent information gathering sources. One takes the form of periodic surveys in which information on births and deaths is collected by means of retrospective questions. In some cases each periodic survey is conducted independently of the others, while in others the interviewers are aware of the information obtained in a previous survey, so that in this respect the procedure is somewhat similar to the prospective method. The information obtained from the surveys is complemented by the information collected from a second source, namely, the continuous registration

of births and deaths. Although various ways of organizing such registration have been devised, what they all have in common is that they gather information as events occur.

19.12. If the coverage of both data sources were complete, each event would be recorded twice, once in the survey and again in the registers. The two sets of data can therefore be matched on an event-by-event basis. The results of this matching process are used as a basis for estimating the degree of coverage of each of the two sources and events that were omitted by both. By this means, it is possible to estimate the total number of events and, consequently, the fertility and mortality rates, presumably corrected for errors of omission. The theoretical basis of the adjustment is that the probability that an event will be recorded or omitted by one data source is independent of the probability that it will be recorded or omitted by the other.

19.13. The requirements for precise definitions of the population—in particular, the need for meticulous preparation of maps—and the work of matching the events recorded in the two data sources influence the cost of dual-recording systems. The tasks are more complex than in a prospective survey, and this means that a longer time is required to produce results.

##### (iii) *The retrospective method*

19.14. As an alternative to surveys that investigate the population on a continuous basis, there is another procedure in which information on past events is gathered by means of retrospective questions. The estimates that can be obtained by this approach are, however, generally less accurate than those furnished by an investigation that monitors the population on a continuous basis, despite the progress that has been made in recent years in techniques for the demographic analysis of retrospective information. Nevertheless, the retrospective method has an important advantage. It is much more economical than the methods requiring repeated visits to the same household, precisely because it collects all the information required in the course of a single visit.

19.15. Recognizing the efficiency of this method as a basis for making approximate estimates of fertility and mortality, and considering the usefulness of incorporating in its population surveys an element by which it could test the quality of the estimates obtained, CELADE has proposed including in one of the rounds of visits for the prospective survey a questionnaire on which to gather retrospective information. This innovation was first introduced in the National Demographic Survey carried out in Honduras in 1971 and 1972. In the fourth and final round of this investigation, retrospective information which made it possible to work out fertility and mortality estimates for the past was collected. While approximate, these estimates proved useful in assessing the results of the survey.

19.16. At present, CELADE is especially recommending surveys of the retrospective kind, since analysis of the results has led to the conclusion that, despite the disadvantage of a slight reduction in the quality of the data because of the length of the recall period, advantages are obtained in terms of costs, field work and timeliness of the availability of data. Prospective surveys have disadvantages such as the difficulty of maintaining a uniform level of quality throughout the investigation and the discipline necessary for the reinterview programmes, two problems

which are reduced or avoided in retrospective investigations.

## 2. *Investigation of internal migration*

19.17. Although migration is a basic component of a country's population growth equation and, as such, is investigated in demographic surveys, there are many other analytical and practical purposes for which migration data are useful. It is therefore appropriate to deal with this topic separately. For lack of space, in this section only the problem of measuring and analysing internal migration will be considered, without reference to international migration. In most countries of the area the socio-economic consequences of internal migration have, in fact, had greater weight than those of international migration. Moreover, although the methodology for the investigation of international migration imposes specific requirements on information and sample design, many of the problems that arise in measuring and analysing it are also found in the investigation of internal migration.

### (a) *The role of household surveys as sources of data on internal migration*

19.18. The countries of the region do not have registers which provide the necessary continuous statistics to meet the demands for information on internal population movements. When they do exist, the quality is so poor that no satisfactory analysis of the phenomenon is possible. In fact, it has been population censuses that have provided the initial figures on the magnitude, direction and make-up of migratory movements, albeit with the inherent limitations of availability only at 10-year intervals, the limited number of questions which can be included on the census form, and the shortcomings in data quality principally as a result of the underqualification of interviewers and their lack of sufficient training.

19.19. While it is undeniably useful to continue to invest efforts in improving the monitoring of internal migration phenomena by the use of continuous registration and censuses, household surveys appear to offer a method which opens new prospects for the knowledge of such phenomena. Through the possibilities of using surveys periodically and of including a greater number of questions designed for the purposes that guide the investigation of migration, together with the availability of better qualified groups of interviewers, information can be gathered to undertake more detailed and in-depth analyses of migration phenomena.

### (b) *The problem of sample design*

19.20. Any decision on sample design must take account of both the general characteristics of migration phenomena and the specific characteristics pertaining to the particular purposes of each survey. One of the general characteristics which must be taken into account is the fact that migrants usually constitute a minor segment of a country's population. This means that in order to obtain representative nation-wide data, it will usually be necessary to use relatively large samples and to draw heavily on sources which can provide data to stratify the sample. The possibilities of extracting a good sample improve with the quality of existing registers and with the concentration of migrants in certain residential areas or occupations.

19.21. The specific purposes motivating the investigation of migration are, in turn, related to other factors which affect sampling design, such as the degree of sophistication of the analysis being undertaken or the number of variables which have to be examined simultaneously, the margins of error acceptable in the estimates, the scope of the criteria used to define the minimum geographical units whose boundaries must be crossed before a geographical movement may be defined as migration, the strictness of the definition of a migrant (for example, whether or not the desire to settle permanently at the point of destination is to be taken into account) and the degree of detail which is sought in analysing the causes of migration at the points of origin.

19.22. It is appropriate to use all available information for the purpose of stratifying the sample. Censuses constitute one of the principal sources in this connection. Most of the censuses taken in the region in recent decades make it possible to distinguish between migrants and non-migrants, although many have not published tabulations classifying the population according to this variable. Account must also be taken of the fact that when the date of a census used for stratification purposes is far removed from the date when the survey is conducted, census data may not reflect some of the recent, significant changes in migration flows.

19.23. Another potential source is offered by registers of changes of residence or social security registers. In some countries of the region, a person must register a change of residence for administrative processes, such as to take part in elections or to obtain the good-conduct certificates required when applying for employment. In addition, some countries maintain up-to-date social security registers which include information on the migrant status of the insured person. In these cases, countries usually impose sanctions on employers who fail to register their employees with the appropriate offices, and this helps to ensure that the registers are kept up to date. When they are available, these registers can be used for compiling a list of the surnames and given names of persons born outside the jurisdictional boundaries which they must cross before they can be defined as migrants. Although, in general, these sources are incomplete, the extent of incompleteness can be evaluated with the help of data from the most recent census, or by means of data collected in household surveys designed for other purposes.

19.24. For applications which require some explanation of the dynamics of migratory movements, their causes and their consequences, or for the preparation of projections of the magnitude and direction of migratory movements, it is normally necessary to gather information on the characteristics of the place of origin in order to evaluate the impact of such characteristics on the propensity to migrate of different segments of the population. For this purpose, it is important that, in the process of sample stratification, special consideration be given to the identification and categorization of the places from which the migrants have come.

### (c) *Identification of internal migrants*

19.25. The basic feature of the migration phenomenon is a change of residence. However, if the concept is to be of use in explaining the peculiarities of migrant behaviour, the concept must be accompanied by a series of restrictive

conditions. The most important such conditions concern the definition of the boundaries which must be crossed and the minimum time of residence or intended residence at the point of destination. These two conditions raise serious problems for comparative investigation, owing to the fact that both the definition of the boundaries and the degree of restrictiveness in the definition of the intent to settle at the point of destination depend on the purposes of the investigation. In some cases, it may be considered useful to classify as a migrant any person who crosses the boundaries of relatively small jurisdictions, such as urban districts, municipalities or communes (or whatever they are called locally), as may be the case in planning for the provision of various services organized at that jurisdictional level. Regional or provincial development plans, on the other hand, will require data on migration among regions or provinces instead of, or as a complement to, data on population movements within such units. These problems have a direct impact on the degree of detail with which the information on the places of origin and destination of the migrants is recorded in the questionnaire and subsequently codified.

19.26. A similar line of reasoning may be applied to the criterion of length of stay at the point of destination. As an extreme example of a short stay, we may cite the case of tourists, who plan only occasional and limited stays. It is difficult to envisage any purposes for which it could be useful to consider such people as migrants. In contrast, there are other cases in which the decision as to how to classify people proves complex and must be tailored to the purposes of the investigation. (Such is the case, for example, of nomadic populations, seasonal workers, military personnel temporarily stationed in a particular region, diplomats and the staff of international agencies, students who reside throughout the school year in the environs of educational institutions, far from their habitual residence, and so on. Internationally recommended definitions for international migration statistics are given in (73) and (75).

19.27. Thus, there is no single, easily applied criterion for defining a migrant. The criteria will depend on the degree to which the categorization of individuals corresponds with specific behaviour differences in the population being studied. Irrespective of the kind of geographical units defined as places of origin or destination, and of how long and how firmly people who arrive at the place of destination plan to remain there, it is also necessary to identify which of the various places in which the migrant habitually resided in the past is to be considered his place of origin. This identification is important because a knowledge of the characteristics of the places people emigrate from is required for an analysis of the determinants of the phenomenon, as well as for the study of the patterns of choice which affect the propensity to migrate. Moreover, the figures finally obtained concerning the net volume of migration and the information on the direction and path of migratory movements depend on the choice of the place to be considered the place of origin.

19.28. Undoubtedly, the formation of a data base for users, with a detailed history of all the movements of those interviewed, including the length of time they have stayed at each place, would represent a source of useful data for the study of migration from various standpoints. However, the conduct of such a detailed, one-time survey

poses resource problems which cannot always be solved in the countries of the region. This generally leads to the inclusion of the subject in multi-subject surveys, thereby placing certain restrictions on the number of questions to be included, which in turn requires careful consideration of the relative advantages of some questions over others.

19.29. The basic difference among surveys in this connection is which of the possible previous places of habitual residence should be recorded as the place of origin. At one extreme, it can be the place of birth, which, for purposes of analysis, is generally considered as a good proxy for the place where the respondent is most likely to have spent most of his childhood. This information is useful for studying the process of assimilation of migrants, since the place where the respondent spent his early years is usually where his tastes, habits, aspirations and standards were established which will have a significant influence on his later behaviour and help determine how flexibly he deals with problems of assimilation to different environments and styles of life. The socio-cultural differences between places of origin and places of destination also enable the analyst to evaluate the objective difficulties of the assimilation process in each case.

19.30. When dealing with migration to metropolitan areas, it is also useful to bear in mind some results of surveys carried out in three capital cities in the region (103). These demonstrate that approximately three quarters of all migrants arrive directly from their place of birth, thus lessening the importance of investigating the previous place of habitual residence at other points of time.

19.31. In contrast to these advantages to using data on place of birth, there are also various disadvantages. First, as will be shown later, there are other important objectives in the study of migration for which information on place of birth is not the most useful. Secondly, from the operational standpoint, reference to place of birth has the following drawbacks: (a) it means that persons who return to their place of birth after having lived elsewhere for long periods are not classified as migrants, and this affects the estimated net volume of migration at different periods; (b) it does not reveal the movements of persons who have not moved directly from their place of birth to the place where they are residing at the time of the survey; (c) it raises problems of recall which grow worse with the time elapsed between the survey and the time when the individual moved from his place of birth, and therefore the older the respondent the less precise will be his information; (d) added to this, there is the possibility that the name or geographical boundaries of these places may have changed, and this may create difficulties when tabulating the data; (e) lastly, the older the respondent, the less relevant the information regarding the present characteristics of the place of origin will be as a means of assessing the causes of migration, since these may have changed substantially.

19.32. One alternative is to record as the place of origin the place of habitual residence prior to the present one. For a series of studies, this information is more meaningful than information relating to place of birth—for example, in analysis of the determinants of the differences between the socio-economic conditions of migrants and natives, or in drawing up projections relating to the supply of migrant labour and its impact on the dynamics of employment markets.

19.33. The previous place of habitual residence may or may not be referred to in terms of a fixed point in time. If it is, this has the advantage of unifying the interpretation of the answers and helping to focus the individual's memory, even though, like the place of birth, it has the drawback of not showing any moves that may have been made in the interval between the time of the survey and the reference date. The length of the time interval to be used must be decided in the light of the main objectives of the survey and the frequency with which data are collected. For example, when questions on migration are included in surveys which are carried out at regular and frequent intervals and when the aim is to obtain data regarding seasonal migrants as well, it is advisable to use short reference periods such as the year preceding the interview. In censuses, a five-year period is generally used, since most censuses are taken every 10 years and a five-year period makes it possible to obtain a picture of the territorial distribution of the population (excluding those persons who may have died in the meantime) at the mid-point between two censuses. However, the inclusion of questions about migration in household surveys is generally motivated by an interest in more immediate changes and is designed to help in the formulation of policies for a shorter term than those which can be considered census studies. Accordingly, shorter reference periods are required.

19.34. Whether questions are asked about the previous habitual residence at a fixed point in time or about the habitual residence immediately preceding the present one, users of data on migration may also require information concerning the length of time a person has resided at the place of destination. Such information is especially useful for studying how the migrant is assimilated into his new society.

### 3. Investigation of employment

#### (a) Difficulties in defining the economically active population

19.35. The difficulties which have been experienced in the region in identifying the economically active population are due basically to the lack of clear criteria for distinguishing between economic and non-economic activities and for distinguishing the active from the inactive. These problems are found both in developed and in developing countries. However, in the latter the boundaries between the various productive activities are less clearly defined and an individual's links with the labour market are less stable since people enter and leave that market more frequently and there is a larger number of occasional workers. In these circumstances, whatever criterion is used to identify economic activities and economically active persons and however rigorous the criterion, the impact on labour force statistics is far greater than would be the case in developed countries.

##### (i) Distinction between economic and non-economic activities

19.36. How clear this distinction is to the observer depends largely on how far the division of labour has progressed in each country and how differentiated and specialized people's activities have become. The further this process has gone, the easier it is to draw up clear and pre-

cise operational criteria for allocating those activities to categories on one side or the other of the production boundary.

19.37. Recently, the attention of employment analysts has been drawn to the problem of classifying various activities which are commonly found in developing countries and for which it is difficult to determine whether they do in fact produce some kind of economic benefit. These activities may be pursued communally or through a system in which people exchange services, or they may be carried out as a part of household tasks. In the case of the Latin American countries, the number of persons who carry out tasks of this type as their principal activity does not seem very significant. Such tasks tend, instead, to be secondary activities, particularly in the agricultural sector, carried out by women and young people who are not heads of households. Nevertheless, it is advisable to gather as detailed information as possible regarding people's activities, so that the available data base may be used for a supplementary analysis of hard-to-classify activities, to facilitate decisions on whether or not they should be included among economic activities.

##### (ii) Distinction between the active and the inactive

19.38. Once the boundary between economic and non-economic activities has been drawn it is necessary to specify the criteria that will be used in identifying individuals engaged in economic activities so as to separate the active from the inactive. These are used for persons above a certain age threshold, taking into account the relative amount of time they have spent on economic activities within a given reference period.

19.39. The problems of establishing the criteria relating to age limit, reference period and minimum time spent in an activity and of applying them in an analysis of the Latin American labour force do not differ greatly from those involved in that kind of analysis in the developed countries. Nevertheless, the relatively greater numerical weight of rural and occasional workers in Latin America raises problems concerning the criteria that deserve detailed consideration. In the case of rural workers, in order to obtain sufficient information concerning the economically active population engaged in farm work, it is generally necessary to use longer reference periods than those used to determine the urban economically active population, so as to be able to record activities that depend on the seasonal nature of farm work. Differences in the age limits set for the segment of population to be classified according to activity status also affect participation rates in the urban areas differently from those in the rural areas. The farm labour force tends to include a larger proportion of minors, most of whom work as unpaid family workers, and for this reason the relative weight of the economically active population engaged in farm activities tends to increase in relation to the overall economically active population when the age limit is lowered. The recording of occasional workers, either in order to include them in the figures for the economically active population or in order to analyse their position by means of special tabulations, poses similar problems with regard to age limits and reference periods and also to the criterion of minimum time worked. The occasional worker characteristically has a sporadic relationship with the production of goods and services and enters and leaves the labour market fre-

quently. Typically, a significant proportion of this segment of the labour force is made up of women and young people whose decisions to enter the labour market are linked to family survival strategies aimed at offsetting the fluctuations in real income and instability in the employment of heads of households.

19.40. Long reference periods, low age thresholds and low minimum requirements concerning time spent in an activity all tend to increase the coverage of occasional workers and therefore to produce higher figures for the participation of women and young people in the economically active population. Since the contribution of occasional workers to the national product is very different in significance from that of the rest of the labour force, the inclusion of occasional workers in the economically active population would increase the internal heterogeneity of the labour force and might thereby lessen the usefulness of that concept for many analytical and practical purposes. However, the use of flexible criteria to ensure that occasional workers are properly identified does not necessarily mean that such workers must be included in the economically active population. Information on them may be included in the data base in such a way that a specific analysis of their characteristics can be made.

19.41. In short, the features peculiar to Latin America require that special attention should be paid in household surveys to the identification and classification of persons engaged in farm activities and of persons who do occasional work. In order to collect as detailed information as possible on these segments of the population for inclusion in a data base which may be used for specific analyses, it is useful to collect information on activities carried out over long reference periods and to reduce the age limit and the minimum time spent on the activity that are necessary for inclusion in the active population. These criteria for the definition of the economically active population may be used instead of or in addition to stricter criteria. The most obvious disadvantages of tackling the problem in this way are, on the one hand, the additional costs of studying the occupational characteristics and employment situation of a greater number of people because of the use of less stringent criteria and, on the other hand, the need to store the information in such a way that separate segments of the population may be grouped for specific analyses.

(b) *Significance of statistics on open unemployment and visible underemployment*

19.42. Statistics on unemployment and underemployment were long considered especially useful indicators of fluctuations in labour markets in Latin America. Accordingly, collecting such statistics was one of the main purposes of the household surveys conducted in the region. These statistics revealed that most urban areas showed rates of unemployment and underemployment that lay within a relatively narrow range. That did not, however, imply that such areas were not affected by serious problems of labour force underutilization. The relatively low rates of unemployment and visible underemployment were, in fact, a reflection of a phenomenon that is very common in countries with a low level of development and a chronic deficit of productive employment, namely, the widespread existence of invisible or disguised underemployment.

19.43. This situation is typical of a large number of

workers who carry out marginal, low productivity activities that make insufficient use of their productive capacities and yield very low incomes. These workers do not have access to the means needed to support themselves while unemployed and seeking suitable employment, and many of them are convinced that, because of the conditions prevailing in the labour market, such a search would ultimately be useless or not worth the effort. Accordingly, they are inclined to engage in any activity which provides them with some income.

19.44. These facts have led to a reconsideration of the significance of statistics which focus on changes in the unemployment rate and the measurement of visible underemployment for the economically active population as a whole. It is now felt that if these data are to be really useful, an additional effort must be made to examine the phenomena in specific, relatively homogeneous segments of the population—for instance, wage-earners in the modern sector of the economy who are assumed to have valid expectations of finding productive employment that will justify using up personal family resources during a period of unemployment or of increasing the hours of work in the case of an employed person working fewer hours than normal. If reliable results can be obtained, which is determined to some extent by the size of the sample used in each case, there is a growing consensus that it is desirable to tabulate information on unemployment and visible underemployment for these segments of the population.

(c) *The "discouraged unemployed"*

19.45. Investigators of the employment situation in developing countries often find cases of unemployed persons who, convinced that their efforts are useless, have abandoned the search for employment or have never attempted it. These persons are called the "discouraged unemployed". Some household surveys in the region attempt to identify them, and under certain circumstances they are classified as unemployed and part of the economically active population. This treatment is useful when one wants to estimate the size of the labour force which would be available for the production of goods and services if the conditions of the labour market were to change.

19.46. Categorizing a person as one of the discouraged unemployed is a complex procedure that involves a number of checks. First, the fact that a high proportion of persons with skills similar to those of the respondent is actively seeking work clearly detracts from the credibility of the respondent's statement that he wishes to work. Other things being equal, persons who have made some effort to find work are probably showing a greater desire to join the labour force than those who have not, whatever the reason they may give for their inaction. Secondly, the respondent must declare that his failure to look for work is due to his conviction that there are no employment opportunities available and is not due to other reasons. Many of the region's household surveys determine this fact through specific questions about the reasons for not seeking work. Thirdly, expectations about the type of work (length of workday, working conditions, amount of pay, and the like) and whether such expectations are realistic should be examined in terms of what is currently offered in the market to a person with the respondent's skills. This verification is relevant even for those who have looked for work in the corresponding reference period. Additional infor-

mation that helps evaluate the willingness to work declared by the respondent is whether he has ever had any job and, if so, the length of time he has been unemployed. Other things being equal, a person who has recently become unemployed and who says he wants to work is more likely to be believed than one who has never worked. Similarly, persons who have primary responsibility for support of a family will be more compelled to work than those who do not.

19.47. In general, it can be stated that the borderline between the inactive and the unemployed is vague and that the criteria establishing it are necessarily arbitrary. It is also clear that this borderline can be established more accurately only by various control questions. The cost of including them in the questionnaires will be justified only when such questions have proven their effectiveness and when the number of persons who would be wrongly classified if such questions were not asked is sufficiently large in terms of employment policy priorities to justify the additional cost. Field investigations conducted in the region by the International Labour Organisation (146) show that a significant proportion of those who express a desire to work but have not looked for work during the reference period wanted only part-time work. An even larger proportion stated that they had made no attempt to look for work over long periods of time before the survey (three months). In addition, most such persons were not heads of household, did not have prior work experience and engaged in other activities, such as students or homemakers.

19.48. Where the lack of job opportunities is due to a visible and known disruption of an important source of jobs, it is relatively easy to decide to classify as "discouraged unemployed" any individual who states that he wishes to work even though he has not tried to find work. This may be true, for example, of persons who live in communities where the demand for labour is greatly influenced by the seasonal nature of the economic activities carried out there or where the demand for work is to some extent the monopoly of an enterprise which has halted or temporarily reduced its activities.

#### (d) *Investigation of invisible underemployment*

19.49. Aside from the desirability of tabulating data relating to unemployment and visible underemployment for specific segments of the economically active population and the particular care which it is advisable to take in identifying and classifying the discouraged unemployed, the problems connected with measurement and analysis posed by a study of unemployment and visible underemployment do not appear to differ greatly from those found by analysts in the developed countries. On the other hand, because of the important social and economic consequences that invisible underemployment has in the region and because of the complexity of analysing it, the problems involved in its investigation deserve more detailed treatment.

##### (i) *The complexity of situations of invisible underemployment*

19.50. Conditions of invisible underemployment usually represent the most severe problem of labour force underutilization in the developing countries. Investigative efforts in this field have been modest, however, compared to the severity of the problem, due largely to the many dif-

iculties encountered in collecting and analysing the data required for such investigations.

19.51. Part of the complexity of this phenomenon is due to the fact that the conceptualization of invisible underemployment involves two goals with analytical and practical implications that are clearly different: concern for the social welfare of the population and concern for adequate utilization of the human resources available for production. From the standpoint of welfare it is important to record all variables connected with employment that make it possible to form the most complete picture possible of the economic status of the most disadvantaged sectors of society and that furnish data useful for drawing up policies designed to alleviate or solve the most pressing problems of those sectors. From the standpoint of better utilization of human resources, on the other hand, the main interest is to determine and analyse how productive capacities are underutilized and to obtain data for drawing up employment policies to improve the utilization of human resources affected by various kinds of invisible underemployment.

19.52. The complexity of the analysis is also due to the existence of a multiplicity of invisible underemployment situations, each of which requires for identification the simultaneous examination of a broad group of variables. The most usual situations of invisible underemployment are those characterized by low income or insufficient utilization of skills, which may be grouped under the term "disguised underemployment", and those characterized by low productivity of the production unit in which the individual is active, which may be described as productivity underemployment. In situations of disguised underemployment, underutilization because of low income usually affects labour force segments that are very different from those defined by their overcapacity with respect to the technical requirements of the activities they perform. These differences make it desirable to treat the two types of underutilization separately.

19.53. Study of productivity underemployment is not usually included in household surveys because of the difficulties inherent in measuring the productivity of production units where the surveyed person is active. However, it is important to note that this analysis is very significant for any dynamic study of the problem of underutilization. While persons working in low productivity units may receive more income than is usual for that level of productivity, this generally occurs because of other institutional forces. A dynamic analysis of the problem of human resource utilization should take into consideration these imbalances between the productivity of production units and the incomes of individuals, which are characteristic of certain growth patterns. In addition, while these situations of productivity underemployment, when considered from a static standpoint, do not greatly injure the welfare of the persons involved, their presence can have important consequences on those persons' welfare in the long run.

##### (ii) *Low income as an indicator of underutilization of the labour force*

19.54. When it is proposed to analyse disguised underemployment solely in terms of the effectiveness of the economy's operation, that is, in order to determine those employment situations in which there is inadequate utilization of workers' productive capacity, the adequacy of

income as an indicator of productivity levels must be evaluated, and, even assuming that it is adequate, income limits below which abnormally low productivity may be predicted must be set.

19.55. The main problem in using income as a productivity indicator lies in the difficulty of differentiating between low incomes resulting from low productivity and those reflecting only underpayment of the worker in situations where his productive capacity is completely utilized. It is difficult to believe that the presence of abnormally low income in productive units of the economy's modern sector, where stable employment and pay occur most frequently, would generally be due to the poor utilization of the human resources capacity of the sector. Stability of work remuneration usually is an indication that the expected and the actual use of the productive capacity coincide. In these situations, remuneration below a specified standard would indicate underpayment rather than low productivity. Consequently, it does not appear desirable to take income as a productivity indicator for these cases.

19.56. The pattern of utilization of labour force capacity in the traditional sector of the economy, which is characterized in the developing countries by a strong concentration of own-account and piece-rate workers, is different. In these cases, the use of income in analysing invisible underemployment should take into consideration that, because of a lack of the technology and capital resources that might mitigate its impact, these workers would be highly exposed to fluctuations in demand, which would directly affect the level of utilization of their capacities and consequently their income. It has been suggested that in these cases income should be used as an indicator of underutilization of the sector's human resources and that income received during the reference period should be compared with the maximum received during a specified prior period (155). This is based on the assumption that the maximum remuneration received is a good indicator of the maximum yield in such activities, just as for the economy as a whole, where levels of full employment are usually estimated on the basis of previous maximum production.

19.57. This procedure, however, poses serious measurement problems in highly inflationary economies, where the comparison between current and past incomes should be made after adjusting the data for changes in prices, a task that is particularly difficult when fixed periods for making the comparison are not set in the survey. In addition, data on maximum income obtained would have to be monitored in order to reduce the incidence of income declarations involving totally atypical situations. Lastly, this procedure would pose special problems for determining underutilization of some own-account activities—for example, brokerage or certain professional activities—where the significant reference periods for evaluating the unit's productive capacity are usually longer than is normal in other own-account activities.

19.58. Despite the difficulties in using income as a productivity indicator, a key factor in characterizing invisible underemployment when it is examined in combination with other variables is to delimit specific situations of underutilization. Thus, recognition of the complexity of invisible underemployment and of the multiplicity of ways in which it occurs leads to the suggestion that efforts should not be concentrated on devising a single invisible

underemployment measure, whose meaning will always be ambiguous. Instead, there should be a detailed analysis of its various aspects through the simultaneous use of several variables.

(iii) *Income as welfare indicator*

19.59. As mentioned, using income in the investigation of invisible underemployment is also usually influenced by a concern for problems of the labour force's social welfare. This concern is reflected in the attempt to determine those portions of the labour force that are under a certain minimum income level, sometimes termed the poverty level, and to investigate the employment characteristics of that segment, where the problem of human resources underutilization is usually seen most dramatically. In this approach to employment problems, underutilization is important to the degree that it is postulated as one of the most significant determining factors for low incomes, and consequently for poverty.

(iv) *The skills criterion*

19.60. In addition to abnormally low income, another symptom of disguised underemployment is inadequate utilization of skills, that is, an imbalance between training received and abilities learned inside and outside the formal education system on the one hand, and the requirements of productive activity on the other. From the standpoint of improving the utilization and proper allocation of available human resources in the developing countries, the importance of such measurement is undeniable. In practice, various difficulties are encountered in making this measurement. First, in the developing countries there has been a strong expansion of education in recent decades along with devaluation of education in the sense of a rapid growth in the number of years of formal education required for the same job. As a result, it is common to find in the same activity various generations of persons who have had radically different opportunities for access to and continuation in the education system. In comparing the situations of younger and older workers, it is also necessary to take into account the experience the latter have gained on the job and the difficulty of establishing equivalences between the skills derived from that experience and those acquired through some kind of formal education.

19.61. Assuming that a way to solve this problem is found, the criterion for measuring this imbalance must then be defined, for example by establishing how much deviation from the average skills required for a particular occupation will be taken as a measure of significant underutilization. Correct measurement of this imbalance also requires precise identification of occupation and the level of skills. For occupations, there must be a breakdown that will ensure that occupations usually requiring different levels of skills will not be mixed, which will probably occur at levels of more than two digits of the International Standard Classification of Occupations. Otherwise, the imbalances obtained might merely reflect the heterogeneity of the occupations making up larger groupings. For skills, surveys usually include questions on the level of formal education and the training courses taken. Measurement of each of these variables admits of varying degrees of refinement. Measuring imbalances between skills and occupations is also important from the standpoint of welfare problems, particularly because of the psycho-social prob-

lems that are usually associated with the lack of opportunity to exercise the skills acquired and with the frustration of expectations of higher income.

(v) *Data requirements for analysing invisible underemployment*

19.62. The magnitude and significance of the social and economic problems associated with invisible underemployment and the wide variety of information required to analyse them adequately make it desirable to examine the possibility of including either in recurring surveys, in special surveys or by adding to recurring surveys a number of relatively simple questions to enrich the data base for investigating invisible underemployment. In establishing the desirability of these extensions of the scope of investigation, it must be taken into account that household surveys—and this is even more true for an integrated programme of surveys—furnish a data base opening up the possibility of simultaneous analysis of many variables, and that as technical and operational resources to create easy-access data files become available, this enables interested users to investigate invisible underemployment problems in an almost unrestricted fashion.

19.63. Income and skills of persons constitute the nucleus of current approaches to investigating invisible underemployment. To these variables may be added others needed to specify their significance. First, it would seem to be desirable to study the possibility of investigating how pay is received—per hour, day, week, two weeks, or month or on a piece-work basis. This information helps, *inter alia*, to interpret data on income stability. Income stability, in turn, may be studied by comparing current income with income received in the past, but the problems that this procedure may cause have already been indicated. On the other hand, it may be possible to make an approximate measurement of income stability by asking the informant whether the income of the person surveyed usually varies much or little between the periods defined for this purpose.

19.64. Analysis of some household surveys in the region shows differences in the information asked about income. To evaluate the advantages and disadvantages of these practices with respect to furnishing income data for characterizing disguised underemployment, it is useful to consider the approaches used in the compilation of the data. In the case of the welfare approach, it is useful to obtain information on family income from all sources. This may be collected, or calculated, making the appropriate adjustments, for the same reference period. The data should make it possible to identify those family units that, because of their income, are below an established poverty line, for later study of the occupational and employment characteristics of each member of these units. If what is sought, on the other hand, is to determine what types of economic activities are not efficient enough to generate income above the poverty level, it will be necessary to inquire about income derived from the main activity of each person who has worked for a period equivalent to or longer than the normal workday in that main activity during the reference period.

19.65. Lastly, if it is assumed that the productive capacity of all those working full-time and with stable wages is fully utilized, the problem of underutilization according to income is reduced mainly to own-account and piece-rate

workers. As mentioned before, it has been proposed that for these cases an analysis be done of underutilization by comparing income received in the reference period with the maximum income received in the same activity as payment for work in a similar period of the immediate past. Here again, information on income from the main occupation is required. If, because of the characteristics of the activity, it is desirable to ask about income for a longer reference period than that used to investigate the characteristics of employment, it is important to make sure that such income derives solely and exclusively from that activity and not from other activities that the individual might have performed during the longer period.

19.66. Other useful variables for characterizing underemployment situations and analysing the phenomena of labour market segmentation are those that indicate the level of technological development and capital and financial resources available to the production unit where the respondent engages in his main occupation. Since it is obviously difficult to obtain accurate information on these aspects of the production unit through household surveys, it is suggested that the inclusion in the survey of questions about the size of the establishment, which is a variable closely linked to the aspects mentioned, should be considered. While this measurement poses some difficulties, it is much more feasible than measuring the other aspects mentioned above. Investigating the size of establishments has the additional advantage of furnishing information on small establishments, which is difficult to obtain by other means.

19.67. Despite the fact that there seems to be a widespread consensus on using information on the size of establishments to characterize employment and underemployment situations, this consensus is not reflected in the current content of household surveys, primarily because of problems arising in obtaining accurate information on this subject. The main problem seems to be the informant's lack of clarity as to which is the unit whose size is to be reported on—whether it should be the enterprise, the establishment or the section or technical unit where he works. This information may also be particularly distorted when the person surveyed is not the informant himself. In order to study the possibility of including this variable in household surveys, it has been suggested that intervals representing gross orders of magnitude should be used so as to simplify the assignment of establishments to size categories. These size categories should correspond approximately to identifiable technological strata in the country. Mention has also been made of the possibility of asking each employed person the name and address of the establishment in which he works, which would make it possible, using a very simple questionnaire, to conduct a survey of those establishments along with the household survey. Thus, not only the size but also the economic activity could be investigated with greater accuracy than that attained in the household survey, as could aspects of the establishments, such as the degree of unionization and the existence of training programmes, that are also pertinent for a specialized analysis of employment situations.

19.68. To analyse the degree of utilization of each person's skills, the level and type of regular or other education of the persons being surveyed must be determined. In particular, it would be desirable to obtain information on training courses taken by the persons surveyed, since

this is training that will have to be compared with training requirements of the specific activity in order to estimate any imbalance between skills and occupation. Information on training courses would supplement information on regular education, which, strictly speaking, is conceived of more as an indicator of the social and intellectual capacity of a person to be trained for specific activities. Similarly, in order to characterize adequately imbalances between skills and occupation, it may be desirable to work out some equivalence between regular educational attainment and training courses taken and, where such information is available, some measure reflecting the training received at the place of work.

19.69. Another possible source of information on inadequate utilization of skills is the evaluation of the informants themselves. To that end, some surveys have included a question on the person's degree of satisfaction with the manner in which the requirements of his current occupation enable him to update or develop skills and abilities already acquired. Like any question requiring subjective evaluation by the respondent, it should be accompanied by other questions to check the reliability of the response.

19.70. Lastly, as in the case of visible underemployment, analysis of invisible underemployment should specify what unit is to be used. The unit may be the individual, the household or the activity itself. The choice depends on the priority objectives of the analysis. For example, from the standpoint of seeking to evaluate the economic efficiency of the system's operation, it is important to obtain information on the characteristics of activities since it is these activities which underutilize the productive capacity of individuals. An immediate implication of this approach is the need to identify incomes for each occupation, particularly for the main occupation, and to compare the skill requirements of the occupation with the training received by the individual. When, on the other hand, the approach is primarily social, it is important to consider the individual and the household as analysis units. For skills, it will be important to determine how they are used in the various activities performed by each individual. For income, it will be desirable to consider all types of income received by each person in all of his occupations and aggregate them later at the level of the household unit. This is the most appropriate procedure for classifying households above or below the poverty line.

#### 4. *Measurement of levels of living and income*

19.71. The level of living of an individual (and, similarly, of a household) depends on the degree to which his needs are satisfied and is determined by his resources and opportunities taken as a whole, including access to free or subsidized goods and services and to social security systems. Accordingly, the concept of level of living embraces the various aspects of well-being and the circumstances that may affect it. Its measurement can therefore be approached, in principle, from different points of view.

19.72. In this sense, it seems advisable to make a preliminary distinction between those approaches which emphasize the relevance of subjective aspects in the determination of individual levels of well-being, and those which stress the significance of the objective and impersonal

measures of living conditions. Measurement of the subjective elements of well-being in terms of the aspirations, perceptions, degree of satisfaction and attitudes of individuals is a relatively new and increasingly active field of investigation and may prove to be a necessary complement to objective measurement for analysis and policy purposes. Although such measurements are difficult, they may be especially important in societies undergoing rapid changes or in transitional phases of development, as is the case in many Latin American countries, and sample surveys of individuals are the main instrument for applying them. Objective measurement of living conditions, on the other hand, may concentrate on indicators for each component of levels of living or on the resource base available to households for obtaining satisfaction of their needs.

19.73. The first approach requires indicators of "inputs" and "outputs" for each group of needs. The "outputs" are the degree to which each need is satisfied and are the components of levels of living, including health, nutrition, housing, clothing, education, employment and working conditions, social security, recreation, relationship with the physical and social environment, social participation and human freedoms. These last components—usually called "non-material needs"—are not easily quantifiable from an objective point of view, but household and individual surveys are central to any effort at assessing living conditions in such areas. Furthermore, except for differences in survey-taking capabilities and institutional limitations, their investigation in developing countries should not present more difficulties than those encountered in developed countries, which, as is generally recognized, are considerable.

19.74. However, even the construction of physical indicators of the degree of satisfaction of the most "material" components of levels of living raises many conceptual and operational problems. Moreover, to combine them in a single composite objective measure of the level of living is difficult because of the conceptual complexities involved in considering individual preferences and making interpersonal comparisons of well-being and because of the resulting difficulties in selecting an appropriate procedure for combining the component measures. In the search for a composite measure, interesting as it may be for overall comparative purposes, the potential value of a body of data on the various components of the level of living for the analysis of the complex structure of well-being should not be underestimated. Seen from this point of view, household surveys may prove an unparalleled instrument for obtaining such basic data.

19.75. One way out of the aggregation problem in trying to obtain a synthetic measure of the level of living of individuals and households is to concentrate on their consumption of goods and services for the satisfaction of each group of needs, valued at the prices which they pay for them—in other words, their consumption expenditure. The consumption expenditure of a household may be regarded as an approximate measure of its level of living on the assumption that each household distributes its budget among the various goods available so as to obtain maximum satisfaction, and provided that the size and composition of the household are also taken into account. This is only an approximate measure, however, because a comparison of amounts expended on consumption does not

take into account differences in prices paid or in the actual access of different households to goods and services. It does not cover current savings, which can contribute to future well-being, nor goods and services provided free of charge or at nominal rates by the Government. Nor does it include the direct contribution of wealth to levels of living.

19.76. Income constitutes a somewhat more comprehensive measure of levels of living than does consumption expenditure, inasmuch as it covers not only the amounts devoted to the latter but also current savings, which increase wealth, and hence future—and, to a certain extent, present—well-being. Income also synthesizes the results of the application of the household's resources to the attainment of purchasing power, based on the time and skills devoted to work by its members, of the returns from wealth—through its monetary yields—and of rights to social security. It does not, however, include the possible contribution to well-being represented by the time devoted by the household, which is assumed to make optimum use of its resources, to leisure, education and non-economic activities. Perhaps more important, income does not normally incorporate services provided to households free of charge or subsidized by the Government, such as health services or education, which can make a significant contribution to levels of living and actual access to which may be distributed rather inequitably.

(a) *Measurement of household expenditure*

19.77. Household income, consumption and expenditure surveys have progressively shaped a characteristic type of household survey and represent the richest source of information on household consumer expenditure.

19.78. The major purpose of surveys of this kind, carried out in Latin America until recently, was to obtain weighting coefficients for the preparation of price indices, and they were usually limited to certain specific socio-economic groups. Towards the end of the 1970s, surveys conducted under the Joint Studies on Latin American Economic Integration (ECIEL) programme in the major metropolitan areas of Latin America shifted the emphasis towards the analysis of consumer behaviour patterns and their comparison among countries, while the socio-economic coverage of the surveys was extended to all segments of the population. More recently, increasing importance has been given, among the many objectives of income, consumption and expenditure surveys, to the examination of levels of living and the measurement of differences in well-being among various population groups. However, there has still been little progress towards systematic use of the results of income, consumption and expenditure surveys in official estimates of national expenditure or in estimating the household account in the national accounts. The fact that most of the surveys do not have nation-wide coverage has no doubt hampered the attainment of that objective. Besides, very few Latin American countries have conducted such surveys on a regular basis and even in those few that have, the surveys have been isolated and not comparable with one another, being separated by periods of 5 to 10 years.

19.79. The trend noticeable in some countries of the region towards integrating income, consumption and expenditure surveys into a permanent household survey pro-

gramme will certainly promote a variety of uses of the results and facilitate a diversified analysis of levels of living and changes in them over time. The measurement of household consumer expenditure in the examination of levels of living calls for an analysis of all the money spent by members of the household on goods and services for their individual use and for use by all members of the household, as well as goods and services produced by the household for its own use and those provided either as payment in kind or current transfers. In order to make valid comparisons of levels of living on the basis of household consumer expenditure, one must also include in the measurement of such expenditure the estimated rental value of the dwelling occupied by the household, when such dwelling belongs to it or is provided free of charge or when its use represents part of remuneration.

19.80. "Consumer expenditure" does not include several other current household disbursements, such as direct taxes, social security contributions, insurance premiums, transfers to other households or to non-profit private institutions, payments for loans and savings deposits. However, because household expenses must be examined closely and in view of the need to monitor the consistency between income and expenditure measurements by comparing total receipts and disbursements, it is also advisable to examine current household disbursements other than consumer expenditure and savings deposits, with a view to their separate analysis for specific purposes.

19.81. Many of the income, consumption and expenditure surveys carried out in Latin America have recorded only the total value under each expenditure item in accordance with a classification by purpose of expenditure. It is better, however, in the investigation of levels of living to record the consumed or acquired amount of each type of good or service with the corresponding price—even though this is a more costly operation. Such a method may also make for more accurate estimates of expenditure levels. In any event, there is also a need for information on the consumption of goods produced within the household, or provided by way of remuneration or as current transfers, for estimating the corresponding values of income, consumption and expenditure in kind. In particular, in order to analyse basic needs, one has to look closely at the quantities consumed or acquired—if nothing else, at least those for food. This requirement can be fully satisfied in the special diet and nutrition surveys which weigh all the food consumed and even the food wasted, but even ordinary income, consumption and expenditure surveys usually record in detail the amounts of food obtained during the period covered. In some cases, the amount of food actually consumed has been recorded by means of detailed food inventories taken at the beginning and end of the period. However, this costly procedure should probably be reserved for food produced within the household or for special diet and nutrition surveys.

19.82. In respect of other expenditure items, the distinction between goods actually consumed and those acquired during the period covered is not so crucial. On the other hand, in the case of durable goods usually purchased on credit, there is an important distinction to be drawn between the total value of purchases made during the period covered and the payments made for goods obtained during earlier periods. There are compelling reasons why the sur-

veys cannot record in detail the two types of transaction, but it is advisable to include under total household consumer expenditure the value of the purchases, record the amounts owed and treat instalment payments as income used to reduce liabilities.

19.83. There are arguments in favour of two different methods of collecting household expenditure data—the log-book method and the interview method, which relies on the informant's memory. Controlled tests conducted in Latin America with the two types of questionnaire have shown no significant differences, although the two methods cannot be expected to produce similar results. On the one hand, the log-book system offers a better breakdown of total values. Moreover, it is an appropriate method for gathering information on the amounts of each type of good purchased. However, it can be used only with informants who have received some education, and even so the instructions are subject to frequent misinterpretations. The system is also affected by lapses of memory. On the other hand, with the interview method, the instructions can be followed more closely and interviewer-informant interaction makes for greater accuracy and reliability of the data gathered. But this method is probably more subject to response errors, mainly because of problems of recollection. One solution which has been successfully tried when the period covered is short is to gather data at several successive interviews, thus reducing the periods of recall.

19.84. Various types of income, consumption and expenditure surveys have been carried out in Latin America. Most of the surveys under the ECIEL programme used samples which combined a panel of households interviewed repeatedly throughout the year with semi-panel groups and subsamples distributed over the different trimesters. In other cases, particularly with surveys designed to obtain weighting coefficients for price indices, the sampling design used was one which distributed the total sample over the entire year. Last, some surveys have been carried out on one single occasion for the entire sample of households. In the first type of survey, when the aim is to reconstruct the pattern of household expenditure throughout the 12 preceding months, the information obtained is seriously affected by lapses of memory and omissions. When the aim is only to reconstruct the pattern of spending for a shorter period—for example, three months—such errors become somewhat less important, but the results are affected by the seasonality of spending.

19.85. Problems also arise when all the categories of expenditure refer to the same period. For each category of expenditure there is probably an optimum reporting period for which lapses of memory are minimal and the data are not too unrepresentative. Hence, it is advisable to use these "natural" reporting periods for each category of expenditure. This means, however, that in order to process the information uniformly, one must impute the values in such a way as to make them refer to a reporting period common to income and expenditure. As a rule, for expenditure disbursed monthly the month is the natural reporting period. Weekly reporting is perhaps most suitable for recurrent expenditure (on food, for example) when the interview method is used. For occasional expenditure (on durable goods, for example) longer intervals are needed—three months or perhaps one year. The use of sufficiently long reporting periods for each type of expenditure is crucial to the representativeness of the data being collected in

one-time surveys, even if it entails more response errors. In subsample surveys, sufficiently long reporting periods serve to cover more instances of spending, thus reducing the error in the estimation of occasional expenditure. On the other hand, with surveys conducted by the panel method, the records for the year are built up on the basis of the combined data for the periods between interviews.

#### (b) *Measurement of income*

19.86. The income obtained by a person from participating in economic production inevitably has two aspects: it is characteristic of that occupation and therefore of the relation of that occupation to the productive process, and it is the amount of economic resources that that activity gives him to provide for the earner and the earner's family welfare. Any measurement of income must, therefore, satisfy to a greater or lesser extent both basic purposes: analysis of remuneration originating in each productive activity and in the various labour markets and analysis of levels of and disparities in well-being.

19.87. In the final analysis, the ultimate purpose of measuring income is to evaluate and analyse the well-being of the population. However, concern about income distribution leads to analysis of the conditions under which the income is generated in productive activity and of any *income transfer mechanisms that might modify the income distribution* resulting from productive activities. Both instrumental purposes are, therefore, important for diagnosing and guiding public policy. For that reason, analysis of remuneration and of redistribution mechanisms and income formation should be distinguished from analysis of income distribution viewed as welfare distribution.

19.88. Information for these objectives of analysis could, in principle, be obtained from income, consumption and expenditure surveys. In practice, however, such surveys run into financial problems because of their complexity and this accounts for their low frequency and incomplete coverage. Moreover, the required amount of detail and the complexity of recording expenditure data greatly limit the marginal allocation of survey resources to the investigation of income. On the other hand, as regards use of the data, current practice in Latin America is characterized by shortcomings in analysis of individual income data and underutilization of such analysis in investigation and examination of the occupational status of household members in the income/productive process linkage. The result is that some of the data collected are not used at all or are not used to the fullest possible extent.

19.89. Current evaluation of the impact of economic and social policy and of the national accounts estimates that support it requires, however, frequent data on the formation and distribution of household income. Any complete evaluation of the welfare of various groups of households also requires, as just noted, data on their consumption, but once the diagnosis is made and the structural features of the situation and the behaviour of household expenditures are diagnosed, the probable evolution of the conditions of welfare and poverty can be followed through systematic measurement of the income distribution of households and their access to essential public services. This possibility makes feasible a new type of survey that can be included in multi-subject programmes, namely, an income survey, or coverage of household income in recurrent multi-subject surveys. Special income

surveys may also gather information to meet analytical requirements for the study of income distribution on how that distribution originated and changes and how it is connected with productive occupations. On the other hand, since such surveys do not gather information on the disposal of income, they can tell us nothing about the real well-being which the various household groups derive from their income. In Latin America, Brazil and Panama have conducted such surveys on a nation-wide basis, with satisfactory results in so far as the quality of the data is concerned.

19.90. Drawbacks unrelated to the methodologies and design of these surveys have made it difficult to repeat them and use them in other countries. By concentrating attention and resources on income, such surveys make it possible in principle to devise more sophisticated or complex solutions to the special problems of measuring specific types of income, such as income in kind. In general, one possible recommendation would be to conduct these surveys annually, which could also furnish a basis for estimating and updating the household account in the national accounts.

19.91. Multi-subject surveys could fulfil these objectives if they included an income module in the questionnaires. The obvious advantage of this type of survey is that the information obtained permits an interrelated analysis of income distribution and such factors as employment, health and education. The region's experience with recurrent multi-subject surveys shows that employment is the main concern of these surveys, which usually record remuneration as one inherent aspect of occupation. Some countries, for example, Chile, Argentina and Uruguay, include a questionnaire module to investigate income more thoroughly, although it is not always included in subsequent rounds of the survey. Some drawbacks of module-based income analysis in these surveys have to do with the limitations on the amount of detail that can feasibly be covered in multi-subject questionnaires, and with the accuracy of the estimates derived from a number of observations which are, at times, determined from other variables. Specialized employment surveys are another valuable source of income data, in so far as they gather data on the remuneration of the economically active population.

19.92. There is no doubt that the measurement of individual remuneration, together with other variables characteristic of the employment situation, is highly important in monitoring and guidance of employment and wages policies and makes it possible to focus on analyses related to underemployment. However, the ultimate overriding objective in the identification and analysis of underemployment derives from considerations of well-being and its interrelationship with the problem of poverty. The analysis of underemployment on the basis of individual remuneration will therefore be complete only if such remuneration is examined in conjunction with household income levels and, ideally, if that information is related to data on the availability and accessibility of goods and services which reflect levels of living.

19.93. The United Nations guidelines on income distribution statistics afford an adequate general conceptual frame of reference for measurements of income and income distribution obtained through household surveys. This frame of reference is largely consistent with the national accounts and, at the same time, focuses on and is

geared towards the recording and description of each major phase in the acquisition and use of income by the household.

19.94. Surveys of family budgets use a broader concept of income which includes fluctuations in assets in order to delimit appropriately the economic level and budgetary situation of households. This type of survey does not, however, always cover all strata of the population since in some cases, when the purpose is to provide weighting coefficients for consumer price indices, surveys are limited to the wage-earning population residing in urban areas. A useful review of recommendations and definitions for such surveys is provided by the report on this subject to the Twelfth International Conference of Labour Statisticians (33).

19.95. In using income data to make comparisons of levels of living, measurements should include the monetary income deriving from employment, payments received in the form of retirement and old-age pensions, scholarships, subsidies and other current transfers, and income from capital, such as interest, dividends, rent, royalties, and the like. The data collected should be sufficiently detailed for calculating the total available household income by adding all the appropriate components and subtracting direct taxes and social security and pension fund contributions. Income deriving from compensation in kind, the receipt of goods free of charge or at reduced prices and goods produced by a household for its own use may be a major component of total income, particularly in rural areas. It is more difficult, however, to gather precise information about such income and to estimate its value. Income components must also include the imputed rent for owner-occupied housing or housing which is free or is provided under the employment contract of a member of the household.

19.96. The use of short reference periods makes it possible to obtain more accurate answers. However, for certain kinds of income which are received over a more extended period it may be necessary to use longer time reference periods.

19.97. This conceptual framework must be used flexibly in household surveys, taking into account the practical possibilities which these instruments of measurement provide. Taking as an example the imputation of income in kind in surveys of income, consumption and expenditure, in view of the greater emphasis attached to research on consumption, income imputation could be based on this research in most cases. When, on the other hand, special income surveys are made, there is a greater possibility of investigating the various components and basing the imputation of income in kind on these. In employment surveys, the possibilities of obtaining detailed information on remuneration are limited, and therefore, rather than trying to cover all income in a single question at the risk of not finding out which cases include income in kind and which do not, it may be preferable to limit the question to monetary income and, if possible, to ask whether income in kind has also been received.

19.98. The questions on income included in surveys should refer more specifically than indicated by the conceptual framework to the ways in which recipients receive and perceive different types of income. This is closely related to the degree of detail with which each type of survey investigates income. For instance, even when the

statement of a wage-earner's remuneration is supposed to include total and not just usual receipts, whether or not information on seasonal or special receipts is actually obtained depends to a large extent on what can be asked separately about these particular receipts, and this in turn depends on the total interviewing resources available. Similarly, when net income is investigated without asking detailed questions about deductions, the interviewers may obtain statements of income after deductions, such as trade-union dues, payments on loans or deductions for legal reasons, which none the less form part of income. In the same way, attempts to measure gross income before any kind of deduction may come up against the limitations imposed by the actual possibility of investigating payments or deductions for tax and contribution purposes and of determining whether the income declared is in fact gross income.

19.99. The degree of detail with which income is investigated is related, in practice, to two kinds of concern. On the one hand, there is concern for ensuring the inclusion or exclusion of given items, such as those just mentioned, even when the main purpose is to measure total income. On the other hand, there is concern for obtaining the breakdown of household income into income types, which is required for analytical purposes and which it is advisable to incorporate into the data base created by means of the survey. In order to satisfy most of these needs, including the detailed analysis of the relationship between types of income and types of expenditure, one would ideally require the detail included in the United Nations guidelines and the division of each item into habitual and occasional income. However, for many analyses of the formation of household income, survival strategies and behaviour in the labour market, it may suffice to measure the four main types of income (salaries and wages, entrepreneurial income, income from property and current transfers), which also lend themselves to most exercises to verify survey results with information from other sources. In this connection, it is important to emphasize the need imposed by both analytical demands and practical convenience to distinguish salaries and wages from entrepreneurial income among the different kinds of primary income received by the active population.

19.100. The use of more detailed questions on income may or may not reduce the underreporting of total income. It is likely, on the other hand, that detailed recording of income helps to obtain more accurate measurements of the kinds of income recorded and hence greater conceptual homogeneity of measurement throughout the population surveyed.

19.101. In so far as it is possible to generalize on the basis of the results of occasional experiments on this particular aspect of survey techniques, responses to a broad question on income tend to cover only net habitual withdrawals of income. Short recall periods operate in the same way. Detailed recording of all income, when carried out in optimum conditions, would make it possible to overcome this tendency by recording, on the one hand, net income under each of the corresponding items and, on the other, non-habitual income, deductions, imputations of earned income, and income in kind. Longer recall periods also seem to help to record non-habitual receipts, although they may affect the accuracy of measurement in other ways.

19.102. It is reasonable to suppose that when wage-earners respond to a single broad question concerning their remuneration in the previous week or month, they tend to include only net cash recurring income. It is in recognition of this possibility that most employment surveys ask about precisely that income. Those which inquire into gross total income probably succeed, in most cases, only in measuring net recurring income, which aggravates the conceptual heterogeneity in overall responses. Surveys of family income and expenditure budgets, on the other hand, use detailed itemization of remuneration and longer recall periods. This helps to reduce the errors of interpretation and recall which generally interfere with the recording of non-recurring receipts. Such a procedure can also help to reduce the bias in replies which tends towards recording net income. Something similar may occur with the recording of wages in kind. When such remuneration is included within the scope of a single broad question on income, together with remuneration in cash, the overall response may underestimate the component in kind or even ignore it, in spite of the instructions accompanying the survey. If wages in kind are investigated by means of a separate item, this facilitates their inclusion, although their measurement may suffer from a bias towards underestimating such income.

19.103. With regard to the measurement of entrepreneurial income almost all surveys, even those on family incomes and budgets, inquire in very little detail concerning this kind of income and include only one or two questions on income from business or a profession, after expenses have been deducted but before taxes. One can assume that this kind of broad question receives highly diverse responses, but with a marked propensity to record withdrawals made in cash from the respondent's own establishment or independent activity. When the survey does not apply, because of its high cost, the alternative technique of reconstructing an activity's production account in approximate terms, the conceptual interpretation of such withdrawals may prove ambiguous, since in general the recipient is not able to determine the net income from that entrepreneurial activity. It is difficult for him to estimate the deductions which ought to be made to offset depreciation in fixed capital or to assess the extent to which such withdrawals (a) differ from the net entrepreneurial income generated in his activity over the current period or (b) involve subtractions from or additions to the net capital of the business. Short recall periods, for their part, do not help in taking account of transactions or imputations which the businessman normally is able to report in a more accurate way only when he draws up his annual balance sheet, generally when he makes out his income tax returns.

19.104. In the case of surveys in rural areas of units corresponding to farm undertakings, the way to obtain more accurate information may be to reconstruct the production account in order to determine the profits of the unit. In such cases, it is also important to take into consideration that part of production which was used for home consumption so that its value can be added to household income. In the case of owner-occupied dwellings, imputation of the corresponding rent probably presents the same kind of problems as those mentioned with regard to wages in kind. When questions are asked about such rent as a separate item, they are subject to the response errors

common in any imputation made by the respondent. When, on the other hand, they are recorded together with all other income from property, the most likely outcome is that they will be underestimated or that those questioned will forget to include this component in the overall response.

19.105. The same kind of comments can be made concerning all current transfers received and all income from property, except that the effect of bias in the answers given can be very different in each case. Most transfers are recurring, are not subject to major deductions and do not generally accumulate for a single recipient. In such circumstances, global questions can only cause the person answering to forget minor items. The non-recurring and supplementary nature of much income from property, on the other hand, increases the probability that such income will be omitted or substantially underestimated in overall responses or responses with short recall periods.

(c) *Effective access to public and social services*

19.106. The United Nations guidelines point out that the value of goods and services provided free or at reduced charges and that are clearly and primarily of benefit to the households as consumers must be counted as a form of income in order to arrive at a more accurate measure of living conditions. It is difficult, however, to make these imputations by means of household surveys alone. On the other hand, it is recognized that they can be made at subsequent stages of assessment, using the accounting information provided by the offices incurring the expenditure.

19.107. In any case, it is of crucial importance for analysing welfare and identifying poverty conditions to collect data on the effective access of households to various public services, the degree to which they are utilized and the obstacles encountered in satisfying basic needs in these areas. Income, consumption and expenditure surveys unquestionably can investigate these aspects of welfare in addition to the characteristics usually measured in such surveys. Special surveys on income might include, within the limits of allocated interview resources, the investigation of access to public services, an unequivocal component of welfare conditions that these surveys endeavour to identify. The inclusion of this topic in current employment surveys, on the other hand, is more problematic, even when a special income schedule is added to them. Investigation of access to public services can in itself justify the inclusion of an additional questionnaire in the employment survey devoted to the topic in addition to the questionnaire on income, or even the conduct of special surveys, such as the work carried out in Colombia at the national level (417) to investigate the access of households to water, sanitation, electricity and waste disposal services, to various levels of education, to fellowships, to various kinds of medical services, and to transportation to the place of work, as well as the cost of these services.

(d) *Investigation of housing conditions*

19.108. The housing situation is one of the most important factors in determining living conditions. A broad interpretation of this concept should include the condition of the dwelling, the related infrastructure and household equipment. Multi-subject surveys conducted in the region generally include questions concerning the type of dwelling, the materials used in the construction of walls, floors

and roofs, the number of rooms, the number of households occupying the dwelling, kitchen and bathroom facilities, drinking water, sanitation and lighting systems, the fuel used in cooking, tenure of the occupants of the dwelling, and in some cases the amount paid for rent. Generally, no inquiry is made concerning the age or state of preservation of the dwelling. Although this information could be of great interest, it presents certain operational problems, such as the informant's lack of knowledge concerning the date of construction or the difficulty in setting up objective and easily applicable criteria to determine the state of preservation.

19.109. An example of a specific investigation into the housing situation by means of household surveys is the investigation which was carried out in urban areas with 10,000 or more inhabitants in Venezuela in 1970 and which was used in preparing a study of the housing market in Venezuela. This survey included other topics covering the year of construction or reconstruction, the purchase price and renovation cost, the financing of the purchase, travel time to each member's place of work or study, income, migration of the head of the household, and his opinion concerning the possibility of and plans for improving his housing situation.

19.110. Data on household equipment are also useful in determining the living conditions of households. However, the investigation of these topics in surveys in the region is infrequent, since these questions could bring about high refusal rates caused by fears of tax changes.

(e) *Food and nutrition surveys*

19.111. Income, consumption and expenditure surveys gather data on food consumption, among other types of information, but the data are usually provided only in monetary terms. When they are used for price indices, the weighting coefficients are calculated on the basis of the monetary values. Data on physical quantities are used only to check the values used and the quality of such checks is usually poor.

19.112. When the surveys are designed to study food and nutrition specifically, the field work must be more detailed. This involves weighing the food prepared and the amounts wasted in order to determine what food is actually consumed. Few countries in Latin America have conducted this type of investigation. Among others may be mentioned the *Encuesta nacional de consumo de alimentos* (National Food Consumption Survey), conducted in Peru in 1971-1972, using a sample of 8,000 households. Brazil carried out its *Estudo nacional da despesa familiar* (National Family Expenditure Survey) in 1974-1975, using a sample of 54,000 households (131, 153). Honduras has also conducted a special investigation of food consumption, using a subsample in the income and expenditure survey of 1978-1979.

(f) *Conclusions*

19.113. Everything that has been said about the close interrelation of the analytical purposes served by measuring income, remuneration and other factors which affect living conditions and about the degree to which the various types of surveys complement one another emphasizes

the advantages of an ongoing programme of integrated surveys. To the extent that a permanent capability for conducting national household surveys is established, it is possible to apply this capability to the implementation of a programme of surveys on a number of topics and not necessarily to use a single general, multi-subject survey. This capability would have the necessary continuity and flexibility to conduct different types of surveys with periodicity suited to the main goals of each. Such an integrated programme, using its basic capabilities, can correlate the results of different types of surveys to examine the relationship between the different components of income which can be investigated by each type of survey, the connection between the various types of recipient units and the complementary nature of the periods for which investigations are conducted—including correlation of the results of different subsamples—and thereby approach the goal of establishing a single dynamic data base on households.

## B. PROBLEMS OF SAMPLE DESIGN AND DATA QUALITY

19.114. The countries of Latin America, through the national statistical offices, have made slow but steady progress over the years in the field of statistics. All the countries of the region conducted population censuses in the 1970s, and all of them are conducting household surveys based on probability samples in a regular or occasional fashion. The availability of a recent census, which in most cases had an acceptably high level of organization and included a considerable effort of cartographic updating, makes available some of the basic elements for the preparation of an updated sampling frame for designing the national household samples necessary for a permanent programme or for redesigning those used in the existing programmes. Some countries of the region have proceeded to evaluate the results of their population censuses by direct methods based on post-census household surveys. In some of these cases, the surveys have been used as a starting point for a permanent household survey programme. In other cases, the census evaluation survey was made part of a programme of surveys that already existed.

19.115. A good many Latin American countries conduct household surveys on a recurrent basis. These surveys, which are conducted regularly in some cases and occasionally in others, have as their principal purpose the investigation of employment and unemployment. However, few countries have succeeded in using their recurrent surveys to provide national coverage, or even to cover all of the urban areas. Almost every one of these countries has occasionally conducted household income, consumption and expenditure surveys. Some countries have carried out demographic surveys, and a few have conducted special surveys dealing with income, food and nutrition or health. Some of the countries with a permanent household survey programme have included surveys on education, migration and other specific subjects in that programme.

19.116. Many countries of the region have already completed the initial stages of establishing permanent capabilities for carrying out household surveys, at least in the main urban centres. In these countries the main problems concern (a) the representativeness of the sampling frame and the adequacy of the cartographic base, (b) ad-

aptation of sampling designs to the levels of accuracy needed for the various purposes of the surveys, (c) validity of the definitions and the investigative techniques used in relation to the analytic objectives being pursued, (d) quality of the field work, (e) investigation of the various sources of non-sampling errors, (f) storage and timely processing of the data, and (g) the capacity to analyse the results.

### 1. Sample design

19.117. Sample design includes a series of operations leading to the establishment of the method of selection of the sampling units, that is, the sampling plan, and of the method of estimation. The sample design stage is not independent of the other stages of the investigation. All of the stages form a unified whole and are closely inter-related. The manner in which a unit is selected will depend on the available sampling frame, and the formula for estimating a result will depend partly on the available processing method and the desired reliability. The latter, in turn, will depend on the cost, and the cost will depend on the purposes of the study.

#### (a) Sampling frame

19.118. The sampling frame is one of the principal elements of the sampling plan and represents the population for which inferences are to be drawn. The frame consists of the sample units from which the sample will be chosen. Consequently, all the estimates made will be made for this frame, and if the frame does not represent the population under study because it is out of date or incomplete, the estimates will not be valid for this population.

19.119. In the case of household surveys, population censuses and housing censuses have constituted the traditional frame for the selection of samples of households or dwellings. When the population and housing censuses of the 1970s were planned in Latin America, they generally did not include the preparation of sampling frames as one of their main objectives. Although there was an awareness that the census would serve as a frame for the selection of samples, there was no planning of actual frames specifying, for example, what variables should be included, what the sampling units would be, what kind of records would be kept, what subframes would be set up, what the method of updating would be, and so on. After the censuses were held, the frames consisted of the files of census questionnaires, or, in the best of cases, lists of sample units, which is not very practical for the selection of samples, or for the appropriate weighting of persons and dwellings. In either case, the work of selecting the samples had to be done manually.

19.120. In order to produce an effective sampling design, it is important to have characteristics that permit stratification of the frame on the basis of socio-economic indicators, which can be prepared from information obtained in the census itself and on the basis of knowledge of the cost of access to the sample units. These make it possible to select the sample units in conformity with budgetary restrictions. Otherwise, it sometimes happens that when the sample units have been selected, no resources are available for interviewing them, and reprogramming becomes necessary. This is not advisable be-

cause it may introduce various kinds of bias into assessment of the results.

19.121. Another important factor is the updating of the sampling frame. In the large urban areas, there are usually zones of rapid growth which can make a frame obsolete a short time after the census. In these cases, although the selection of the units is carried out with an approximate probability of selection, there may be a significant real difference with regard to the real probabilities of selection of the units belonging to areas of differential growth which an out-of-date frame may fail to detect. In this example, if two zones have grown at markedly different rates, the sample will not give a proper representation of the population. If the process of keeping the census sampling frame up to date is thought to be too expensive, it may prove practical to maintain up to date a sample or subframe representative of that frame.

19.122. Another attribute that the frame should have is easy and rapid accessibility. Once the sample units and the characteristics of the frame have been established, it will be convenient to file the information concerning the frame in such a way that it can be flexibly stratified as a function of its own variables. This will make possible the rapid selection of samples, easy updating, and separation into subframes.

#### (b) *Cartography*

19.123. Cartography forms part of the sampling frame. Each sample unit within the frame should have its corresponding location map. The relation should be symmetrical and unambiguous. Many of the shortcomings of sampling designs that use area sampling units are due, in general, to the lack of cartography to identify correctly the areas selected. For example, in multi-stage designs, it frequently happens that a recount of the dwellings in the selected areas must be made. It is also common to find omissions or duplications in these lists as a result of the fact that the enumerator wrongly identified the limits of his area, perhaps because he had no adequate cartography. This introduces a bias into the investigation.

19.124. Another factor increasing the cost is the time required in the field to find exactly where the selected area and its boundaries lie. This phenomenon occurs both in rural and in urban areas. Frequently the lack of reference points, or the failure to update these points, leads to confusion which makes it necessary ultimately to delimit the area of work at the time when the investigation is being conducted. In such a case, unless provision is made for reshaping the adjacent areas, the result may be that some areas are omitted or duplicated. Consequently, there will be changes in the probabilities of selection of the areas involved, thereby introducing biases.

19.125. Still another frequent cartographic problem is inequalities in the sizes of the area units, particularly those units which are not chosen at the last stage. This involves two problems. One is a technical problem, consisting in the fact that the probabilities of selection of different units may be substantially different. The other is an operational and cost problem resulting from enumeration conducted within those unduly large units. In this connection, reference may be made to the work being done in Mexico to homogenize the areas, dividing the national territory into small areas of uniform size which will be used for facilitating statistical investigations.

#### (c) *Accuracy of the estimates*

19.126. In general, the accuracy of an estimate made by using a survey based on a sample depends on the sampling procedure, on the size of the sample and on the analytical structure of the estimator used. When a sample is designed, it is important to consider the extent to which results are required for certain geographical zones or administrative areas, since this implies a need for scattering the sample and determines the feasible degree of clustering, in view of the fact that the designer must select a sufficient number of units—for the first stage and successive stages—within each zone or area for which information is required, so that the estimators for this domain of study will be reliable. Something similar may happen when results are required for social groups in poverty situations, which are concentrated in marginal areas of urban zones.

19.127. For purposes relating to income distribution, the sample must be representative with respect to socio-economic groups. In particular, it is necessary to have an adequate representation of high-income households, which, although relatively few in comparison with the total number of households, receive a considerable proportion of total income. Stratified samples may help to achieve this objective, among others. However, to do this the stratification must be based on socio-economic characteristics of units which are closely associated with income or on income information, even if biased, obtained from other sources. Stratification by area, which is frequently used, may fail to meet this requirement fully, since even in zones that seem to be socially homogeneous there may be considerable dispersion of incomes. However, it is still rare to have available any information for directly stratifying the households instead of the clusters. Sampling frames derived from population censuses, and particularly from censuses which ask questions about income, will make it possible to use better stratification techniques for these purposes.

19.128. The size of the sample to be used in a household survey will depend on the level of accuracy desired in the estimates, on the degree of detail or the subsets of the population for which precise estimates are desired, and on the rates of non-response associated with the variables investigated, as well as on the resources available for carrying out the investigation. In general, if the number of subsets for which estimates with a given accuracy are required is large, the size of the final sample will be proportional to this number. Although it is possible to think of a reduction of the dispersion of the variable under study within the subset, this decrease is not very large, and the sample size required for the subset will be, in most cases, somewhat smaller than the sample for the total population. The subsets of the population for which estimates are desired may prove to be fairly numerous, since one of the objectives of household surveys is to study differences in characteristics among different socio-economic groups. If it is proposed to conduct an exhaustive analysis of some specific social group as a policy objective, such as poverty groups or marginal groups, it may prove convenient to design a special subsample for these groups.

19.129. When a household survey is carried out, a considerable number of variables must be estimated. Given the size of the sample, the statistical reliability of each of these estimates may be quite different. One possible solution is to calculate the sample size required for

the level of accuracy desired for each of the variables deemed to be of major importance: the largest of the sample sizes obtained will be the one to be used, taking into account the availability of resources, for the decision concerning the size of the sample.

19.130. In determining the sample size, consideration must also be given to the effect of non-response, both total non-response, where no interview was conducted, and partial non-response, in which no answers were obtained on certain subjects. In order to ensure a desired level of confidence for an estimated value the size of the sample must be sufficient to absorb the cases of non-response. This emphasizes the need to devote greater effort and resources to the reduction of non-response since the cost of maintaining the desired accuracy may be appreciably increased by non-response.

19.131. The most sensitive questions, such as questions about income, usually lead to a relatively high number of non-responses. Furthermore, non-responses are usually concentrated. In high-income groups, where there is a greater motivation to conceal economic position, the rates of non-response may be particularly high. This is one of the reasons that make it advisable to use stratified samples, which enable the designer to overdimension the sample in those strata in which higher rates of non-response are expected, so as to obtain a sample design that seeks similar accuracy in all the strata. However, effective application of this device requires making the stratification conform to the socio-economic characteristics of the households, in order to ensure in so far as possible that households with a certain level of income which did not respond to the survey will be represented by households of the same income level situated in the same area.

19.132. Given the importance of the expected rates of non-response for an appropriate sample design, and given the fact that this is a critical factor in the design of the questionnaire, it is possible to take advantage of the pretests required for the adoption of a new questionnaire as a means for determining in advance the proportion of non-response that may be expected in each stratum with the questionnaire selected. The initial sample size for a survey, whether continuous or recurrent, may subsequently be revised to the extent that the sampling plan divides the total sample into replications which will provide equally valid estimates of the characteristics investigated and make it possible to analyse the influence of size on the variability of the estimate. In some countries of the region favourable results have already been obtained with the application of this procedure.

19.133. One of the most important advantages of probabilistic sampling is that it makes it possible to calculate sampling errors. The degree of complexity of the variance formulae depends on the estimator used. Rapid methods for approximating the variance, such as the iteration method or the calculation of design effects, may yield valid approximations for the variables under study. Calculation of the analytic expression for the variance in the case of the most important variables makes it possible to study the contribution of the distinct stages of the sample to the sampling error. In presenting the results of a survey, it is important to give measures of variability together with the estimated values so that the user of the data may determine whether or not an item with the indicated sampling error is useful to him in taking a decision or making an analysis, in accordance with the degree of

reliability the task requires. Any indications, even approximate ones, that can be provided concerning the accuracy of the estimates will be of greater utility to the user than uncertainty on this aspect of the results.

## 2. *Non-sampling errors*

19.134. It is generally recognized that the various non-sampling errors usually affect the accuracy of the estimates of most of the socio-economic variables to a greater extent than sampling errors do. In the experience of Latin America, sampling errors constitute only a small part of the total measurement error. Despite the decisive importance of non-sampling errors in the quality of the information collected through household surveys, the efforts being devoted to analysing the possible sources of such errors and to reducing their effect on the measurements obtained are grossly inadequate. Apart from coverage errors due to deficiencies in the sampling frame or to omissions of units and from errors which may originate in the various stages of data processing, the results of household surveys are usually affected by coverage biases due to lack of response and by response errors originating in the interview.

19.135. A lack of response, either because the interviewer has been unable to contact units selected in the sample or because someone has refused to be interviewed, may introduce biases in the representativeness of the set of units surveyed. In such cases it is necessary to analyse the information that can be obtained from the sampling frame or from observation of the dwelling to evaluate the importance of these biases. The practice of replacing unsurveyed units with units of the same sampling cluster does not ensure elimination of the bias. Failure to respond to certain questions on the questionnaire may be associated with certain characteristics of households to a greater extent than a total lack of response. In these cases it is necessary to analyse the known characteristics of these households in order to evaluate the direction and magnitude of the biases, and then a decision can be taken on the application of procedures to impute the missing information. The results of the analysis of the lack of response and information on the imputation criteria used to remedy it should be provided to users together with the results of the survey.

19.136. An interview is a situation in which there is interaction among a number of factors that might give rise to response errors. Some of these errors are of a kind that tends to balance out in repeated experiments and are therefore attributed to the variance of response in interviews. Other errors, in contrast, are systematic and give rise to response biases which may be associated with the specific conditions of the survey. One important source of response errors consists of differences in the interpretation of the same question by different informants. The formulation of questions, the instructions for their correct interpretation and the training given to interviewers are crucial in this connection. The conceptual heterogeneity that is usually found among the replies to the same broad question on income constitutes a clear example of how this type of error can affect the conceptual validity of the results.

19.137. The informant may also furnish incorrect information deliberately, because of embarrassment, fear or a desire to gain prestige with his reply. The replies to questions on fertility, health, income or economic position

are usually subject to this type of error. Evaluation of the magnitude and direction of such errors requires a careful analysis that can validate the replies with information from other sources or evaluate the response errors by repeat interview with subsamples of the surveyed population. The informant's memory may pose additional obstacles to the accurate gathering of information, either by failure to recall circumstances required for an adequate application of the definitions of the survey or by distortion in the perception of past events.

19.138. The degree of detail with which variables such as income, consumption and expenditure or fertility are investigated may in some degree mitigate the omission of components included in the respective concepts, and therefore this should be the subject of careful experimentation. Long reference periods make it possible, on the one hand, to estimate with greater precision the occurrence of infrequent events: unusual expenditures or items of income, changes of residence, births, deaths and so on. On the other hand, they increase the risk of bias as a result of distorted recollection, omission of components or omission of secondary events. In contrast, short reference periods imply a greater sampling error for infrequent events and a higher probability that the response will be subject to 'end effects', that is, the tendency to report events which took place before the reference period.

19.139. Unsatisfactory selection of the respondent is a frequent source of response errors in surveys conducted in Latin America. Strictly speaking, each adult member of the household is best qualified to provide information on circumstances relating to him. On the other hand, if a single person gives information on all the members of the household, which usually occurs in most Latin American surveys, this reduces the time required for the interview and the cost of the survey per household, since a smaller number of visits is required for each household. Nevertheless, any adult in the household will possess insufficient information concerning circumstances relating to the other members. On subjects such as income, occupation or fertility, responses may be considerably biased by this fact. Choosing the head of the household as the informant may limit but cannot eliminate these biases, although it improves the reliability of the data relating to this member, who usually has a major impact on the socio-economic situation of the household.

19.140. In each of the tasks making up a household survey programme there exists the possibility that errors will be made, and this makes it necessary to introduce quality control mechanisms that will make it possible to detect errors and their causes. One way to monitor the responses is to supervise carefully the tasks assigned to interviewers. In the organization of supervisory work, two methods are chiefly used. One is to leave supervisors completely free to organize their work, while the other uses a random model of supervision. The latter is obtained by selecting a sample of interviewers to be supervised. The advantage of the first method is that it can be concentrated on the interviewers who are expected to be less efficient. The advantage of the latter system is that on the basis of the results, it is possible to obtain a general picture of quality of the field work, the problems involved in it and the quality of the survey data and thereby to improve the survey design.

19.141. Most household surveys carried out in the region use the interview method to obtain data. In these cases, appropriate selection and training of the field staff become very important, since deficiencies at this stage may generate errors and biases in the work of those who conduct the survey. Increasing use is being made in Latin America of interpenetrating samples which can be used for evaluating the variability of the survey staff, that is to say, those differences in the results which can be attributed to biases on the part of the staff member.

19.142. The questionnaire is the instrument through which the information sought by the survey is to be collected. In most cases, and particularly when there is a lack of sufficient experience, the preparation of the questionnaire requires careful study, experimentation and a contrasting of alternative drafts in different conditions. In the pre-tests used to design the questionnaire, an attempt may be made to analyse a single questionnaire in order to determine the necessary adjustments, or several models may be compared in order to choose one or a variation of one of these models. The tests conducted include observation of various aspects of the questionnaire. Thus, one may test the sequence and the number of questions, the degree of detail of the information requested, the reference periods used, the understanding on the part of the respondents, and the degree of acceptance or rejection of the interview that may be attributable to the questionnaire.

19.143. Interpenetrating samples also constitute a technique which is also being used more and more frequently in Latin America for testing alternative questionnaires to be used in survey programmes. This makes it possible to evaluate the total error and detect the effect of the interviewer on the variability that the results of a test may show. Factor analysis is another instrument increasingly being used in the region to evaluate various questionnaires. This method requires an additional effort on the part of the field staff, in such a way that for each case surveyed with each questionnaire, information will be available concerning the acceptance or rejection of the interview, total or partial response and the causes for it, degree of co-operation obtained, time taken, cost, and so on. Internal gradation of the various factors and their arrangement according to order of importance make it possible to analyse the behaviour and relative advantages of each of the questionnaires being tested.

19.144. There is a growing tendency in the region to provide users, together with the results of a household survey, tables of the sampling errors associated with these results. On the other hand, evaluations of the quality of the work are infrequent. In order to evaluate the quality of the data, it is possible to use indirect methods, through comparison with data obtained from other sources or direct methods which are essentially surveys taken with subsamples, carried out at a time close to the period when the household survey is conducted, or through schemes of repeat interviews conducted on a subsample during the development of the survey and corresponding to control procedures to monitor the work. The provision of information on the quality of the data is an element of unusual interest for users of the surveys. However, traditionally it is the users themselves who, through comparison work and validation of information from different sources, provide elements for the evaluation of the quality of the survey results.

## XX. INTEGRATED SURVEY PROGRAMMES FOR AFRICAN COUNTRIES: SOME SELECTED ISSUES

20.1. Systematic and continuing programmes of household surveys to meet recurrent needs for information required for economic and social policies are comparatively new in Africa. None the less, a recent study shows that more than half the countries of Africa already have active household survey operations and many of them are thinking in terms of continuing survey programmes. To a large extent this development has resulted from the early lead given by the Conference of African Statisticians. In its eighth session, held in 1973, the Conference recommended that a household survey programme for Africa be investigated as a logical sequel to the African Census Programme. On its recommendation the basic elements of such a programme were worked out by a working group in 1974. The Economic Commission for Africa (ECA) at its twelfth session and third meeting of the Conference of Ministers, in February 1975, welcomed these efforts of the Conference of African Statisticians and urged that multi-subject household surveys be undertaken by African countries for the collection of integrated demographic, social and economic data through the establishment of field survey mechanisms. The programme received further encouragement at the ninth and tenth sessions of the Conference of African Statisticians, held in 1975 and 1977, respectively. Meanwhile, the programme was acquiring global dimensions through the efforts of the United Nations Statistical Commission, which emphasized the programme's applicability to other developing regions. These efforts culminated in the adoption of a resolution on the National Household Survey Capability Programme by the Economic and Social Council of the United Nations in May 1977. The African Household Survey Capability Programme (AHSCP) is now a regional component of the global NHSCP, and the Statistics Division of ECA acts as the regional advisory resource centre.

20.2. The Statistics Division of ECA, in collaboration with the Statistical Office of the United Nations Secretariat, specialized agencies and experts from African countries, has done a great deal of technical work to give practical shape to AHSCP. The main details are presented in this paper. Integrated surveys have been proposed to cover different subject areas in cyclical rounds, with a selected list of core items of information remaining common from round to round. Broad guidelines in this respect have been prepared and more work is proposed to be done, but the entire scheme is flexible and it is for individual countries to draw up their own programmes through joint consultation between producers and users of data. To start with, the surveys may be designed to yield national estimates separately for urban and rural areas with appropriate stratification. There should be stable arrangements from the beginning for planning each round or survey, including data collection, checking and supervision, data processing and data evaluation, analysis and dissemination. An even

flow of work through all these stages should be maintained to ensure speedy information output. The main aim of AHSCP is to develop capabilities for such continuous survey-taking among African countries by providing necessary financial, technical and logistic support in the initial stages. For this purpose, problems have been identified in the light of past experience, necessary inputs have been determined, external aid resources are being mobilized, staff training arrangements in the region are being expanded, with special emphasis on training of programmers and system analysts, and the regional advisory service is being strengthened. It is expected that in the course of four to five years most of the participating countries will be self-sufficient and will be able to maintain the programme of continuing integrated surveys on their own.

### A. AFRICAN HOUSEHOLD SURVEY CAPABILITY PROGRAMME

20.3. The subject areas which have been identified to be covered under AHSCP are as follows:

- (a) Demographic characteristics;
- (b) Household income, consumption and expenditure;
- (c) Labour force (employment, unemployment and underemployment);
- (d) Conditions of health, nutrition, housing, water supply, education, literacy and access to related services;
- (e) Food consumption;
- (f) Household enterprises (agriculture, handicrafts, trade, transport, and so on).

The list does not indicate any order of priority nor is it exhaustive or rigid. It is left to the countries to choose subject areas of their choice in any order of priority or grouped according to their individual needs and requirements. Initial plans have to be regarded as flexible and subject to subsequent improvement.

20.4. In African conditions agriculture and food topics must form a central part of the survey programme. Data on household agricultural transactions and food intake are normally included in income, consumption and expenditure surveys but there are other data on acreage, production, productivity, costs of production, and the like, which are normally collected using the holding as the statistical unit. Nevertheless, holdings are normally approached through households in developing countries and hence there are good prospects for bringing more agricultural statistics within the purview of household surveys. Food and nutrition surveillance programmes, already initiated in some African countries, introduce additional dimensions to data requirements, as does evaluation of rural development programmes. The Statistics Division of ECA is in touch with FAO to work out details for an expanded base of agricultural and food statistics under AHSCP. The

need for labour force data, including employment in agriculture, is also increasing in the African region and here again the Statistics Division of ECA and the ILO are working in collaboration to develop a survey methodology appropriate to African conditions.

20.5. Demographic statistics also continue to have a very high priority in the African region, where there is a genuine concern with population questions. Income, consumption and expenditure surveys are still in demand, but their priority status seems to be changing in the face of competition with other data requirements. Increasing attention is being given to social subjects in current and planned household surveys in Africa, but areas such as culture, education and health are somewhat neglected because the methodology is not yet clearly established. On the whole, there is an increasing diversity of subject areas which the African countries wish to cover through household surveys and new priorities are likely to emerge with the changing scene. The Statistics Division of ECA intends to keep abreast of the situation.

20.6. When many subject areas are to be covered through household surveys, a scheme of rotation over several years is unavoidable. Once all the subjects are covered, they should be repeated so that data on each subject are available with a certain periodicity. From the plans which some countries have drawn up, it may be seen that the length of the cycle varies from four to six years. Though each round of the survey will be devoted to a particular subject area, integration of the different rounds is to be effected by collecting information on a common list of core items in every round. An illustrative list of core items which has been drawn up is as follows:

(a) Community variables, that is, information for the locality as a whole. Main source of and distance from water supply, distance to and nature of nearest health facility, availability of primary school, police post, post office, community centre, village radio, electricity, agriculture co-operative farmer's association or similar groups, distance from regional capital and nearest market and cropping pattern or main ecological characteristics;

(b) Household variables. Number of households sharing housing unit, number of rooms occupied, total income, number and distances of agricultural holdings owned or operated, ownership of productive assets;

(c) Household member variables. For each member and visitor, name, age, sex, relationship to head of household, residence status, marital status, birthplace, nationality, school attendance, highest grade attained, literacy, activity status, occupation, industry, employment status.

20.7. These core items are in the nature of background and basic characteristics which have to be related to the subject area in each round for descriptive and analytical purposes. They also provide serial data from round to round on characteristics of communities, households and population to reflect the changes taking place. This list of core items is flexible and it is left to individual countries to make additions and alterations. In some countries of Africa there is also an alternative arrangement for a continuing "core survey", the content of which does not vary greatly over time and to which specialized questionnaires are added as necessary. The two approaches are not radically different—in one case there is a set of core questions in every round and in the other a core questionnaire.

20.8. The Statistics Division of ECA has made some progress in working out the details of the data content of integrated survey programmes. In a recent paper on household data requirements (91), it presented concepts and definitions with their corresponding classifications and tentative tabulation plans for the core items, taking into account experience in African censuses. In regard to subject areas, the Statistics Division of ECA has provided a check-list of items on which information is to be collected. This will be followed up with adaptation of basic concepts, definitions and classifications, development of illustrative questionnaires and supporting material on the basis of country experiences, and preparation of illustrative tabulation programmes and their eventual extension to a more comprehensive and flexible data base approach. This technical work will be done for each subject area. Ultimately it will be possible to develop techniques of household data analysis not only for analysing individual surveys or subject areas but for establishing interrelationships among data from different surveys or for various subject areas. It has repeatedly been emphasized that this work must be developed with reference to the realistic conditions in Africa.

20.9. For integrated analysis of economic, social and demographic data, one obvious requirement is that uniform and standardized concepts, definitions and classifications should be followed in all surveys. Without such consistency there is no comparability among data from different surveys or at different periods of time and consequently no possibility of examining data interrelationships. Having established this consistency, data interrelationships can be examined by the use of a common set of core items in every survey round, as discussed earlier. For example, if the data for each subject field, covered in different rounds, are classified by the same economic, social and demographic variables of the core items, an interrelationship among different subject fields is automatically established. This interrelationship can be further strengthened by the use of the same master sample for different rounds of surveys. Of course, the sampled households may be different from round to round, but if they are selected from the same master sample of clusters (area units), there is better comparability of data collected in different rounds. For the moment, it cannot be claimed that much more than a start has been made on the integration of survey data, and more experimentation and exploration need to be done in this regard to develop appropriate techniques.

20.10. In terms of coverage, it is generally agreed that the integrated surveys should cover the whole geographical area of a country, but there are some differences of opinion regarding the smallest geographical area for which reliable estimates should be attempted, that is, whether they should be for the country as a whole, separately for rural and urban areas of the country, for provinces, for districts or down to planning zones. With countries anxious to carry economic planning to grass roots levels, there is more interest in having data for the smallest planning or administrative zones. On the other hand, there are considerations of cost and resources, because the smaller the geographical areas for which separate estimates are required, the larger the sample size needed and hence the greater the demand for financial and other resources. At least in the initial stages, most countries in Africa prefer

to confine themselves to obtaining reliable estimates at the national level for urban and rural areas, each of these being divided into a few strata where necessary.

## B. HOUSEHOLD SURVEY EXPERIENCE IN AFRICA

20.11. In many African countries, household surveys were initiated in the 1950s. There was a significant increase in survey activity of all kinds in the 1960s, during the period immediately after independence, supported by bilateral or international assistance in some cases. Among these surveys, income, consumption and expenditure surveys, demographic surveys and surveys on nomads, which are a special feature of the African region, outnumber the other types. Multi-subject surveys have been implemented in some countries in order to make the best use of scarce resources in collecting the social and economic information required for development planning.

20.12. For the definition of the household, most African countries have adopted the definition included in the recommendations for the 1970 population censuses. However, in some countries there are rural areas in which people live characteristically in large groups—perhaps 30 or 40 persons in one compound. In these cases a practical way of defining a household is as a group of people who live and eat together. Relatively few countries spell out the definition of head of household. It may be presumed that the internationally recommended definition, that is, the individual who is generally recognized as such, has in fact been followed in the majority of cases. The definitions of the other household, demographic and social characteristics are largely the same as those used in other regions.

### 1. *Household income, consumption and expenditure surveys*

20.13. Surveys on household income, consumption and expenditure have been carried out in many African countries since the early 1950s. At first, the greater part of survey operations was confined to urban areas, usually for the establishment of retail price indices, but coverage was extended to rural areas later on (88). In the urban areas, administrative or geographical sections or blocks, and in rural areas administrative divisions and villages, normally serve as frames of primary units. Only in some countries have census enumeration areas or other units constructed from census records been used. It is a common practice that a two-stage sampling method is applied in urban or rural surveys, but in some urban surveys households are selected directly from available lists.

20.14. In recent country-wide surveys, three or more stages of sampling are applied using administrative units as primary units and clusters or segments as penultimate units. Primary units are selected with probability proportional to number of households or clusters in those units, estimated on the basis of the census records. Clustering or segmentation is done in the stage prior to the penultimate stage by actually visiting the selected area. Some clusters or segments are then selected in the penultimate stage with equal probability if they are of equal size or with varying probability otherwise. Then, information on income of individual household members (wages, income from trading, handicrafts, and the like), value of agricultural sales

of the household in the past year, other entrepreneurial activities and demographic and social characteristics of household members are collected. Then, based on declared cash income, three strata are formed for urban and rural areas by fixing strata boundaries so as to allocate an equal share of total cash income to each stratum, and overall strata sampling fractions are calculated in order to allocate equal parts of the predetermined sample to each stratum.

20.15. Overall stratification and allocation of the sample are carried out centrally by collecting all penultimate stage enumeration records for preparation of overall summary tables, calculation of strata boundaries and selection of the household samples. The records then have to be transmitted back to the supervisors and enumerators in the field to proceed with selection of households. The objective of this method is to have high-income households well represented in the sample. However, this involves some inequality in enumerators' workloads if an enumerator is assigned to each penultimate stage unit, due to the variation in household income distribution among penultimate stage units.

20.16. An alternative method is the use of percentile income groups as a basis for stratification, possibly involving a 2:3:5 allocation or some other allocations of households (94). Since a constant number of households is to be selected by this method, it produces a neat, self-weighting sample and hence various countries of Africa use it. It avoids the need to centralize the enumeration records for processing and sample selection and it ensures the equal distribution of households to enumerators. However, its overlapping strata are inefficient and selection of the household sample in the field could lead to loss of control over the survey operation. A measure called the deflator of overall sampling fraction is introduced to make it easier to calculate the number of households to be selected from each stratum in each penultimate stage unit (95).

20.17. Although it is generally true that data on household income collected in a single enumeration visit are not reliable, crude income data provide a good basis for stratification. On the other hand, the use of household cash income rather than total income for stratification can lead to some problems in the rural areas, even though it apparently works satisfactorily in urban areas. If subsistence consumption is mainly a characteristic of poorer households, its exclusion from the stratification data would result in a rather large number of households in the lowest income stratum. This problem has been solved by an arbitrary adjustment of strata boundaries or by different strata sampling fractions.

20.18. One problem with selection of primary and possibly secondary units with probability proportional to size based on sizes of later stage units is the inconsistencies in the size estimates used, which can destroy the self-weighting nature of the sample (94). This means that many complicated weights are incorporated at the penultimate stage to prepare the estimates, making computation so cumbersome that it is difficult to prepare summary tables by hand for each primary unit in the field.

20.19. After the households are selected in the last stage, they are divided into rotating samples to be enumerated with partial replacement on successive occasions over one year. This ensures better estimates of seasonal variation, annual totals independent of seasonal variation,

and better results from retrospective questionnaires. In some countries the households in each penultimate unit are divided into four groups and each group is enumerated for a week in the first quarter but in different weeks in the following quarters. In some countries, the households in a penultimate unit are enumerated for one or three months and then replaced by those in the other units. In a few countries, the same households are retained and enumerated for the whole year. However, such a long survey calls for a strong organization and good resources to carry it out.

20.20. Even where these requirements are met, many surveys using rotating or fixed samples encounter technical problems, such as non-response, moving away of some households due to various causes, resignation or sickness of some supervisors and enumerators, so that some households cannot be enumerated in time. There are also logistic problems, such as loss of collected information in storage or during transportation, lack of transportation and communication and so on. In view of these problems and scarcities of manpower and financial resources, some countries have to use a survey in which all selected households are enumerated for one month only. It might also be worth noting that shorter surveys are normal in urban areas.

20.21. As for the frequency and duration of household visits, a one-month recording period with daily visits has been used in some surveys. But in recent surveys, in an effort to increase the sample size at the same cost, weekly or even monthly visits to households, say, over a period of one year have replaced daily visits. However, if the inconclusive studies on this subject carried out in some African countries up to early 1970 are any guide, weekly and monthly recall periods can underestimate food consumption expenditure by anything from 10 to 20 per cent and 20 to 30 per cent respectively compared with daily recording (95). In view of the relatively heavy weight of food in total consumption for the average African household (that is, about 50 per cent), the underestimation of consumption expenditure through the use of weekly or monthly visits, compared with daily visits, will be considerable. In recording expenditure, African countries have tried the log-book method, interview method and sometimes both. It is found that in view of low literacy rates, particularly in rural areas, the interview method is more suitable. However, the log-book method has been used in some urban surveys with the co-operation of the selected households, followed by proper checking and supervision.

20.22. For concepts of income and expenditure, the United Nations provisional guidelines are usually applied. However, there are some variations in the coverage of items such as income received in kind, loans raised and repayments received, withdrawal from savings, gifts, and the like, in computing available income. Expenditure has been defined in some surveys as expenditure in cash or in kind on all items of household consumption but in some other surveys as the expenses incurred by the household in purchasing commodities and services during the reference period regardless of time of delivery or consumption. Hence, standardization of concepts and contents of questionnaires in order to make comparability among countries feasible has been proposed by the Statistics Division of the Economic Commission for Africa to the various working groups (86, 91).

20.23. Calculation of sampling errors for the various items of estimates from household surveys used to be the exception rather than the rule for most countries of the region. The tendency in more recent publications of survey results, however, is to give somewhat more information on the extent of sampling errors involved. In the assessment of non-sampling errors, however, little is usually said in the publications except for a qualitative statement indicating the possible sources of these errors and the efforts exerted to reduce or minimize them.

20.24. One common experience in household surveys in African countries is the slowness with which the results are analysed and published. One chief bottleneck is processing of data, owing to lack of facilities or shortage of trained personnel. To overcome this problem computers have been acquired by many countries and experts in data processing established in country posts and at regional levels. Data processing is discussed in more detail at the end of this chapter.

## 2. Demographic sample surveys

20.25. In African countries there is no fully operative system of civil registration and some censuses have not been comprehensive. As a result, modern Africa has seen a flowering of the sample demographic survey as a tool for demographic measurement (92). Such surveys are relatively cheap and easy to control, can be undertaken in countries at any stage of development, and are able to provide most of the information needed by the development planner at an acceptable level of precision (98).

20.26. Some demographic surveys have been conducted as a part of the census operation, for example:

- (a) Sample enumeration in some limited areas, typically nomadic areas;
- (b) Built-in sample in rural areas for enumeration of households in that sample using a long questionnaire;
- (c) Post-enumeration surveys to check the census coverage or the reliability of the responses on individual census items.

The demographic surveys which are not part of the census include inter-censal surveys, surveys carried out as a substitute for a census, most vital rate surveys, demographic surveys incorporated in other surveys and migration surveys. Most of the demographic surveys, including the World Fertility Survey, which have been conducted in Africa have covered the entire country. However, those carried out as a by-product in the course of the household listing stage of a household budget or agricultural survey are sometimes limited to some parts of the country only.

20.27. As in the case of household income, consumption and expenditure surveys, the frame used for demographic surveys consists of geographical or administrative areas—the size of which depends on how much the major variable in question is clustered. Several studies carried out in west Africa suggest that for vital rates the optimum size of an area unit is between 200 and 400 persons. However, cost efficiency is found to decrease only very slowly as the size of unit moves away from the optimum. A common survey design is either cluster sampling by which the area units are selected with probability proportional to size and all households in them are enumerated or two-stage sampling in which some households are selected from

each selected area unit. African demographic surveys which are not part of census operations are usually based on samples of between 100,000 and 200,000 persons, yielding results of reasonable accuracy, whereas in some surveys which are part of censuses a certain proportion of households (typically 5–10 per cent) is selected by systematic sampling.

20.28. Most demographic surveys in Africa are single-round surveys, that is to say, the enumerator makes one visit only to each household. The period of reference is, in most cases, taken as the 12-month period ending at the moment of interview. For determining the current structure of the population, such an arrangement is satisfactory. However, vital events and age are not accurately reported, there being errors of omission and errors of dating. In particular, the number of dead children is underreported as a result of cultural taboos on counting them. In a few African countries multi-round surveys have been conducted to overcome some of the sources of error inherent in the single-round approach as regards estimation of births, deaths and migration by recording changes that have occurred in the rounds after the first. On the other hand, with a sample of approximately 100,000 persons at each round, a multi-round survey is an expensive operation.

### 3. *Surveys of nomadic households*

20.29. The Greek origin of the word nomad suggests "roaming about for pasture", that is, moving from one grazing ground to another with herds of livestock. Some nomads combine this mode of life with agriculture and so they may be broadly classified as follows:

(a) Pure nomads. Those who are engaged in pastoral nomadism and who never engage in agriculture; and

(b) Semi-nomads. Those who are mainly engaged in pastoral nomadism but engage in agriculture during a certain period of the year.

20.30. Although nomads can be found in many parts of the world, their number is withering gradually as they are absorbed by the tide of modernization. However, in some countries of Africa, they still constitute a significant proportion of the population (87). Therefore, in those countries many surveys of nomads have been conducted to determine their number, to investigate their demographic, social and economic characteristics and their migratory patterns and to estimate livestock. In some countries multi-subject surveys have been undertaken to collect data for national planning. Since the nomadic way of life is different from sedentary life, survey methods applied are not the same as the usual methods.

20.31. One notable characteristic of nomads and semi-nomads is that they move to places where water and grazing facilities are available. Further study of their movements and approximate locations shows that the cattle-raising nomads stay close to permanent sources of water, like perennial streams and rivers and permanent wells. They move away in the rainy season but come back to their original permanent sources of water when it becomes drier. As for sheep, goat and camel raisers, they can afford to stay in more desertic areas with permanent wells, but they drift away in the rainy season and come back in the drier season as the cattle breeders do. It is rare to find nomads who are not attached to any particular place or

camp. These people move in groups, each with a leader, and groups of the same clan belong to a tribe headed by a hierarchical chief who can exercise authority over them. However, in some countries these chiefs have been replaced by political delegates to serve as intermediaries between the administration or government and the nomads. The chiefs and administration have some information on the nomads and semi-nomads in their tribes or in their area.

20.32. In planning a survey of nomadic households, it is necessary to prepare a list of tribal chiefs and political delegates and data on the nomads under them and to find the time of the year when nomads undertake the least migratory movements and are located in their places or camps. A list of waterpoints and other related information are also required at that stage. The design depends on the objective and the frame in addition to resources at the disposal of the survey. Some approaches used for sample surveys of nomadic households in the African region are described in the following paragraphs.

#### (a) *Tribal or hierarchical approach*

20.33. It is common that a nomadic hierarchical chief or sub-chief has a list of households or families under his control for administrative purposes such as tax collection. The list provides the number, location and some demographic data although the list is most probably not up to date. Under these circumstances, a list of tribal chiefs with an approximate number of households under them is prepared and stratified multi-stage probability proportional to size sampling is applied using a tribe, a camp and a household as the units in the successive stages. In some cases only two stages may be involved. This method is simple and inexpensive and the response is good when the chiefs and sub-chiefs give prior consent and co-operate with the survey at each step. However, if the records of chiefs are not up to date and the camps of his followers cannot be located on the day of the enumeration, there will be biases and errors. At any rate, this method has been tried as part of population censuses and separate surveys in African countries and been found to be viable.

#### (b) *Waterpoint approach*

20.34. A frame of waterpoints used by nomads at the time of enumeration is prepared in this approach. The usual time for enumeration using the waterpoint approach is the peak of the dry season when small waterpoints become virtually dry and can be excluded from the list and most of the nomads are concentrated around the main waterpoints. In some surveys, waterpoints are stratified into very important, important and ordinary points on the basis of their accessibility and usefulness and some are selected from each stratum. For selection of households there are two methods. One is to search for nomadic camps around waterpoints and to select some households after listing them. The other method is to assign interviewers to waterpoints to enumerate the nomadic households when their members bring animals for watering. Since cattle need watering frequently, often every second day, sheep and goats at an interval of three to six days, and camels between 10 and 21 days, the interviewers may be posted at these waterpoints for a period that exceeds the maximum cycle for watering the animals.

20.35. The method of sending interviewers in search

of nomadic camps is very difficult and hazardous in the absence of means of communication or roads. However, with the help of tribal chiefs, the camps can be located and a good sample of households around a waterpoint can be obtained. Household response is usually reliable after the chiefs and supervisors have explained the objectives of the survey.

20.36. The method of posting interviewers at the waterpoint is easier than the above one although it requires a number of days to cover the watering cycle of animals. However, some surveys are conducted on only one day to reduce the strain on the interviewers. In fact there are problems in applying the method of enumeration at the waterpoints on either one day or more than one day, particularly when the cattle, sheep and goats are entrusted to the children and hired hands or when the nomads avoid the selected waterpoints. Despite these shortcomings, when this method is used with the co-operation of tribal chiefs and sub-chiefs, it produces estimates of some reliability.

(c) *Other approaches*

20.37. There are other methods which have been tried in one African country or outside the African region, for example:

(a) Use of enumeration areas created by census cartographic teams;

(b) Placing the enumerators at points on the livestock route and interviewing some households passing through those points during a given time;

(c) Capture-tag-recapture method.

Among many possible sampling designs, those using the hierarchical and waterpoint approaches are generally applied either separately or combined in surveys of nomadic households in the African region. As a measure to obtain reliable data, a publicity campaign is found to be an important pre-enumeration activity. It can be done through the tribal chiefs, political delegates and administrative organs. One way to launch a campaign is by radio broadcasts, since the nomads carry transistor radios.

20.38. The assistance of tribal chiefs and sub-chiefs is essential in survey planning to obtain information on the estimated number of nomads, their location, attitude and characteristics. At the time of enumeration, the co-operation of chiefs of selected nomadic tribes is also imperative to contact the camps and interview households. Hence some kind of remuneration to chiefs serves as a good incentive to obtain their wholehearted co-operation. It is not necessarily true that nomads are generally more reticent than sedentary people. If a proper approach is used, response is satisfactory. In this respect, it is found that local literate persons, if trained and supervised, can perform the enumeration work much more effectively.

20.39. The subjects of surveys carried out on nomadic households have been demography, livestock, migration and income, consumption and expenditure. The first two types of surveys in some countries have been part of the census operations and the third and fourth types have been conducted mostly as special operations. Most of these surveys have covered some topics on occupation, different sources of income, household enterprises, ownership of land and different types of durables in the core questionnaire. Particularly, income, consumption and expenditure

surveys have dealt with these topics in greater detail so that economic activities, including the commercial transactions of the nomadic households, could be studied.

4. *Other topics and types of surveys*

20.40. In African countries other survey topics which have been covered are:

- (a) Agriculture;
- (b) Labour force;
- (c) Health and nutrition;
- (d) Handicraft activities;
- (e) Household enterprise.

Some of these have been covered in specialized surveys but most of them, including household budget and demographic surveys, have been covered under multi-purpose or multi-subject surveys. The adoption of this approach has been largely dictated by a number of factors, among them the high cost of transport because of long distances to be travelled and difficult local terrain conditions, and the very considerable sizes of the countries to be covered by a limited force of enumerators. Furthermore, these surveys are the most effective means of obtaining much of the required economic and social statistics in the countries of the region (85).

20.41. On the other hand, a multi-purpose or multi-subject survey does not produce as good data on each subject as a specialized survey on that subject and there is a problem in processing data on many subjects. The problems in conducting multi-purpose or multi-subject surveys have been discussed in detail in connection with the organization and implementation of such surveys within the framework of AHSCP and some of these details are presented in section C below. Some of the specialized topics are discussed below.

(a) *Agriculture*

20.42. As agriculture is the most important branch of economic activity for almost all African countries, the data relating to it are crucial for formulation of plans and decision-making. As a result, agricultural censuses and surveys are conducted regularly or frequently in many countries of the region.

20.43. It is common in some countries to conduct the agricultural census of large farms by mail questionnaire or complete enumeration and combine it with a sample survey of small farms using multi-stage sampling. Where there are no large farms, a sample census is the technique used throughout the whole country. The administrative areas or census enumeration areas usually serve as the primary sampling units, some of which are selected with probability proportional to size of population or of male population. In the penultimate unit a list of farms or holdings is prepared and a selection is made. At this stage, two-phase sampling is used to find out areas of fields under crops by the interview method or by actually measuring those fields. More extensive questions are asked of holders in the second phase sample. The topics covered are: number and size of agricultural holdings; land utilization and area under crops; production by type of crop; manpower, means and resources engaged in production; cost of production; financing; consumption, marketable surplus; method of disposal of crops; farm income and

saving; capital formation; number and characteristics of livestock; and so on, following the guidelines of the FAO Programme for the 1970 World Census (12, vol. 2).

20.44. Another survey carried out frequently is a crop forecasting survey, which is conducted as an independent operation or as a final stage sample of the above multi-stage sampling. Normally fields serve as penultimate units and sample plots of a predetermined size are selected and marked out in those fields for crop-cutting. The average yields of principal crops so estimated, multiplied by the sown area of those crops, produce the forecast of crop outputs. Other surveys of an *ad hoc* nature are farm management surveys and inquiries on agricultural labour and pump irrigation schemes.

20.45. In some countries, agricultural surveys are part of multi-purpose or multi-subject household surveys and the household rather than the farm or field serves as the ultimate sampling unit. The selection is usually done by multi-stage sampling with the township or administrative areas as the primary sampling unit. In this kind of survey various information, such as income, consumption and expenditure and other items related to agriculture, is collected either in the same round or in different rounds. This facilitates a wider perspective in studying agricultural problems. Some countries adopt this method due to lack of a proper frame of farms or holdings.

#### (b) *Labour force*

20.46. In the past, only two or three countries in Africa conducted nation-wide specialized labour force surveys for collecting in-depth data on employment, unemployment and underemployment. The common practice has been to collect limited data on economic activity, that is, activity status, occupation, industry and employment status, in conjunction with population censuses or household economic or demographic sample surveys. However, during the period 1977-1979, at least three countries are known to have conducted labour force surveys (in one case it was a combined labour force and migration survey) and the results are awaited. Another four countries are planning to undertake such surveys in the near future.

20.47. All the labour force surveys in Africa have been conducted on the basis of multi-stage sampling of households with geographical stratification, such as selected cities or towns, other urban and rural areas by regions or provinces, and so on. The reference period for collection of data has generally been a week, except in one case where it was a day. In one survey the sampled households were visited only once with the total sample evenly spread over one year through monthly subsamples. In other surveys, there were repeated visits to each sampled household once every month or quarter over a period of one year or during continuous rounds.

20.48. Broadly, the surveys have followed the internationally recommended labour force approach based on current status, with some adaptations of concepts, definitions and classifications. Household members above a specified minimum age (which varied from 8 to 14) have been categorized into major groups, such as employed, unemployed and out of the labour force, on the basis of their activity during the reference period. The employed included all persons who did any work at all during the

reference period for pay or profit, in cash or in kind, either for themselves or for the household. Unpaid family workers have been included in the employed, and in one survey unpaid learners and apprentices as well. A broad concept of work or economic activity has been followed. In one survey it was specified to include such activities as gathering goods or materials on the farm, repairing or improving one's hut or house, latrine, fence and equipment, and household chores such as picking vegetables, fetching water and collecting firewood. Persons seeking work or wanting to work were included in the unemployed group. Others, like full-time homemakers engaged in household chores such as washing, cleaning, cooking and child care, full-time students and persons unable to work or not wanting to work, have been treated as outside the labour force.

20.49. For the employed, detailed particulars on the nature of employment and work done, such as occupation, industry, employment status and hours worked, have been collected. In one survey at least an attempt was made to collect detailed data on income from household enterprises, self-employment and paid employment. For the unemployed, relevant particulars on duration of unemployment, nature of work, if any, done in the past, efforts made to find employment and type of work sought have been collected. As is usual in such surveys, data on age, sex, marital status, education and training have been collected in respect of all individual members of the household. A more realistic appraisal of the survey techniques will be possible when the reports and results of the three recent surveys become available.

### C. ARRANGEMENTS FOR INTEGRATED SURVEY PROGRAMMES

#### 1. *Survey organization*

20.50. An integrated survey programme cuts across the sectoral and institutional boundaries of a country's statistical system. This means that the national statistical office has to obtain the co-operation of other concerned government departments and users such as research institutions, employers' organizations, trade unions, and the like in formulating the overall survey plan and outlining the subjects to be covered in successive rounds, the likely sequence in which the subjects will be taken up and the periodicity with which surveys on each subject are to be repeated. The long-term plan should be flexible but periodic revisions of the programme in response to evolving needs must always be a joint undertaking of users and producers of data. African countries are aware of the need for such co-ordination and operational relationships in this regard are beginning to emerge.

20.51. For carrying out surveys on a continuing basis, there should be stable arrangements for (a) planning and design of each round of the survey, (b) data collection through a network of field interviewers and supervisors, (c) data processing with systems and programming personnel and (d) data evaluation, analysis and dissemination. The success of an integrated household survey programme largely depends upon an even flow of work from (a) to (d) and speedy information output. For this purpose not only a large number of trained staff but also a great deal of logistic support are needed. This is the essence of building

up the capabilities of the countries for continuous survey-taking.

20.52. It has been estimated that for a medium-sized country in Africa the requirements on average for running a continuous survey programme are as follows:

(a) Professionals: 4 (1 technical director, 1 senior statistician and 2 statisticians);

(b) Data processing staff: 23 (1 analyst programmer, 15 punch operators, 2 punch supervisors, 5 clerical officers);

(c) Administrative staff: 7 (1 administrative officer, 1 accountant, 2 secretaries/typists, 1 machine operator, 1 driver, 1 messenger/janitor);

(d) Field staff: 132 (2 field executive officers, 10 inspectors, 20 supervisors, 100 interviewers/coders).

In the case of field staff, 132 is an average figure for a full cycle of surveys over a period of four years. The actual number for a particular survey round may vary depending on the subjects being covered. The equipment requirement has been estimated as one small computer with adequate data recording equipment, one medium printing unit, seven motor vehicles, six typewriters, five calculating machines and requisite quantities of office furniture and field equipment. In addition, the organization may need the services of a full-time expert for four years, 12 fellowships for 6 to 12 months each within the region and eight fellowships for 6 to 12 months each outside the region.

20.53. These illustrative estimates are meant for working out the pro forma costs for starting a continuous survey programme in a country and represent a nucleus of survey capability. As the programme develops, the requirements have to be progressively expanded and better provision has to be made for analysis, research and preparation of reports. Also the size of the field staff will depend on the subject-matter being covered, the sample size and the survey design. For example, for conducting an income, consumption and expenditure survey in the United Republic of Cameroon a field staff of 275 persons (220 interviewers and 55 controllers) is required. For a labour force survey in Somalia, the number of field staff required comes to about 80. Kenya has a permanent field force of about 350 persons for handling the National Sample Survey and Evaluation Programme, which is intended to give estimates at district level. Ultimately, the requirements of staff and other resources are specific to each country.

20.54. Most African countries do not have staff, equipment and resources of this kind for the survey programme but it is encouraging that some have already invested considerable resources to establish or strengthen their survey organization. At the beginning substantial support and assistance have to come from external resources which are being mobilized under NHSCP. The general experience in the course of surveys carried out by African countries has been that data processing, analysis and report writing are not able to keep pace with data collection, as a result of which published data are only available with a time lag of four to five years. There is an overall shortage of statistical staff in the region but the main bottlenecks are in getting the right kind of personnel to take charge of data processing, data analysis and report writing. On the question of field interviewers, some countries are in favour of having them as permanent staff for

an integrated programme of surveys but others do not use this approach for various practical reasons.

## 2. Training

20.55. Given the personnel shortages in the region, continuous training is an important factor in extending the programme of integrated surveys under AHSCP. There are many opportunities within the African region and outside for training survey statisticians, cartographers, programmers and system analysts. A large number of fellowships for training personnel both inside the region and outside is, therefore, being provided in the project budgets of countries participating in AHSCP to enable them to use available facilities in the best possible way. It is also envisaged that training will be organized through study tours to African countries having ongoing surveys and by exchanging aid and assistance among countries of the region.

20.56. The field staff are trained locally in each country by the survey management staff. The supervisors are generally drawn from the middle-level staff (diploma and certificate holders) of the national statistical office. They generally have some experience in survey work and will be further trained by the professional staff for each round of household surveys. The interviewers are generally primary school leavers who have completed six years of formal education. Their training lasts for about two to three weeks and is conducted by the professional staff with the assistance of supervisors. Experience has shown that at least half the training period of interviewers should be devoted to practical field work. One basic idea of an integrated programme of household surveys is that the field staff should be stable and available for successive survey rounds. In this way the field staff accumulates experience in survey work and becomes better and better trained. One difficulty in the recruitment of interviewers faced by African countries is the existence of several local languages. It has, therefore, been considered desirable to recruit interviewers from areas where they will be called upon to work and to translate questionnaires and other training material into major local languages.

## 3. Survey operations

20.57. Survey operations begin with work relating to the selection of samples in accordance with the chosen design. For this purpose a good deal of preliminary work is necessary, such as zoning or stratification, selection, demarcation and segmentation of area units at successive stages. It is necessary to keep systematic and careful records of all this preliminary work because they may be needed at a later stage for adjusting the estimation procedures or analysis of data. Absence of such records has proved to be a handicap in several African surveys.

20.58. After the final area units have been selected, the stage is set for the listing operation, which is also known as the penultimate stage of the sample. At this stage the interviewers go to every building or structure within the boundaries of each sampled area unit and prepare a complete list of households residing there. This stage is also used for collection of some part of the survey data, such as community variables, household variables

such as household size and composition, rough figures of household income required for income stratification of households for ultimate stage selection, and demographic and other particulars of individual household members. The advantage of this approach is that the sample size in terms of the number of households is quite large at this stage and estimates can be derived with greater precision. However, the listing of households has to be completed in one to two months' time and hence collection of additional data has to be restricted to a few selected and relatively simple items which do not involve much time and effort on the part of the interviewers.

20.59. From the lists of households prepared in the penultimate stage, final samples of households are drawn up according to the design decided upon. The task of the interviewers is then to collect the necessary data from the sampled households. Under African conditions, transportation and communication problems have to be considered carefully in organization and planning of this field work and the sample design itself must take these problems into account. Generally, too much movement of field staff is avoided and an interviewer is given charge of one locality or a few neighbouring localities. In an income, consumption and expenditure survey, the interviewers are generally able to cover three to four households per day, whereas in a demographic sample survey they can cover 5 to 10 households per day. Depending on the estimated workload, areas are assigned to the interviewers so that they can collect data from the required number of sampled households evenly over the entire round. Most African countries provide means of transportation such as bicycles to the interviewers either by direct purchase and allocation to the interviewers or by advancing money to them for the purchase of the bicycles with an allowance for maintenance. The latter system encourages the interviewers to take better care of their machines.

20.60. Regular supervision and checking of the field work, continuous editing of data and prompt feedback of defects to the field are the only effective means to control the quality of primary data. Generally, one supervisor is in charge of about five interviewers and, depending on how the interviewers are dispersed, a supervisor should be able to check the work of each interviewer under his charge at least once a week. The supervisor has to ensure that the interviewer is doing his/her work uninterruptedly and correctly according to instructions, resolve any difficulties faced by the interviewer, check the interview technique and the collected data to guide the interviewer and check the correctness of data collected by conducting reinterviews for a subsample of households. The work of the supervisors should be checked by field executive officers and other senior professional staff, who should be constantly in the field while the field work is in progress. It is imperative to provide transport facilities to supervisors, field executive officers and other senior staff. When the completed questionnaires are received, the inspectors should quickly check them for omissions, inconsistencies and other errors and bring these to the notice of the supervisor and interviewer concerned for rectification. During long surveys, preparation of summary data at frequent intervals is another means of checking the performance of the field operation. It is advantageous to locate the inspectors in the field so that the supervisor and interviewer con-

cerned can be contacted quickly about defects found in the completed questionnaires.

20.61. The existence of several local languages in African countries poses some problems in survey operations. First, the interviewer must fully comprehend not only the questionnaire and instructions but also the underlying concepts and definitions. Secondly, the interviewer must be able to put the questions to the respondent in the language the latter best understands. Thirdly, the interviewer must be able to understand the exact import of the reply given by the respondent and put further probing questions if necessary. As mentioned earlier, to some extent these problems can be overcome by recruiting interviewers from areas in which they will have to work and by translating questionnaires and other training material into major local languages. In some countries, 10 or more different language versions of the questionnaire were used in WFS. Close attention was paid to comparing these with the original version by translating them back into the original language. Even then, there are situations where the interviewer has to obtain the help of local interpreters.

#### 4. Data processing

20.62. It was stated earlier that data processing has been and still is a formidable bottleneck in African countries. Some of the steps which have been considered to overcome this problem are to plan all elements of the data processing stage, for example, staff, equipment, coding and tabulation plans and software, at the beginning of the survey and to prepare the questionnaire format in such a way that the data collected in the field can easily be transformed into machine-readable form. This means that right from the first stage of survey preparations, a data processing expert must be brought into the work and good communication must be maintained throughout between survey statisticians and data processing staff.

20.63. More and more African countries are considering pre-coded questionnaires with boxes for closed and semi-closed questions. These can then be transmitted for coding after the normal checks by the interviewer, supervisors and inspector. Experience has shown that coding lists and instructions have to be carefully prepared in advance and quality control checks applied to ensure accuracy of coding. In fact, one deficiency of African surveys has been lack of application of modern quality control methods to all phases of survey work, including data collection, editing, coding, processing and analysis. African countries have been urged to include quality control systems in every stage of survey operations and data processing. It has also been recognized that even if arrangements have been made to process the data with the help of a computer, it is necessary to prepare manual summaries of the more important data so that some preliminary results can be obtained pending computer processing. For this purpose it is helpful to have subtotals in the questionnaires.

20.64. Processing of the survey data by computer is the current general trend in African countries. The advent of mini-computers is likely to alleviate the difficulties faced by smaller countries in this regard. Some of the countries participating in the first phase of AHSCP have already installed computer hardware. Others which are in

the process of doing so have been advised to seek independent experts' advice, say from ECA or the Department of Technical Co-operation for Development of the United Nations Secretariat, and to consider not only cost/performance factors but also other criteria, such as equipment maintenance service, existence of other nearby equipment which may serve as a back-up, portability of adequate software, training programmes and national policy on its overall information system. African countries have yet to gain sufficient experience in the use of the computer for data processing and data analysis, and the problem is complicated by a large turnover of high-level data processing staff in the region. However, countries are now more aware of the problems involved and it has been accepted that data processing, whether manual or machine, is an important phase of the survey plan and satisfactory technical, financial and personnel provisions should be made for it from the start, if the whole survey is not to get bogged down in this last phase.

#### D. CONCLUSION

20.65. Many African countries have conducted household surveys since the 1950s. Among these, income, consumption and expenditure surveys and demographic surveys far outnumber other types of surveys, for example, agricultural surveys, labour force surveys, health and nutrition surveys. Some of these have been conducted as separate surveys and others as multi-subject surveys. The technical aspects of these surveys have been discussed in this paper to present experience gained. In particular, there has been a good deal of experimentation with sample de-

sign, inclusion of nomadic households, reference periods for collection of data, concepts and definitions and general survey management. Calculation of sampling errors and assessment of non-sampling errors are two areas to which adequate attention has not been paid. There have also been bottlenecks in data processing as a result of which there have been serious delays in the analysis and publication of results.

20.66. Most of the past surveys were *ad hoc* in nature, without any plan to build on the experience gained. More recently African countries have become interested in integrated multi-subject household surveys on a continuing basis. Since 1973 the Conference of African Statisticians has been urging the countries to adopt such a plan. Recently, under the auspices of the United Nations, a global scheme, the National Household Survey Capability Programme, has been formulated to extend technical and financial help to countries for planning and organizing continuous and integrated series of household surveys. The ultimate objective of NHSCP is to enable the interested developing countries to obtain, through household surveys, a continuing flow of integrated statistics for socio-economic and demographic development. This global scheme has regional components, including for Africa the African Household Survey Capability Programme, for which the Statistics Division of the Economic Commission for Africa acts as the regional advisory resource centre. The Statistics Division of ECA, in collaboration with the Statistical Office of the United Nations Secretariat, specialized agencies of the United Nations and experts from African countries, is engaged in developing technical studies on integrated household survey programmes, some details of which have been presented in this paper.

## XXI. SURVEY EXPERIENCE IN THE REGION OF THE ECONOMIC COMMISSION FOR WESTERN ASIA

21.1. Fourteen nations are members of the Economic Commission for Western Asia (ECWA). Many of the member countries of ECWA are small in area and population. Exceptions include Egypt, Iraq, Saudi Arabia and the Syrian Arab Republic. The Gulf States are wealthy developing economies. Many of the Arab lands have large tracts of desert and, following the discovery of oil and consequent economic development, many people have moved from rural to urban areas. The Governments of the region are also making strenuous efforts to settle the nomadic population. The process is slow but regular. It is possible that within a decade or two the nomadic population will disappear. There is widespread illiteracy in many States, which has hampered rapid economic growth. A major part of the labour force, especially in the Gulf States, is from Democratic Yemen and Yemen, India, Egypt and Pakistan or are Palestinians. The large-scale importation of labour has created its own socio-economic problems. Many of the migrant labourers are young men from different countries, whose families have been left behind as they are on a limited contract basis and housing and other necessities of life are expensive in these countries. In some States good non-Arabic educational institutions do not exist. The children of the nationals are offered free educational facilities and other incentives for higher education.

21.2. Before the discovery of oil in these countries the people depended largely on agriculture for economic support. There were very few industries. In some States the oil revenues are being used judiciously for the development of industry, social amenities, health and educational facilities. Most of the States have adopted plans for integrated socio-economic development which require a statistical data base. Therefore, in many Arab countries the statistical offices have been established as part of the ministries of planning. For the efficient use of scarce statistical resources the collection of statistics has been centralized. Statistical development in many of these countries has been hampered by the shortage of trained and experienced manpower. Collection of statistics is a government function, but there is a large turnover of experienced and trained personnel because Government cannot compete with private organizations which offer better salaries, allowances and facilities than the Government. The educated young people in these States have wide opportunities for employment and they prefer high-level posts outside the statistical services. Therefore, attracting good, educated persons and retaining them in service is one of the most difficult problems faced by the statistical offices of these countries.

21.3. Population censuses are major statistical activities. They not only supply socio-economic data for planning and administrative purposes but also provide the frames for household surveys. During the last two decades substantial progress has been made in many countries of

the region in undertaking population censuses. Nevertheless, it may be noted that 5 of the 14 ECWA countries either have not undertaken population censuses during this period or have not published the results of these censuses for one reason or another. Civil registration systems exist in many countries but need improvement before they can produce data of reliable quality.

21.4. The demand for statistical data is increasing for planning and administrative purposes and for monitoring the progress of development plans. During the last decade there was a rapid increase in the number of household surveys carried out in the region.

### A. HOUSEHOLD SURVEY EXPERIENCE IN THE REGION

21.5. Many countries have conducted household income and expenditure surveys to obtain weights for consumer price indices. These surveys have been conducted over an entire country only very rarely. Some were confined to the capital cities, others extended to important towns or the urban areas of the country and some limited to certain economic groups in the capital cities. Second in importance have been labour force and manpower surveys. Migration surveys have been conducted as part of multi-subject survey programmes in some of the countries. Fertility surveys have been carried out in some of them as part of the World Fertility Survey programme.

21.6. Survey programmes have usually been initiated with foreign help and co-operation. Some of the demographic surveys have been conducted covering a whole country. At the same time some countries have attempted specialized migration surveys and educational surveys, in which information was collected on school enrolment by level and the like. These surveys covered the whole of the countries and usually estimates were compiled for rural and urban areas and for nationals separately.

21.7. Many specialized surveys have been devoted to labour force topics. The purpose of these surveys has been to obtain labour force estimates according to age, sex and occupation separately for rural and urban areas as well as by nationals and non-nationals, especially in the Gulf States. A few countries that have not yet conducted household surveys are now planning and preparing to carry out such surveys in the near future.

#### 1. Survey programmes and organization

21.8. The idea of integrated sample surveys is still new in this region. Most of the countries carry out *ad hoc* surveys to meet certain specific needs. A few countries, for example, Jordan and Iraq, have undertaken continuous

integrated surveys. In Jordan, continuous surveys were planned as it was not possible to carry out a population census in 1970. Through these surveys information was collected on the demographic characteristics of the population, including sex, age, marital status, education, and so on, by urban and rural areas. In subsequent rounds, data were collected on employment and unemployment by industries for different governorates and separately for rural and urban areas.

21.9. Iraq carried out a multi-subject survey in 1973–1974 to estimate rates of births and deaths, infant mortality, divorce and urban and rural migration, followed by multi-round surveys of vital events in 1974–1975. The Syrian Arab Republic also conducted multi-round intercensal surveys in 1976, 1977 and 1978 to obtain national socio-economic data. In addition to vital rates, the surveys provided estimates of internal and international migration.

21.10. Internationally recommended definitions and concepts have been utilized in the region with slight modifications. The household concept has been slightly changed as the head of the household may have more than one wife. In such cases, the husband may be classified as head of the household where he spends most of his time. Usually the head of the household is the one accepted as such by the household.

21.11. Experience in field work varies from country to country. Generally, enumerators are hired on a temporary basis for *ad hoc* surveys. Many of the statistical offices have regional offices in different administrative divisions of the country. These regional offices collect data on prices, industrial production, vital statistics, and the like. This staff is augmented by temporary enumerators who may work part time for the department. It is usually the practice to hire teachers as part-time enumerators because they may be the only persons in the area who are literate and familiar with the households. Being government employees they are expected to be reliable and trustworthy. They are often available in the evenings when the respondents are at home. The team of enumerators is usually disbanded when the survey is over.

21.12. It may be noted here that conditions of field work are very difficult because of extreme heat in many of the countries throughout the year. Some other countries are extremely cold in winter and very hot in summer. Most of the countries have large desert areas and communication may be very difficult in these areas. The enumerators have to be paid special allowances when they are in the field. In some more developed countries, female enumerators have been used with some success, especially in fertility and household income and expenditure surveys. It has also been the experience that households in rural areas and low-income households are more co-operative than wealthy and educated households. When local enumerators are employed, respondents may not co-operate by declining to give information which they regard as confidential and would not like their neighbours to know about.

21.13. In many of the Arab countries, illiteracy is widespread and there is little statistical awareness. Therefore, if long questionnaires are used to obtain detailed information, the respondent is unable to give correct answers and the resulting respondent-enumerator fatigue affects the quality of the data. Countries are tempted to use long questionnaires because in some wealthy countries the working conditions in the field are hard and it is very

difficult to find nationals who will work under such conditions. Countries which are short of resources would like to collect as much information as possible in a single visit, as the major expenditure in surveys consists of travel costs. The problem is aggravated in poor countries where distances are great and communications are poor.

21.14. The non-availability of full-time enumerators has forced countries to employ part-time enumerators. These enumerators work in the afternoons and thus can barely work for a few hours. The selection procedure for enumerators leaves much to be desired. Mostly, enumerators are selected whose qualifications are below the required level. This naturally affects the quality of the data and adds to the heavy burden of efficiently training the enumerators. As there is a dearth of qualified, trained and experienced nationals in many fields, non-nationals have to be employed. Non-nationals from countries like India, Pakistan, Jordan and Egypt form the major part of the labour force in many of the wealthy countries. This has created a problem of communication because some of the non-nationals do not speak Arabic. In some countries this problem has been solved by using multilingual enumerators. In certain other countries, the enumerator carries an English version of the schedule and the instructions for the respondent to read and give the desired information.

21.15. In Arab countries the size of the nomadic population varies from country to country. There have been studies of their movements from place to place according to the season and availability of water. Many countries have formulated plans to settle the nomads. Some of them have been attracted to the cities because of better employment opportunities and better living conditions than in the desert. Another type of population is the tribes moving from town to town in search of employment. There are no studies regarding this type of population and it is difficult to cover them in household surveys. There is a need for more studies in depth regarding such populations. Another phenomenon which deserves attention is movement of whole villages due to the vagaries of rainfall. This presents difficulties if cluster sampling is used in rural areas, as the frame has to be constantly updated.

21.16. It has already been stated that, like other developing countries of the world, the countries of the ECWA region face problems of illiteracy and the consequent poor statistical awareness. In addition, in certain Arab States where modern systems of government were not known until recently, the respondents do not appreciate the value of statistical data and are often sceptical about their utility. They are sometimes afraid of legal action if they give the correct information, although they have the assurance of confidentiality. Social conditions in certain countries do not allow them to mention names of female members of the household and they do not talk about divorced, widowed and handicapped persons, thinking that would lower the social prestige of the family. Sometimes the information is intentionally falsified if there is thought to be advantage in doing so. In one country, deaths are not reported but more births are registered because the Government gives special allowances for every living child. Similarly, household size may be exaggerated if a rationing system has been introduced in the country.

21.17. A basic difficulty in many of the surveys is that the enumerator cannot convey precisely certain concepts to the respondent, for instance the concepts of age in

whole years, occupation, economic activity, income, and so on. The registration of births, deaths, marriages and divorces is a recent innovation in many countries. Many persons cannot identify time periods in the past, such as duration of marriage, residence at a particular place or intervals between births. As they do not maintain records, it is not possible for them to give correct expenditures on different items. The same applies to income. It is difficult for persons to state precisely income from different sources. At the same time, respondents with second jobs may be hesitant to give correct information for fear of additional taxation.

21.18. The household concept is difficult to interpret in countries when there are multiple marriages or wives living separately who sometimes have independent incomes. In certain Arab countries, the Government encourages maintenance of large households by giving incentives, such as allowances for every new-born child, free education and housing loans.

21.19. Another factor in survey planning is that there is no ban on government employees holding two jobs at the same time. As the government organizations have morning hours, employees can accept jobs in the afternoon. This encourages the hiring of government employees for surveys and censuses carried out by the statistical organizations.

21.20. In view of the problems noted above, the statistical organizations in Arab countries have to take special steps to overcome biases due to non-sampling errors. Unfortunately, minimal attention has been paid to this problem. In many reports, the sources of non-sampling errors are not even mentioned. In others, there may be a cursory remark saying that non-sampling errors were controlled by intensive training and careful supervision.

21.21. Even when the data are collected efficiently in the field, care has to be taken in processing the information. The first stage is coding of the data. The accuracy of the published data is adversely affected if coding errors exist because these errors cannot be completely eliminated even by computer checking. The main difficulty is to find intelligent and experienced coders. Although most of the countries have electronic computers, they are short of trained staff to operate them. The turnover of the processing staff is very high and the computers are only partially utilized because of the shortage of staff at almost all levels. There is a need for continuous on-the-job training, but this is sometimes difficult because of the unavailability of academically qualified persons who are willing to work for the Government at low salaries relative to those in private agencies.

21.22. There is also a shortage of staff competent to analyse the information. Many reports come out with only a general introduction, which is often very sketchy, and tables are presented without any analysis. There is need to train qualified persons to perform this function. Another very important aspect of survey experience is documenting experience, evaluation of field techniques, suggestions for improvement, and the like, so that the next time a similar survey is planned, the planners may benefit from previous experience. Usually every survey is treated as a separate exercise and the same mistakes are perpetuated. This is particularly evident in the lack of co-ordinated planning. Very often planning is done without any reference to the

needs of various potential users. Later, requests are received for data that were not collected in a particular survey.

## 2. Household income and expenditure surveys

21.23. Household income and expenditure surveys were initiated in the region in the 1950s for the establishment of consumer price indices and in certain countries to measure elasticities. These surveys were initially confined to capital cities. Later they were extended to other large cities. Recently, for example in Jordan, Iraq and the Syrian Arab Republic, the coverage has been extended to the whole country.

21.24. Usually a stratified two-stage sample design has been followed. Recent surveys have utilized multi-stage stratified designs. The smallest administrative unit has been used as the primary sampling unit. In certain cases, instead of selecting households, housing units were selected and the households living in them were enumerated, for example in Jordan. In countries where nationals and non-nationals were to be distinguished, stratification was done on that basis. In some countries other sampling techniques have been used. In Kuwait, for instance, grid-maps prepared for the 1975 Census of Population were used. The percentage of Kuwaitis in each grid-square was known, and it was observed that the size of the population in each square was related to the socio-economic characteristics of the population. For instance, densely populated squares had a large non-Kuwaiti population with a distinct pattern of economic activity. Therefore, it was decided to stratify the areas according to their population. In the first stage squares were selected and in the second stage households were selected. A self-weighting design was used.

21.25. In the household income and expenditure survey in Iraq, an updated listing of the 1970 housing census was used as a frame. In rural areas, deserted villages were dropped and new villages and dwellings were added to the list. The country was divided into four regions. Each region was divided into two strata, urban and rural. It was decided to select an overall sample of 3,600 housing units. These were allocated to each stratum according to its size. The housing units were then selected at random from the housing lists of each stratum.

21.26. In certain countries, the major civil divisions, the governorates, were divided into strata consisting of the capital, large cities and other cities in urban areas, large, medium and small villages in rural areas. The capital and the large cities were included in the sample with certainty. From the remaining strata, a pre-determined number of cities was selected at random. The selected cities were divided into blocks and from blocks housing units were selected for enumeration. In rural areas, villages were treated as blocks and housing units were selected at random from them. In one country the selected sample was enumerated during the first month of each quarter. An equal number of households was randomly allocated to the remaining eight months for enumeration. In another country, the selected households were enumerated in each quarter. In some countries, direct interviews were used, but in others expenditure was recorded daily by the respondents in a register and checked by the enumerators. This method was regarded as more accurate although it in-

volved more time and expense. Owing to the illiteracy of the population, the log-book method is not very widely used.

### 3. Demographic and other surveys

21.27. It has already been stated that nearly one third of the countries either have not conducted population censuses or have not published the results of their censuses. Civil registration systems are incomplete because of public unawareness and lack of interest. In some countries, there is an incentive for registering births, as the Government gives allowances for the maintenance of a new-born child. However, deaths often go unregistered. Because of social inhibitions, divorces may not be registered. Jordan, where a census could not be conducted, has introduced a regular system of multi-subject surveys to collect demographic data. In other countries, intercensal surveys have been conducted regularly because these data are required for planning and administrative purposes. These surveys are comparatively cheaper than the census and easy to control and manage for countries at any level of statistical development. In most of the demographic surveys, information has been collected for each member of the household concerning sex, age, religion, educational attainment, marital status and economic activity. In some countries, data have been collected on housing conditions, public services and amenities.

21.28. In some countries, for example, Iraq and the Syrian Arab Republic, fertility surveys have been carried out as part of the World Fertility Survey. In Jordan, a National Fertility Survey was conducted in 1972. The survey aimed at obtaining information on the maternity histories of ever-married women in their reproductive ages (15-49). It also investigated the extent of their knowledge and use of contraceptives and attitudes towards family size. The fertility survey of women in Iraq in 1974 measured the demographic characteristics of fertile women and studied the relation between fertility and education and the different methods of contraception used by Iraqi women.

21.29. In many countries, labour force surveys are regularly conducted in rounds of six months each.

21.30. Some countries have carried out surveys to ascertain changing social attitudes. Surveys of internal and external migration are also of great importance in these countries. Because of the rapidly changing economic conditions there is large-scale internal migration. There is also continuous immigration from other countries because of the job opportunities offered by many of the countries of the region.

21.31. In the majority of the countries, a multi-stage stratified cluster sampling design is followed in specialized surveys. In large countries, clustering is done to minimize travel costs and geographical representation is assured by judicious stratification. In some countries, the census data have quickly become obsolete because of tremendous socio-economic changes. For instance in Saudi Arabia, construction has been very rapid. Therefore, area sampling techniques were used as the frame rather than the population lists of the 1974 census. The smallest administrative unit in Saudi Arabia was used as a primary sampling unit. The emirates were classified as metropolitan, other urban and rural, as separate estimates were needed for these

areas. There were six metropolitan areas and six primary sampling units selected in the sample. The remaining urban primary sampling units were placed in seven strata and 11 were regarded as rural, thus forming a total of 24 strata. From each stratum one primary sampling unit was selected with probability proportional to size. Then from these selected primary sampling units five secondary sampling units were selected, each consisting of 500 individuals. Thus, 1,500 persons from metropolitan, 1,700 from other urban and 25,000 from rural areas were selected. Other countries generally follow similar sample designs with certain refinements to give estimates of specific characteristics needed by a particular country, such as nationals and non-nationals.

21.32. Many of these countries, generally speaking, have major civil divisions called governorates, then directorates and police stations divided into sectors. The rural areas consist of villages and other areas although different countries may use different terms for these areas. The central statistical offices usually have regional offices at the governorate level, and when surveys are conducted the staff is augmented by hiring part-time or temporary full-time enumerators. The employment of female enumerators has been tried on a limited basis in some countries with advantage, especially in fertility surveys. Due to social inhibitions, female enumerators may not like to travel with male enumerators and in certain cases it may not be possible for female enumerators to visit the households in the evenings. Female enumerators may not be available in Arab countries if the work necessitates sleeping outside the family home.

### B. FUTURE TRENDS

21.33. The importance of household surveys was realized as early as the 1950s in some countries of the region. The number and scope of surveys increased in the 1960s and expanded rapidly in the 1970s. Most of the countries have carried out surveys in almost all the large cities and some of them have expanded the coverage to the rural and other urban areas of the country. The scope of the surveys has been expanded to include labour force surveys and demographic surveys, including birth and death surveys and fertility surveys. Although a few countries have attempted multi-subject surveys the idea of integrated surveys is new. More such surveys will be planned on that basis in the future. It is expected that the United Nations National Household Survey Capability Programme will play an important role in the development of integrated survey programmes by building up the survey capabilities of the different countries in this region. The meeting of Arab statisticians held in Abu Dhabi from 26 to 29 March 1980 was a landmark in the history of the development of household surveys in the region. The recommendations of the meeting provide guidelines for the future development of integrated household survey programmes in the region. Some of the important recommendations are discussed in the following paragraphs.

21.34. As far as technical and financial help for developing integrated survey programmes is concerned, the countries may be conveniently divided into four categories. In the first group are countries which already have survey capabilities and do not require financial or techni-

cal assistance. The second group consists of countries which have survey capabilities but need financial help. Countries in the third group need financial and technical help. Countries in the fourth group have not yet developed the infrastructure to conduct household surveys. The main components of potential assistance consist of:

- (a) Technical advisory services;
- (b) Training of personnel;
- (c) Data processing facilities;
- (d) Transport and other equipment;
- (e) Additional staff resources.

The meeting recommended that multilateral and bilateral donor agencies of the region should provide resources to assist the countries in the implementation of household survey capabilities. The countries were requested to undertake a detailed exercise of estimating the approximate cost of the programme, taking into account the staff required at headquarters, field organization, equipment, travel, data processing and administration overheads, including accommodation and office equipment.

21.35. In view of the inadequacy of the sampling frames in many countries, the meeting recommended that integrated survey programmes should be initiated as soon as possible after the housing and population censuses in order to utilize the geographical frame created for the census and the census data base for developing the survey design. The meeting stressed the importance of collaboration between users and producers of data in determining the choice of subjects for surveys, their sequence over time and presentation and analysis of data. The survey programme should be flexible to meet the data needs of planners and policy-makers. The meeting stressed the need for preparation of manuals on household surveys to cover the special situations in the countries of the region.

21.36. A basic list of topics on which planners and policy-makers need data regularly was considered, as follows:

- (a) Demographic characteristics;
- (b) Health;
- (c) Food consumption and nutrition;
- (d) Housing conditions and facilities available;
- (e) Educational characteristics and cultural activities;
- (f) Employment and unemployment;
- (g) Economic level of the household.

It was noted that the requirements and priorities of countries in the ECWA region may differ from this list. Thus, the meeting recommended that (a) the list of household

data requirements be revised in the light of the needs and priorities of the region, (b) definitions, concepts and classifications be studied with a view to standardization to ensure comparability of results, and (c) methodological studies in the field of survey design be undertaken. Considering the importance of the nomadic population in the region, it was recommended that in-depth analyses of the data collected and validation checks be carried out to establish the consistency of the data with data obtained through other sources.

21.37. The meeting also discussed integrated household survey programmes and recommended that for the development of such a programme the following were necessary:

- (a) A well-formulated and co-ordinated programme of household surveys taking into account the priority needs of each country;
- (b) An adequate number of well-trained statistical personnel at all levels;
- (c) Availability of an up-to-date frame for sampling purposes;
- (d) Establishment of a permanent field organization with facilities for travel;
- (e) Adequate data processing facilities;
- (f) Arrangements for speedy printing and dissemination of the results of the survey;
- (g) Adequate budgetary resources.

The meeting also stressed that countries with established survey capabilities should document their experience with detailed descriptions of sample design, survey questionnaires, collection techniques, organization of field operations, and quality control in the collection and processing of data so that all countries could benefit from their experience.

21.38. The meeting also took note of the brain drain in the region as it affected statistical work. It recommended improvement of the status and service conditions of statisticians and urged that analysis and research on the problem be undertaken as follows:

- (a) Each country should make realistic estimates of its needs over the next four to five years;
- (b) Each country should train the junior staff in the country itself;
- (c) Training workshops for senior staff in the planning and management of household surveys should be arranged; and
- (d) Detailed training materials should be produced for the benefit of national and regional training centres.

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