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A SYSTEMS APPROACH TO NATIONAL ACCOUNTS COMPILATION

A Technical Report

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NOTE

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List of abbreviations and acronyms

BOP	Balance of payments
CCIS	Cross-Classification of Industry and Sector Accounts
CEMLA	Latin American Center for Monetary Studies
c.i.f.	cost, insurance, freight
COFOG	Classification of the functions of government
COICOP	Classification of individual consumption by purpose
COPNI	Classification of the purposes of the non-profit institutions serving
COPP	households
CPC	Classification of producers by purpose
ECA	Central product classification
ECE	Economic Commission for Africa
ECLAC	Economic Commission for Europe
ERE-TES	Economic Commission for Latin America and the Caribbean
ESCAP	*Equilibre ressources emplois, Tableau entrées-sorties*
ESCWA	Economic and Social Commission for Asia and the Pacific
ESUT	Economic and Social Commission for Western Asia
EU	Extended Supply and Use Table
Eurostat	European Union
FC	Statistical Office of the European Union
f.o.b.	Financial corporation
FIRST	free on board
FISIM	Fully Integrated Rational Survey Technique
GDP	Financial intermediation services indirectly measured
GFCF	Gross domestic product
GFS	Gross fixed capital formation
HRA	Government finance statistics
IAS	Human Resources Accounts
IEA	Integrated Accounts System
IIP	Integrated Economic Account
IMF	International investment position
INSEE	International Monetary Fund
I-O	*Institut national de la statistique et des études économiques*
ISIC	Input-output
ISS	International Standard Industrial Classification of All Economic Activities
ISWGNA	Institute of Social Studies (The Hague, Netherlands)
MBS	Inter-Secretariat Working Group on National Accounts
NFC	Monetary and banking statistics
NGO	Non-financial corporation
NPI	Non-governmental organization
NPISHs	Non-profit institution
OECD	Non-profit institutions serving households
PIM	Organisation for Economic Co-operation and Development
ROW	Perpetual Inventory Method
SAM	Rest of the world
	Social Accounting Matrix

SCN	*Système de comptabilité nationale*
SDR	Special Drawing Right
SEEA	System of Environmental and Economic Accounts
SESAME	System of Economic and Social Accounting Matrices and Extensions
SIAP	Statistical Institute for Asia and the Pacific
SNA	System of National Accounts
SNAPC	System of National Accounts on a Personal Computer
SUT	Supply and Use Table
UN	United Nations
UNSD	United Nations Statistics Division
VAT	Value added tax

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Acknowledgments

This technical report is the result of the international cooperation between the United Nations Statistics Division (UNSD), national and international statistical agencies and individual experts who have volunteered their expertise and time. In particular, the report reflects the practical experience of a number of countries which have implemented the national accounts compilation approach described here in cooperation with UNSD.

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The opinions expressed in this handbook do not necessarily represent those of the United Nations or of the institutions with which the experts are affiliated.

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INTRODUCTION

1 The publication of the 1993 revision of the System of National Accounts[1] (1993 SNA) was the result of a decade-long concerted effort of many national accounts experts in national as well as international statistical agencies to update, clarify and simplify the 1968 SNA and to harmonize it with other international statistical standards. The challenge before the international community now is to formulate practical guidelines for the implementation of the 1993 SNA in countries at different stages of statistical development.

2 The first step to implement the 1993 SNA in a specific country is that users and producers of national accounts information make a common effort to decide upon the following two questions:

(a) **System design: WHAT** is the national accounts system/framework that is appropriate for the country, i.e. which elements of the 1993 SNA (e.g. accounts, tables, classifications etc.) are to be given priority in the compilation?

(b) **System realization: HOW** is the resulting framework of national accounts information to be compiled, i.e. what mechanisms of basic data collection, estimation techniques, data processing, etc. have to be set up to yield the desired result in the most effective manner?

The present report - one in a series of handbooks and other publications - reflects extensively on both these questions. It represents, thus, the efforts of UNSD to define a systematic approach to the design and the effective realization of a national accounting framework for a country.

3 This document is called a "Technical Report" to emphasize that the compilation approach developed at UNSD so far, is work in progress. Moreover, it is by no means an attempt to summarize all the efforts of countries and international organizations to implement national accounts in general and the 1993 SNA in particular. The objective of this report is to provide a general framework in which the multitude of worldwide experiences in the field of national accounts compilation can be incorporated, and thus can be compared and discussed for the benefit of political and technical decision makers.

4 The report is based fully on the 1993 SNA. Concepts, accounts, tables and classifications recommended in the SNA are used throughout the entire report; however, the reader will not find in it extensive conceptual discussions of the SNA: This report is not about elaborating or interpreting the SNA, it is about applying the System in practice. For the purpose of conceptual clarification, frequent references to the appropriate sections of the 1993 SNA are included in the text. Consequently, the reader is encouraged to consult the 1993 SNA publication while reading this document.

5 Although the formulation of the compilation approach, as presented in this report, is based on the 1993 SNA, it is by no means limited in its application to the 1993 System: Certain elements, such as the design of an effective compilation process, that makes optimal use of the existing information, are applicable, in general, to any type of national accounting framework. In particular, the same "compilation logic" as developed in the report, applies to satellite extensions of the core system of the 1993 SNA. This feature of universal applicability, also explains why it was possible for UNSD to start developing the approach long before the conceptual work of the 1993 SNA was finalized.

6 In this Introduction, three elements are described that together constitute the context within which the national accounts compilation approach has been developed. Chapter I, is the heart of the report, presenting the national accounts compilation approach itself. Chapter II discusses the statistical requirements and analytical features of alternative options, and indicates how the compilation framework and procedures need to be adjusted in order to compile the required data. It, thus, provides the basis for a rational comparison between statistical cost and analytical and policy benefits, when designing a national accounting system for a country. Chapter III develops the concept of national accounts and supporting

data compilation cycles. It is argued that the introduction of the time dimension makes it possible to deal with the problem of the growing data needs for an enlarged system of national accounts, without imposing undue pressures on the limited human and financial resources that are generally available.

7 In addition, the report includes two annexes. Annex I presents a summary of practical experiences acquired during the tests of the compilation approach carried out by UNSD in a number of country projects: It deals with the design of the compilation framework, the data sources, the processing of data, the conversion of data to the SNA format, and the reconciliation process. It also attempts to evaluate the experiences obtained. As the compilation approach depends heavily on the identification of statistical discrepancies between independent data sources used in national accounts compilation, Annex II presents in an illustrative manner some types of statistical discrepancies that may emerge. It also shows how a reconciliation strategy may be defined to eliminate these discrepancies.

8 The national accounts compilation approach developed in the report is not a departure from, but fully complements the present efforts to implement the 1993 SNA. This Introduction describes the three elements that constitute the points of departure for the approach presented in chapter I. Section A below describes in general terms the compilation approach, which is called a "systems approach" to national accounts compilation. This section also indicates what the reader can expect to find in the report and what should be sought elsewhere, e.g. in other handbooks. Section B provides a brief description of the relevant aspects of the structure of the 1993 SNA, which is used as the general frame of reference for all chapters in this report. The description of the 1993 SNA serves also as a link between the compilation approach proposed in the report and the present country practices, which are described in section C.

9 The working premise of the report is that the national accounts compilation of the future will have to respond to users of economic and related statistics, who have a preference for more rather than for less detail, in order to deal adequately with newly emerging economic and related issues. These issues go far beyond the production analysis that many national accountants have conventionally emphasized. They include concerns such as government deficits, monetary factors causing high inflation, external debt burdens, foreign exchange problems, environmental issues, poverty issues, etc. The way in which the SNA has been implemented in many countries so far does not address those issues; instead, they are addressed by specialists in the separate fields of analysis. As a consequence, these analyses can only be partial: balance of payments specialists study the foreign economic relations of a country, without looking in detail at either domestic impacts or causes; government statisticians study the internal mechanisms of government budgeting, which require cash balances between revenues and expenditures; monetary specialists study the monetary causes of inflation without being primarily concerned to relate them adequately to the real side of the economy; environmental and natural resource studies can only determine the changes in the natural environment, but cannot identify the economic causes nor the effects of those changes.

10 What is missing in the implementation process, thus, is the dimension of "analytical interrelationships". However, this is exactly what the System of National Accounts is about: The comprehensive data set approach developed in the 1968 SNA[2] and further expanded in the 1993 SNA, provides the adequate conceptual framework for the enlarged vision of national accounting: All economic information is accommodated in an internally coherent system of national accounts and further extensions are facilitated through related satellite approaches. The traditional emphasis in SNA implementation on production accounts needs, therefore, to be supplemented by a new focus on integrated institutional sector analysis and asset accounting, including both stocks and changes in stocks of produced and non-produced assets. However, in order to arrive at such an extended and still coherent data set, the systems logic has to be carried back also into the compilation process.

A. A systems approach to national accounts compilation

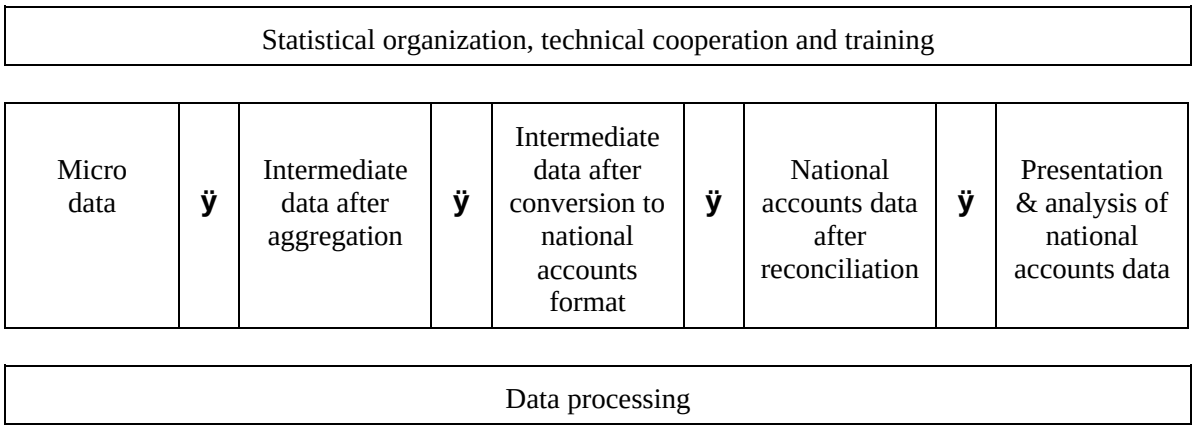
11 The idea of a formalized systems approach for compilation has been developed at UNSD in order to deal more systematically and, therefore more effectively, with the widening scope of national accounts as well as with the increased volume of data that are available for a better estimation of national accounts aggregates. Furthermore, by formalizing the approaches to the national accounts compilation process, the way is paved to making optimal use of existing electronic data processing technologies. Consequently, in developing the compilation approach, microcomputers were used extensively and specific software has been designed and used in the practices of the countries where the approach has been applied. However, the reader should be cautioned that computer software is not the heart of the approach presented in this report. It is rather an approach to national accounts compilation, in which existing estimation procedures are incorporated in a formalized manner and which thus lends itself more easily to computerization.

12 It is, thus, not the objective of the report to introduce any novel approaches to national accounts estimation. Given the long experiences of national accountants all over the world, such an effort would be misdirected. On the contrary, an effort is made to incorporate explicitly this wealth of experiences. What could be considered as "new" in the approach is that it constitutes a "systems" or formal approach to the process of compiling national accounts from the basic source information to the final data set presentation. This formalized approach is based on and draws from the practices of a wide range of countries. The systems approach includes the design of a national accounting framework in which the scope, classifications and estimation methodology are formalized prior to the actual compilation of the data.

13 The scheme presented in the diagram below summarizes the entire scope of SNA implementation issues that are dealt with in greater or lesser detail in the present report. The dimensions of the SNA compilation itself are reflected in the five boxes in the middle of the diagram. The first box stands for the micro data[3] that are collected from economic agents through censuses and surveys, and on the basis of administrative data sources; in the context of this report, economic agents are defined as establishments and institutional units[4]. The arrow between the first and the second box represents the aggregation of the data obtained on and/or from economic agents to an intermediate level of data aggregation; thus, establishment data are combined to yield the industry data and institutional units are grouped to institutional sectors. Further on, the result of the conversion of aggregated intermediate data on economic agents to the national accounts format (arrow between boxes 2 and 3 in the middle part of the diagram) is shown in the third box; the conversion includes adjustments needed to reflect SNA imputations, adjustments for undercoverage, timing, etc. Subsequently, the integration or reconciliation of SNA data, which results in an internally consistent data set is presented in the forth box. Finally, after having obtained a "clean" data set, it is possible to derive analytical presentations of national accounts data for publication and use in further analysis (fifth box in the middle part of the diagram).

14 The flow of data is supported by data processing facilities in the form of hardware and software, and by a statistical organization which is adapted to the requirements of national accounts data compilation, as well as by training and technical cooperation activities which are needed specifically during the first phases of SNA implementation. The data processing facilities are reflected in the lower box of the diagram, and the statistical organization, training and technical cooperation activities in support of the national accounts compilation are presented in the upper box of the diagram.

DIAGRAM



15 The report deals in particular with issues that concern the systematization or formalization of the SNA compilation process. The emphasis of the report is placed, therefore, on the issues involved in converting aggregated intermediate basic data to the national accounts format and the subsequent reconciliation of data (see chap. I and annex II below), as reflected in the third and forth box in the middle of the diagram. Chapter III addresses some issues related to the link between micro data and national accounts. Chapter II deals with the relation between analysis and compilation, as reflected in the fifth box. On the other hand, some attention has been given (see chap. I, sect. A.3 below) to the use of computers and supporting software in the conversion of the data from their basic format to their final and internally compatible format in the national accounts, as reflected in the lower box of the diagram. The topics of statistical organization, training and technical cooperation, are addressed in annex I.

16 When dealing with the topic of converting aggregated intermediate data to the national accounts format this report does so by means of illustrative examples. For instance, there are references to the difficulties encountered when converting business accounts records to the format of the sector accounts for corporations; household survey information to the national accounts format; or when using agricultural and other economic survey data for compiling the production accounts for industries. The report also mentions examples that illustrate the type of imputations that are needed to adjust further the intermediate data in national accounts format to the SNA requirements. However, it goes beyond the scope of the report to give a full and detailed description of the conceptual link between basic statistics for all the different economic sectors and the national accounts. This will be the object of further handbooks which will cover specific sectors or data subsets of the System[5].

B. The accounting framework of the 1993 SNA

17 The comprehensive accounting framework of the 1993 SNA is presented in diagrammatic format in table 0.1. Without entering into conceptual detail, for which the reader is referred to the SNA itself, some features of its structure, that are relevant to the compilation approach presented in this report, should be mentioned.

18 The basic structure of the 1993 SNA includes three segments: (a) a Supply and Use Table (SUT) presented in the upper panel of the table, and (b) the Integrated Economic Accounts

(IEAs) represented in the lower panel of the table. Between the two in the middle segment of the table lies (c) the Cross-Classification by Industries and Sectors (CCIS) of the common elements of the SUT and the IEAs, such as for example output, intermediate consumption and value added and its components.

19 The SUT in the upper panel of table 0.1 is a schematic presentation of SNA Table 15.1: "Supply of products at basic prices and use of products at purchasers' prices" (see 1993 SNA, p. 350). It includes, basically, output and imports in the row of supply, and intermediate consumption, final consumption, capital formation and exports in the row of uses. Also presented in the table are a number of adjustment columns to the left, which allow to arrive at total supply and total use in purchasers' prices. The box below output and intermediate consumption represents value added, which is obtained as the difference between output and intermediate consumption. Furthermore, the SNA recommends to accommodate additional information relating to the production factors labour and capital - if available - in a box below value added.

20 The boxes in the SUT represent vectors or matrices, based on the underlying classification detail: The supply and use elements are classified in the rows by type of products (represented by categories of the Central Product Classification (CPC)). In the columns output, intermediate consumption and value added are classified by industry groups (represented by categories of the International Standard Industrial Classification, ISIC). The unit of classification for the industries are establishments; the establishment is defined in the 1993 SNA (p. 116, para. 5.21) as "an enterprise, or part of an enterprise, that is situated in a single location and in which only a single (non-ancillary) productive activity is carried out ...". The two product and industry classifications lead to the well known matrices of output and intermediate consumption by industry and products, to product vectors for imports, exports and final consumption, and to industry vectors for value added.

21 The boxes in the lower part of table 0.1 indicate SNA accounts for institutional sectors[6]. The table includes the five major sectors of the System, i.e. non-financial corporations, financial corporations, general government, households and non-profit institutions serving households (NPISH). There is furthermore a column of accounts for the total economy and the rest of the world. The accounts for each sector describe its behaviour and therefore record all economic transactions in which the sector is involved. Thus, there are (a) accounts for production, (b) accounts that record income and the use of income, and (c) capital and financial accounts, as well as (d) the balance sheets of each sector[7]. The unit of classification for the lower panel of the table is the enterprise or institutional unit, which is defined in the 1993 SNA (p. 87, para. 4.2) as "an economic entity, that is capable in its own right of owning assets, or incurring liabilities and engaging in economic activities and in transactions with other entities".

22 A new feature of the 1993 System is the close integration of the analyses based on the data included in the upper and lower panels of table 0.1. This integration is made operational by cross-classifying all the common elements between the upper and lower segments of the table by industry and institutional sectors. Thus, the 1993 SNA includes as a minimum, a cross-classification[8] by industries and institutional sectors of all elements of the production and generation of income accounts, i.e. output, intermediate consumption, value added and its components. In addition, all or elements of the assets accounts of produced and non-produced (non-financial) assets, including gross capital formation may be cross-classified. In this schematic presentation the cross-classification is placed in the middle part of the table.

23 In order to be able to assess the state of national accounting in individual countries and the progress made over time, the so called "6 milestones" have been developed. It is important to note that SNA implementation is essentially a country responsibility. Countries may therefore choose a different path to implementation that they find better suited to their needs and technical and financial resource priorities. The 6 milestones are presented in table 0.2 and are explained in more detail below.

24 The first two phases described in the table - phases 1 and 2 - refer to those parts of the SNA that have the most immediate and general use for policy makers. Consequently, many countries have already implemented these "traditional" phases. Phase 1 contains basic gross domestic product (GDP) data at current and constant prices by final expenditures and by industries. In combination with the trade balance from phase 1, phase 2 provides the rest of the world account, which is now fully consistent with the IMF Balance of Payment (BOP) System. At the end of phase 2, countries can calculate gross national income, national disposable income, national saving and net lending/borrowing.

25 Phases 3, 4 and 5 involve the development of comprehensive flow accounts for the institutional sectors. Phase 3 relates to the compilation of the new production accounts, which are an innovation of the 1993 SNA, and a full set of the accounts for general government. The sources for these accounts are quite reliable in most countries, and the main balancing items - government saving and net lending - are of particular interest for economic policy. The breakdown of GDP by cost components may be developed in phase 3 at the same time as the production accounts by sector, which are understood to include the generation of income account as well. In phase 4 the accounts are extended to sectors in which data sources are generally weaker; there is particular interest from a policy point of view in the accounts of the household sector and the non-financial corporations and, if priorities are assigned within this phase, the accounts for these sectors should be compiled first. Phase 5 completes the transaction accounts for institutional sectors with the compilation of financial accounts.

26 Phase 6 refers to the "other flow accounts and balance sheets". Completion of the other changes in asset accounts can only be achieved by countries with a highly developed system of basic data, including a wide range of price statistics and detailed information on stocks of produced and non-produced assets. Balance sheets are fully integrated for the first time in the 1993 SNA.

27 Once countries have reached certain milestones, they must choose whether to allocate resources to reaching more advanced levels of implementation represented by higher milestones or to improving estimates from earlier phases. Their choice should also depend on the availability and quality of complementary data systems. The basic data shown for the pre-SNA phase include statistics on agricultural and industrial output, foreign trade, prices, employment, retail trade, construction output and household expenditures. Under phase 1, complementary data systems include supply and use worksheets in current and constant prices with limited product detail, which are recommended in order to improve consistency between value added and expenditure data. Other items include the BOP System and government finance and monetary statistics, which are being aligned with the corresponding parts of the 1993 SNA, so that data compiled for them can be transferred into the SNA accounts with minimum adjustments.

28 Complementary data systems for phase 3 include capital stock statistics (closing stocks of fixed assets by industry), which are important for dynamic I-O and related analyses. If the perpetual inventory method is used for these estimates, basic data requirements are relatively modest, so that they may be compiled by some countries which have passed only milestones 2 or 3. In addition to providing data on capital stocks, this approach would also allow for estimating the consumption of fixed capital. The BOP stock statistics refer to the international investment position (IIP) reflected in the balance sheet of the stock of external financial assets and liabilities.

29 Countries may decide to implement some refinements and additional accounts as they develop the accounts reaching milestones 2 through 5. Chief among them are quarterly and regional accounts, the former having proved of great value in monitoring short-term economic developments. Input output tables are also included under this heading. Satellite accounts, particularly for the environment, are currently being implemented by several countries. Analytical considerations and compilation issues raised as a consequence of these advances of SNA implementation are dealt with in chapter II.

C. Present national accounts practices

30 A brief overview of present national accounts practices is given in this Introduction. The objective of this presentation is not to provide comprehensive descriptions of country practices in the compilation of national accounts[9], but rather to highlight those features that are relevant for the compilation approach developed in this report. These features are:

(a) The type of aggregates that are estimated;

(b) The accounting framework defined by classifications and concepts;

(c) The type of data sources that are used;

(d) The number of independent data checks that are applied.

Feature (d) may be considered as the most important feature of the approach to be developed in the subsequent chapters: The underlying national accounts methodology requires that many identities hold in the final presentation of the accounts and tables. These identities constitute, thus, data checks, which indicate how far the compilation and reconciliation process has progressed. In the systems approach, these potential data checks are incorporated explicitly in the compilation process in the form of statistical discrepancies, which need to be eliminated. Because of the importance of the statistical discrepancies for the systems approach, the description of present country practices below will focus extensively on the independent data checks applied.

31. The main reasons for the wide array of country practices are differences between countries in their:

(a) Statistical development, including the institutional responsibilities for statistics;

(b) State of social and economic development;

(c) Development of policy analysis uses.

These three elements define the needs and the limits for the generation of statistics in support of national accounts. As the three elements differ from country to country, there exists at present a wide spectrum of national accounts compilation practices, ranging from the very simple GDP compilation by industry and type of expenditure to more comprehensive systems of national accounts, including supply and use tables, institutional sector accounts, flow of funds analysis, balance sheets and, lately, satellite extensions such as environmental accounts or human resources accounts (see chap. II, sects. D and F).

32. Because of the multitude of different compilation practices in countries, it is of course difficult to classify them in a precise manner. However, in order to introduce the idea of the systems approach it is considered useful to group present country practices roughly into the following three broad categories: (a) production-expenditure-income approaches, (b) commodity flow approaches, and (c) integrated accounting approaches. In subsections 1 to 3 below, the differences between these approaches will be explained briefly, focusing mainly on the extent to which independent data reconciliation checks are applied and statistical discrepancies can be made explicit. The three approaches are presented in order of increasing comprehensiveness concerning the scope of the national accounts: With an enlarged scope of national accounts the reliability of the data generally increases, because the number of independent data checks also increases.

33. The way in which these existing practices are introduced below may surprise some readers familiar with national accounts compilation, as the "systems language" of the compilation approach will be used. The reason for doing so is to build a bridge explicitly between commonly known compilation practices and the compilation approach, which will be introduced subsequently. It has to be emphasized again that the UNSD compilation approach is not meant to replace the existing country systems, but rather to "englobe" them and to put them into a larger context. The idea of a "sequence" of accounting systems is taken up again in Chapter II, when a sequence of frameworks (=options) for the implementation of the 1993 SNA is presented in order of increasing complexity, each framework corresponding to specific policy concerns and taking into account the statistical data base of countries.

1. Production-expenditure-income approaches

34. The production-expenditure-income approaches constitute the still frequently used, most basic way of compiling national accounts. The limited focus on the production account is historically rooted in the 1953 version of the SNA. These simplest approaches to national accounting aim at estimating GDP and its alternative breakdowns by (a) economic activity or industry, (b) expenditure, and (c) income or cost components of value added. They provide the minimum set of data that are required by the so-called Harrod-Domar type of macro growth models developed in economic theory.

35. The scope of this approach is represented in table 0.3. It includes only a few "data blocks" that are located in the SUT segment of the comprehensive SNA presentation of table 0.1. The shaded data blocs for output and intermediate consumption only refer to some industries, mainly goods producing industries. The product (CPC) breakdown of the supply and use rows is not considered in table 0.3.

36. The three methods of measuring GDP are based on the ways in which GDP as the main aggregate of national accounting can be conceptually disaggregated[10]:

(a) With some minor adjustments, total GDP equals the total value added generated by all producers. Compilation methods based on this identity commonly use the first digit level of the International Standard Industrial Classification of All Economic Activities (ISIC) - including categories such as agriculture, mining, manufacturing, trade, transport - and are known as the production approach;

(b) Taking the perspective of the final uses for a country's output, GDP can be derived as the total of private and government consumption, capital formation and net exports. Estimating these use-components of GDP is called the expenditure approach;

(c) Finally, GDP can be regarded from the point of view of the costs incurred by the producer during the operation: Consequently, GDP corresponds to the sum of compensation of employees, taxes on production and imports, consumption of fixed capital and the operating surplus. Estimation methods that build up GDP (or industrial value added) by its income or cost components are usually referred to as cost or income approaches.

Countries following these simple approaches do not necessarily arrive at GDP following all three methods, but often estimate GDP only following one or two approaches: In most of the cases the income approach is missing as it is generally regarded to be the most difficult one to compile.

37. Most often GDP is estimated by the production approach. The basic statistical units used may be establishments, which group production activities with similar characteristics in terms of output, inputs and technology used; alternatively, in less refined approaches, institutional units may be used. Total output and intermediate consumption are compiled and hence value added is obtained as the difference between the two. The statistical sources that are used range from specific surveys and censuses (agriculture, industry, etc.) to business accounts of public and private enterprises as well as administrative records concerning government revenues and expenditures. Initial estimates may be further adjusted for output of households for own consumption, imputations for the output of financial intermediaries (FISIM) and insurance and so on. If comprehensive data are not directly available for one or more years, estimates are generally restricted to value added only. The value added estimates may be obtained by extrapolating benchmark data with production volume indices and by applying appropriate price indices.

38. When using the expenditure approach, the different elements of the expenditure breakdown are estimated in the following way: For imports and exports, estimates are based on foreign trade and balance of payments statistics, which are in general readily available. The same is true for government final consumption expenditure, which can be obtained from government records. Concerning household final consumption expenditure, retail sales statistics or, where available, household expenditure surveys may serve as appropriate data sources. With respect to capital formation one has to differentiate between fixed capital formation and changes in inventories. Data on fixed capital formation may be obtained from specialized surveys or from general production surveys and, in the case of government and public corporations, directly from

the accounts. Changes in inventories are more difficult to estimate, especially because of the related problems of stock valuation.

39. The income approach is used by relatively few countries because of statistical measurement problems. If applied, however, independent estimates are most frequently made of compensation of employees which are based on labour statistics and wage rates, and taxes on production and imports which are estimated with the help of government records. Estimates of consumption of fixed capital are often not included because they can only be made if produced capital stock data are available. Relatively few countries attempt to estimate operating surplus independently using as a basis profit and loss accounts and similar statements of enterprises.

40. Ideally, the three approaches described above should be used simultaneously and independently from each other. If that is the case, the data resulting from each approach can be used as checks to evaluate the data obtained from the other two approaches. In practice, however, this ideal situation is rarely encountered: Some countries do not reconcile their estimates at all, and statistical discrepancies remain in the published results. Other countries do not use the three approaches independently; in this case three broad variants can be observed.

41. The first most commonly found variant is when countries apply only one approach and there is no data reconciliation check. The majority of countries applying this single approach generally use the production approach and thus would only have data available on GDP by industries.

42. The second variant is when two or three of the approaches are used, but not independently: Most commonly, one category of one approach is estimated as a residual, so that at the aggregate GDP level no data check is available. For instance, if the production approach is used as the predominant approach to GDP measurement, final consumption and/or changes in inventories for the expenditure approach are measured residually, I. e. the total GDP of the expenditure approach is automatically equalled to the total GDP resulting from the production approach. If the income approach is applied together with the production approach, operating surplus is often the item which is measured residually.

43. The third variant is when countries apply the three approaches in parallel, but to different industries. Generally, the production approach dominates: It is applied to the estimation of value added in most of the goods-producing industries and in those industries - mining and manufacturing - that are dominated by large scale public and/or private enterprises. The income approach is often applied in the case of several services sectors, as no output data are available. Particularly in the case of government and other non-market services, the cost approach is always used with the assumption that net operating surplus is zero. For construction, often the production and expenditure approaches are combined, by estimating construction output with help of information related to expenditures on public works projects and on housing and building construction, and deducting intermediate consumption on the basis of technical coefficients determined for different types of construction projects.

44. However, even if the three ways of estimating GDP are used independently, the characteristic of this group of approaches is that reconciliation is often only done at the aggregate level of GDP. Generally no further cross-classifications of data between the three approaches are compiled. Thus, usually, no data are available on cross-classifications of final expenditures by

products and industries producing those products, or cross-classifications of value added components by recipient sectors and the sectors making the expenditures. Including such cross-classifications, of course, significantly increases the number of data checks.

2. Commodity flow approaches

45. The previous practices could be characterized as the more simple approach to implementation of milestone 1. The next degree of sophistication is reached by including in addition to the data elements of table 0.3, output and intermediate consumption for all industries and by introducing a systematic breakdown of the supply and use rows by products or CPC categories, as well as by including data on labour inputs per industry. This could be considered as the more complete approach to milestone 1; the result is shown in table 0.4, which represents a genuine supply and use framework. The compilation methods that utilize the product detail as represented in the table, are generally characterized as the "commodity flow" approach to national accounts compilation. This approach is strongly influenced by the Leontieff input-output models which are a further breakdown and extension of the Harrod-Domar growth models. The inclusion of additional detail on output, intermediate consumption and labour inputs serves more comprehensive analyses based on production functions.

46. The basic principle of the methods described is that, on the level of the total economy, the identity for total resources and total uses must hold for each individual product category. As supply - I. e. output and imports - are valued in basic or producers' prices and uses are valued in purchasers' prices, adjustment vectors with product detail are needed for trade and transport margins and product taxes minus subsidies.

47. Concerning the statistical sources for the commodity flow method, they are similar to the sources mentioned in subsection 1 above, with the additional requirement of a detailed product (= goods and services) breakdown. Where detailed annual information is not available, structural parameters such as input/output coefficients or intermediate/final consumption proportions are used to distribute the supply of products over the uses.

48. If product (commodity) flow balances are compiled, this method provides a very detailed set of data reconciliation checks at the level of product or commodity groups. Thus, this method can potentially improve the reliability of the GDP data as compared to the estimates resulting from the production-expenditure-income approaches which often only reconcile data at the aggregate GDP level. This is only so, however, if all data on supply and use are estimated independently. Even though the commodity flow approach does not necessarily imply the compilation of an I-O table, in practice, only those countries that compile annual I-O tables use this method comprehensively.

49. As it is rather costly for many countries to compile all necessary information for a fully detailed supply and use table, they may compile a part of the data indirectly through the commodity flow approach. This applies in particular to estimates of changes in inventories, and very often also to final consumption and gross fixed capital formation. In the latter case, detailed product groups are identified as specific to final consumption and gross fixed capital formation, so that the commodity flow method can still be expected to arrive at better estimates of GDP

than the production-expenditure-income approaches, even if some of the categories are estimated residually.

50. Summarizing, it could be said that only a few countries apply this method for the whole economy. In practice, many countries use the commodity flow approach as data check for a limited number of product groups for which independent estimates of supply and use are available. In all other instances, countries use the commodity flow method to derive in an indirect manner estimates of supply or use elements on which no direct data are available. In those cases, the commodity flow method obviously does not provide additional data checks.

3. Integrated accounting approaches

51. The compilation approaches mentioned so far are strongly production-oriented and yield results which correspond to what was defined as milestone 1. Several countries, however, have extended their national accounts coverage to describe not only the production process, but also the ensuing income distribution and redistribution processes, and the linkages to capital and financial flows and stocks. If these macroeconomic aggregates are compiled at the level of the total economy, this corresponds to milestone 2. Moving beyond milestone 2 would imply the calculation of aggregates also for institutional sectors.[11] With the inclusion of the institutional sector dimension not only a more comprehensive picture of the economy can be provided, but in general also a more accurate one, as the number of data cross checks increases significantly.

52. The comprehensive approach to national accounting described above was initiated by some countries after the introduction of the 1968 SNA, which provided the conceptual framework for it. It is also the approach which most closely resembles the approach developed in this report, and which is the one strongly suggested by the 1993 SNA.

53. A typical scope of the national accounts used in this approach is represented in table 0.5. It includes the same SUT elements presented in the "commodity flow" approach of table 0.4, but to these are added limited institutional sector accounts of the IEAs of table 0.1; the latter do not include the production and generation of income accounts, nor the balance sheets and other changes in asset accounts. NPIs are excluded from the sectors for which integrated accounts are being compiled; they are generally included together with households[12], as is also done in table 0.5. In these approaches which are based on the 1968 SNA, the only common element between the SUT and IEA is operating surplus. Table 0.5 indicates a CCIS for operating surplus; in practice, however, a cross-classification of operating surplus by industries and sectors is only implicitly available in the statistics compiled by countries using the integrated approach, and hardly ever explicitly presented.

54. The extension of the previous compilation approaches to this more comprehensive approach requires that data not only be compiled on the basis of establishments that are grouped together by industries, but also for institutional units - corporations, households, government units - that together define the institutional sectors of the 1993 SNA. The introduction of institutional units in the collection of statistical data often required costly changes in the content of surveys and survey procedures which prevented many countries from implementing these integrated approaches to national accounting.

55. The integrated approaches have taken on many different formats, depending on the sophistication of basic statistics development and also depending on the extent to which different data compilations are carried out in one institution and/or coordinated between different institutions. There are broadly four approaches which are combined with each other in practices of countries that apply the integrated accounting approach.

56. A first group of countries compiles the institutional sector accounts separately from the production account data and integrates the two compilations only at the level of the total economy. In this case, very few data checks are added, particularly if the institutional sector accounts are not independently compiled for all sectors. A second group of countries integrates production and/or value added at the level of institutional and industry categories, in other words, they increase the possibilities of compiling CCIS tables beyond "operating surplus" as shown in table 0.5. The more detailed the cross-classification between institutional sector and industry data is, the more data checks become available and the more the institutional sector data compilation contributes to the over-all reliability of the national accounts data.

57. Concerning the extent to which the institutional sector accounts are compiled, one group of countries limits the compilation to the production or generation of income accounts through the capital accounts. This approach is often applied to three sectors in particular, i.e. general government, financial corporations and the rest of the world. The elements of the external account of primary income and current transfers as well as the capital account for the rest of the world stem from the balance of payments, for the government sector from the government budgets and the public accounts. Large enterprises (private and public) include information on tax payments and property income in their profit and loss accounts. The most difficult sectors to estimate are the private non-financial corporate sector and the household sector which includes small unincorporated enterprises. This is the reason why countries that have attempted to compile institutional sector accounts estimated these sectors either residually or omitted them altogether. It is clear that if only three sectors are compiled directly and other sectors are derived residually, there is little scope for additional data checks, even if institutional sector and industry data are integrated through a cross-classification as described in the previous paragraph. The more sectors that are compiled independently, the more data checks that will be become available through this approach.

58. A limited group of countries has extended the compilation of the institutional sector accounts to include the financial accounts, moving thus to milestone 5. In such approach, national accounts are integrated generally with flow of funds data made available and analysed by monetary authorities and/or the financial institutions. Not many countries have attempted this extension of the institutional sector compilation, because the national accounts and flow-of-funds compilations are carried out by different institutions and are, therefore, difficult to reconcile. Integration of the financial account of a specific sector creates the problem of within-sector or "vertical" reconciliation between saving or net lending obtained as part of the IEA, as opposed to saving or net lending obtained from the flow-of-funds analysis. For units that publish integrated accounts - such as public and large private enterprises, financial institutions, the central government and some decentralized government institutions - this vertical consistency in principle should not pose a great problem, if the compilation proceeds in an integrated manner. However, in practice very often compilation of the IEA and of the flow-of-funds analyses are in different hands and adjustments to the basic data are made in a uncoordinated manner and therefore result in data that are not compatible. It is clear, nevertheless, that if flow-funds data

are reconciled with the IEA, additional data checks become available, particularly for those sectors for which integrated data sets exist. Potentially, this would further improve the overall data quality of the national accounts.

59. Hardly any country has attempted to integrate balance sheets and accounts for other volume changes and revaluation, which is the requirement for reaching milestone 6. The main reason that these accounts have been rarely compiled in countries is that the 1968 SNA had not developed well these accounts; if compiled, they are generally limited to selected institutional sectors, e.g. public and large private non-financial and financial corporations. The data, however, would be very useful as an additional check: They permit confrontation of the data on changes in net worth from the flow accounts with the changes in net worth obtained by comparing balance sheets over time.

60. The number of data reconciliation checks available in the institutional sector approaches is potentially much larger than in the previous approaches (see subsections 1 and 2 above) that are restricted to reconciling production and product data only. In these approaches, the data on output and value added can be checked for each institutional sector with independent data on income, expenditure and financial flows, if available. However, as the latter data are generally considered to be weaker than the production and product data, many countries applying this approach do not use these data as checks, but rather reconcile them with the product and production data instead. Even if income and expenditure data are used to make estimates which are not altered in the reconciliation with production and product data, any discrepancies are often eliminated through adjustments of financial data which are in most cases the weakest link in the data set. If balance sheets are compiled for some sectors, the discrepancies cannot be eliminated through adjustment of financial data for those sectors, as the latter need to be consistent with the difference between opening and closing balance sheets for the sectors concerned. In that case, any discrepancies are often "reconciled away" by adjusting financial flows in the sectors for which no balance sheets are available, such as government and households.

Table 0.1 Comprehensive accounting framework of the 1993 SNA

SUPPLY AND USE TABLE (SUT)

			Industries, ISIC					
CPC	Total supply at market prices	Overall adjustments: product taxes, trade & transport margins, FISIM	Output at basic/ producers' prices					Imports cif
CPC	Total use at market prices	**Expenditures by purpose** →	Intermediate consumption	Gross capital formation	Final consumption by government	Final consumption by households	Final consumption by NPISHs	Exports
	GDP	Overall adjustments: product taxes, FISIM	Value added	**Occupational groups** ←				
			Employment Consumption of fixed capital Changes in inventories Gross fixed capital formation Stock of fixed assets at end of year	←				

CROSS-CLASSIFICATION BY INDUSTRIES AND SECTORS (CCIS)

	Total economy	Non-financial corporations	Financial corporations	General government	Households	NPISHs
ISIC	Output, intermediate consumption, value added components					

Table 0.1 (continued)

INTEGRATED ECONOMIC ACCOUNTS (IEA)

Total economy	Non-financial corporations	Financial corporations	General government	Households	NPISHs	Rest of the World
Production account Gross domestic product (GDP)		*Production account* Value added				*External account of goods and services* External balance of goods and services
Generation of income account Operating surplus		*Generation of income account* Operating surplus				*External account of primary incomes and current transfers*
Allocation of primary income account National Income		*Allocation of primary income account* Balance of primary income				
Secondary distribution of income account National disposable income		*Secondary distribution of income account* Disposable income				
Use of disposable income account National saving		*Use of disposable income account* Saving				Current external balance
Capital account Changes in net worth due to saving and capital transfers Net lending		*Capital account* Changes in net worth due to saving and capital transfers Net lending				*External capital account* Changes in external net worth due to saving and capital transfers Net lending to abroad
Financial account Net lending		*Financial account* Net lending				*External financial account* Net lending to abroad
Other volume changes account Changes in net worth due to other changes in volume of assets		*Other volume changes account* Changes in net worth due to other changes in volume of assets				*Account for other changes in volume of external financial assets and liabilities* volume changes of external financial assets and liabilities
Revaluation account Changes in net worth due to holding gains/losses		*Revaluation account* Changes in net worth due to holding gains/losses				*Account for revaluation of external financial asserts and liabilities* gains/losses of external financial assets and liabilities
Opening and closing balance sheet Net worth		*Opening and closing balance sheet* Net worth				*Opening and closing balance sheet of external financial* External net worth

Table 0.2 Implementation milestones for the 1993 SNA

Phases of implementation	SNA accounts	Complementary data systems	SNA-related data and developments
Pre-SNA phases		Basic data (production etc.) Balance of payments (BOP), goods and services Monetary stock statistics Price indices (consumer, producer, wholesale)	
Phase 1. Basic indicators of gross domestic product (GDP)	Final expenditures on GDP, current and constant prices GDP by industry at current and constant prices	Supply and use worksheets Other BOP transactions (income transfers, capital and financial) Government finance statistics (GFS), transactions accounts	
Phase 2. Gross national income and other primary indicators	External account of primary incomes and current transfers Capital and financial accounts for the rest of the world	Capital stock statistics	Quarterly national accounts
Phase 3. Institutional sector accounts: first steps	Production accounts for all institutional sectors Generation of income, allocation of primary income, secondary distribution of income, use of income, capital and financial accounts for general government	BOP stock statistics International Investment Position (IIP) GFS stock statistics	Regional accounts Satellite accounts for environment and other country priority satellite accounts
Phase 4. Institutional sector accounts: intermediate steps	Generation of income, allocation of primary income, secondary distribution of income, use of income, capital accounts for all institutional sectors other than general government	Monetary and other financial flow accounts	Input-output analysis
Phase 5. Institutional sector accounts: last of the transaction accounts	Financial accounts for all institutional sectors other than general government		
Phase 6. Other flows accounts and balance sheets	Other changes in assets accounts for all institutional sectors Balance sheets		

Table 0.3 Production-expenditure-income approaches to national accounts compilation

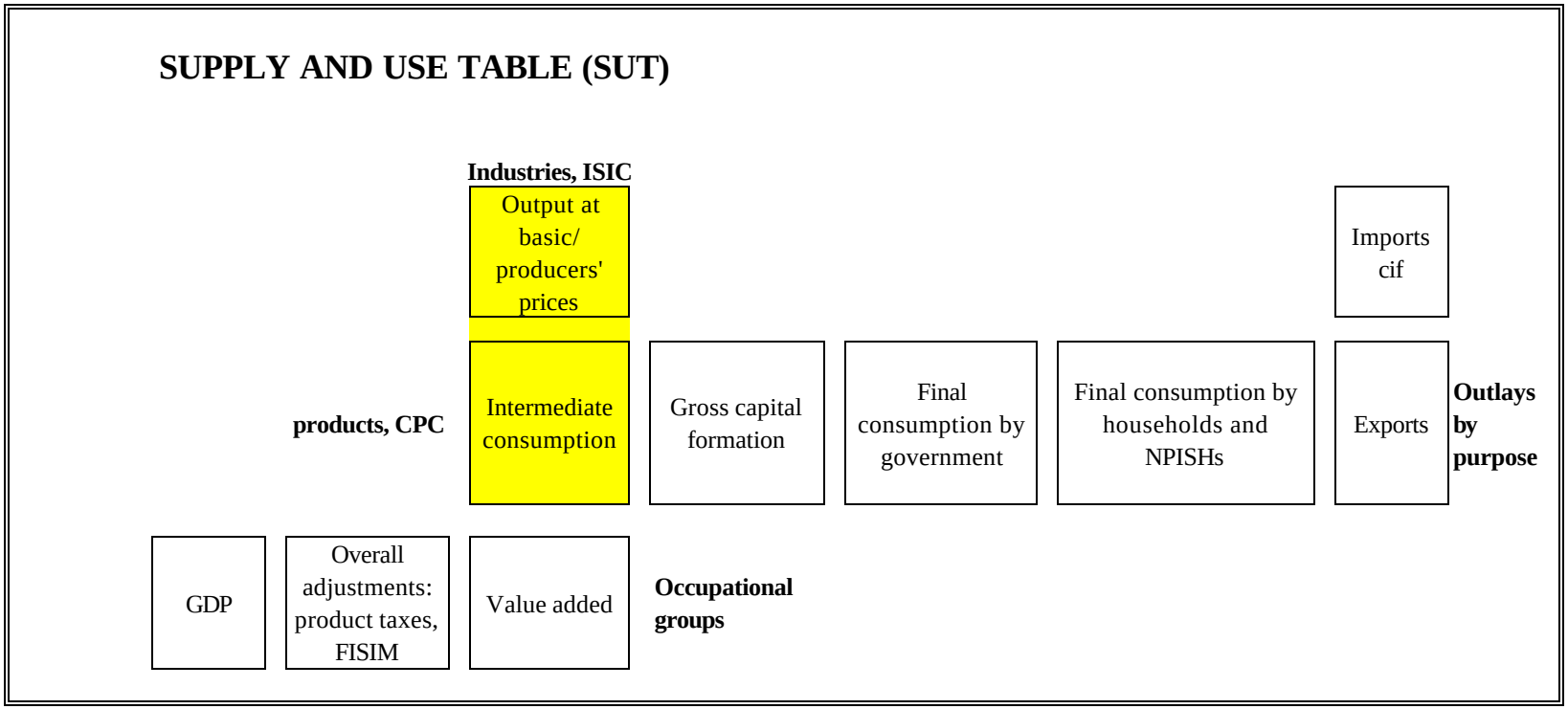


Table 0.4 Commodity flow approaches to national accounts compilation

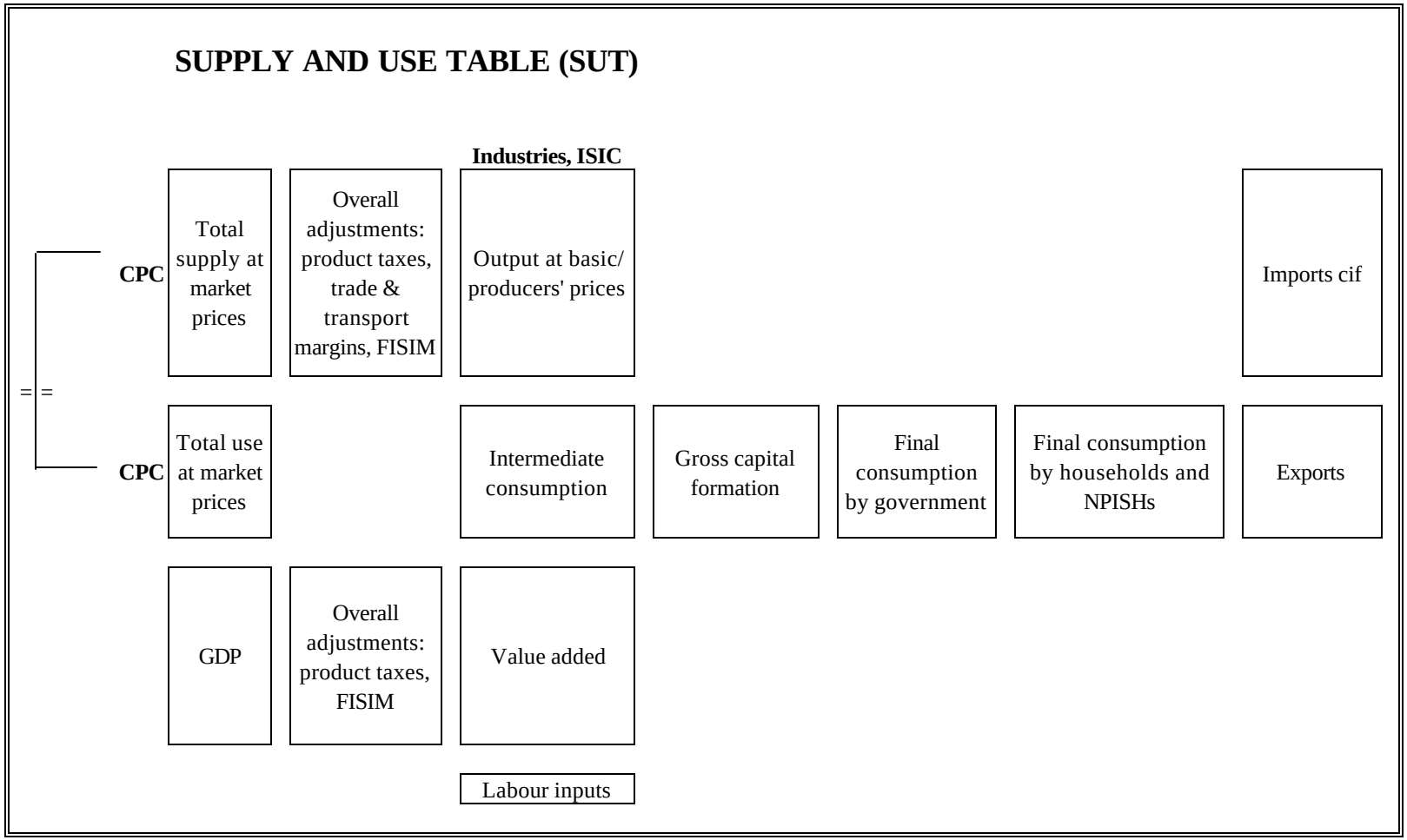


Table 0.5 Integrated approaches to national accounts compilation

SUPPLY AND USE TABLE (SUT)

			Industries, ISIC				
CPC	Total supply at market prices	Overall adjustments: product taxes, trade & transport margins, FISIM	Output at basic/ producers' prices				Imports cif
CPC	Total use at market prices		Intermediate consumption	Gross capital formation	Final consumption by government	Final consumption by households and NPISHs	Exports
	GDP	Overall adjustments: product taxes, FISIM	Value added				
			Labour inputs				

CROSS-CLASSIFICATION BY INDUSTRIES AND SECTORS (CCIS)

	Total economy	Non-financial corporations	Financial corporations	General government	Households & NPISHs
ISIC		Operating surplus			

INTEGRATED ECONOMIC ACCOUNTS (IEA)

Total economy	Non-financial corporations	Financial corporations	General government	Households & NPISHs	Rest of the World
Allocation of primary income account Operating surplus National Income	*Allocation of primary income account* Operating surplus Balance of primary income				*External account of primary incomes and current transfers*
Secondary distribution of income account National disposable income	*Secondary distribution of income account* Disposable income				
Use of disposable income account National saving	*Use of disposable income account* Saving				Current external balance
Capital account Changes in net worth due to saving and capital transfers Net lending	*Capital account* Changes in net worth due to saving and capital transfers Net lending				*External capital account* Changes in external net worth due to saving and capital transfers Net lending to abroad
Financial account Net lending	*Financial account* Net lending				*External financial account* Net lending to abroad

I. THE COMPILATION APPROACH

61. In section C of the Introduction, the different compilation practices used so far in countries were presented. Chapter I presents the compilation approach, as developed by UNSD. It is explained on the basis of the comprehensive accounting framework of the 1993 SNA (as illustrated in table 0.1), although it is equally applicable to more reduced (or extended) accounting frameworks, as is explained in chapter II.

62. The compilation approach is explained, with the help of tables and diagrams that are closely related to table 0.1. First, some general features of the approach are discussed in section A below, followed in section B by a detailed presentation of the tables and worksheets that constitute the compilation framework which is the heart of the compilation approach, and in section C by a description of the compilation procedures that define the use of the approach for compiling national accounts in practice.

A. General features

63. Before explaining the details of the approach, three of its important general features should be highlighted. The first one is its emphasis on compiling intermediate (meso) data on the basis of integrated accounts for groups of micro units, i.e. industry accounts for groups of establishment units and institutional sector accounts for groups of institutional units. In this context the development of institutional sector accounts in addition to the industry accounts compiled by most countries until now is recommended in subsection 1; in subsection 2 it is explained that the compilation of industry and sector accounts should be clearly separated in the compilation procedure from the reconciliation of data across sectors and industries; and in subsection 3 attention is given to the use of computers not only in processing data but also in the more typical national accounts activity of reconciling data.

1. Integrated development of institutional sector and industry accounts

64. Table 0.1 has shown that the SNA includes accounts for two groups of units or economic agents: (a) industry accounts for groups of establishments, and (b) sector accounts for enterprises and other institutional units. The first type of accounts describes the technologies of the economy, whereas the second type describes the behaviour of different groups of economic agents reflected in transactions related to incomes, expenditures and financial transactions.

65. The present report emphasizes an integrated approach to the development of data on economic agents, i.e. establishments and institutional units. The most comprehensive unit of the two is the institutional unit, of which the establishments are subdivisions. The comprehensive institutional unit is used for compiling data on all current and capital transactions, flows and stocks of the unit, while the more refined unit of the establishment is utilized to compile, in more detail, selected data related to production, including data on output, intermediate cost and value added, and - if feasible - also data on gross fixed capital formation, stocks and changes in stocks of produced and non-produced assets.

66. The integrated approach under ideal circumstances would be based on compiling institutional unit and establishment data from the same micro unit. Under such circumstances aggregated institutional sector data with industry breakdowns for production-related information would be available. In practice, however, such an integrated data set cannot be easily derived from basic statistics, as the compilation of data is not integrated in this sense: A variety of surveys are used to compile different data from the same unit. The systems approach, nevertheless, attempts to come as close as possible to the ideal situation by "constructing" an integrated data set through the merger of different data sources.

67. In the past, the emphasis in national accounts has widely been on the compilation of industry accounts and input/output tables. The compilation approach presented in this report introduces a more balanced approach, in which the institutional sector accounts of the SNA are more fully developed and integrated with the industry and production accounts. As the information for the different institutional sectors and industries comes from a variety of specialized statistics, the national accounts, thus, will become a more fully developed coordinating system for economic statistics, which allows for interrelated analyses of such diverse economic phenomena as production, income distribution, finance and external debt, government deficits and external deficits, inflation, money supply, etc.

68. Adding the institutional sector dimensions to the national accounts is also becoming more important given, the increasing interest in meso - as distinct from macro - analyses of the behaviour of groups of economic agents. This is considered to be particularly helpful in the context of policy analysis, as sector data permit to identify the economic impact of actions of one sector on one or more other sectors of the economy. For instance, if time series of institutional sector accounts are available, it is possible to measure the impact of production, employment and investment actions taken by the corporate sector on tax and other revenues of the government sector, or, vice versa, to identify the implications of government policies on the profitability of corporate and household production activities, etc.

69. One advantage of the emphasis on institutional sector accounts is that certain data sets, in their original format, are available in an integrated manner for individual transactors and therefore for groups of transactors (= sectors): The best examples are corporate business accounts, government accounts, and accounts of banks and insurance companies. Emphasis on the sectoral integration of the accounts follows naturally the recording of information by micro units. Furthermore, with the development of sector accounts, it becomes easier to integrate specialized statistics such as balance of payments (BOP) and government finance statistics (GFS), monetary and financial statistics[13], etc. into the national accounts compilation process. As mentioned before the harmonization of national accounts with other economic statistics was one of the declared objectives of 1993 SNA; in practice, use of these intermediate specialized statistics is still very limited, with the exception of the BOP. This situation is partly due to organizational obstacles, as the specialized data sets are developed in government institutions and by specialists that are different from those that compile the national accounts. However, in the few countries where the compilation of GFS and monetary and banking statistics (MBS) data are directly coordinated with the national accounts compilation, the experiences obtained with such coordination have been very favourable.

70. The reconciliation of the specialized statistics with national accounts has several advantages. First, it is useful for analytical purposes, because it enables the analysts to use the variables of national accounts together with variables of specialized statistics in economic models and other types of analysis, without having to adjust the data before using them together. Second, it improves the reliability of data. If a large number of specialized statistics are integrated into the national accounts compilation process, more consistency checks are generated, resulting in more accuracy of national accounts data. In turn, this may also improve the accuracy of specialized statistics, in particular statistics such as BOP and financial statistics, which rely on data covering transactions of a large number of economic agents, the counterparts of which are all included in the national accounts. Third, this orientation has also budgetary advantages; it makes it possible to define more clearly the flows of information between different types of compilation. Results of sectoral studies can be used for the improvement of national accounts and vice versa; this will lead to an optimization of the use of human resources in the area of statistics.

2. Three stages in the compilation of national accounts

71. A further characteristic of the proposed reorientation is that a clear distinction is made in the compilation between the following three stages:

(a) The editing and aggregation of micro data to intermediate meso data for sectors and industries;

(b) The conversion of intermediate sector and industry data to the format of the SNA;

(c) The final stage of reconciling industry and sector data to arrive at an internally consistent data set for the total economy, industries and sectors.

The three stages are represented in table I.1 below, which amplifies a part of the diagram presented in section A of the Introduction.

72. The compilation process starts with assembling micro data from industry and sectoral sources (agricultural and industrial censuses and surveys, household surveys, local, state and central government budgets, financial statements or profit and loss accounts of private and public enterprises, banks, insurance companies, etc.). The micro data obtained from census and survey questionnaires and those based on administrative records of enterprises and government may have to be edited in order to eliminate internal inconsistencies, before being aggregated to intermediate meso data that can be used as point of departure for the national accounts compilation. The collection, editing and aggregation is represented in lower part of table I.1.

73. Examples of the intermediate meso data after editing and aggregation are represented in the second "box" from the bottom in table I.1. The editing and aggregation to the meso level is not always done by the unit compiling the national accounts. Other parts of the statistical agency may do, for instance, the editing and aggregation of agricultural, industry and household data obtained from surveys and censuses, and thus the national accounts department starts with data at the intermediate meso level of aggregation. Also, data may have been aggregated by other

agencies; for instance a central bank generally will have compiled the balance of payments as well as consolidated accounts for the financial sector. Government authorities such as the Ministry of Finance may already have compiled consolidated data for the government sector, based, for instance, on GFS standards, and may also have compiled consolidated accounts for public enterprises. Similarly, countries may have quasi-public authorities supervising non-financial corporations and they may have compiled consolidated financial statements for the enterprises they supervise; alternatively, tax authorities may be in a position to consolidate their data on non-financial enterprises obtained as a by-product of their tax submission procedures. Thus, some of the intermediate meso data mentioned in the second box from the bottom may be compiled directly by the national accounts department, while others have been elaborated by other units of the same statistical agency or even by other government and quasi-government agencies, depending on the institutional organization of statistical activities in a given country.

74. The industry and sector attributes are present in each of the intermediate data sources presented in table I.1 The list reflects the database of national accounts in many country practices, even though in most practices not all are utilized to the fullest extent in compiling the SNA. Some of these data sources present data only by establishment (e.g. economic surveys and censuses), some by institutional units (e.g. household surveys and financial statements by corporations) and others may include information on both (e.g. financial statements of large private and public corporations which may also provide establishment information, and some economic censuses which may also identify the enterprise to which the establishments belong).

75. The next step is the conversion of the data to the national accounts format, and their preliminary integration in an intermediate data set by sectors and industries. The two main difficulties related to this step are the following: (a) As the basic data are often collected by different statistical agents and for varying analytical purposes, their format (coverage, classifications, concepts used, etc.) and the underlying compilation methods and rules are quite different; and (b) the intermediate data set does not reflect many of the imputations and other special features of the national accounts such as the measurement and treatment in supply and use of financial intermediation, insurance and pension services, or the attributions of payments to other sectors (e.g. current transfers in kind paid for by the government but attributed to households, or social insurance contributions paid for by employers but included in the SNA as part of compensation of employees). Thus, conversion to the SNA format includes the definition of links between micro data and national accounts concepts, as well as further adjustments.

76. After the conversion from the basic data to the SNA format has been accomplished, the reconciliation stage represented in the top part of table I.1 follows. This integration and reconciliation may include several steps. The first needed step is to integrate or reconcile the data within the sector accounts, if different data sources are used for different accounts of a sector; for instance, if financial and balance sheet data were used to compile the financial accounts and balance sheets of, for example, the public non-financial and financial corporations and establishment, and other data sources were used to compile the production accounts through the capital accounts, the two data sets would have to be integrated and reconciled at the level of net lending. A further step is to integrate and reconcile industry data with the corresponding sector data; this is a very essential step, as, generally, separate data sources on establishments are used to compile industry accounts and enterprise and financial statements of corporations, household surveys and other institutional unit based data sources are utilized to compile the sector accounts.

A final step is to integrate and reconcile data between industries and between sectors, which consist respectively of balancing products between supply and use, and of transactions, other flows and stocks between uses and resources and assets and liabilities. Two agents for the same economic transaction may, for example, have recorded a transaction at different times (cash versus accrual basis) or even at different prices (imports c.i.f. versus exports f.o.b., producers' versus purchasers' prices, etc.). Furthermore, certain data may not be available from the basic sources at all, or only in the form of a very rough estimate. The reconciliation phase is designed to produce a consistent set of economic data in conformity with the standards of the SNA.

77. In principle, the compilation approach discussed in this report touches on all three stages of the data and national accounts compilation described above. However, the compilation framework that is described in section B of this chapter focuses mainly on the last two stages, i.e. the stages of converting intermediate data to the national accounts format and of reconciling national accounts data across industry and sector accounts. Nonetheless, it is important to make a distinction between all three stages in order to delineate clearly the scope and orientation of the compilation approach.

78. The distinction between what is micro data collection and processing and at what point starts the conversion of the aggregated micro (i.e. intermediate) data to the national accounts format, determines the extent to which the consequences of data adjustments taking place in the national accounts compilation would be worked through in adjustments of the micro data. One may take as a principle that data adjustments as a consequence of the national accounts compilation procedure should not be worked through in the data bases that exist prior to the conversion of the data to the national accounts format. This implies that adjustments made as a part of the conversion of intermediate data to the national accounts format and adjustments made in the final reconciliation are not worked through in the detail of the micro data prior to conversion. Whatever the exact distinction, national accounts compilation, generally, will not deal with basic micro data. Therefore, in this report reference will generally be made to intermediate or meso data rather than to micro data.

79. The exact dividing line between "micro data editing and aggregation" and the "national accounts data conversion and reconciliation", that is part of the national accounts compilation dealt with in this report, may differ between countries and would depend on the organization of the statistical apparatus. It is clear that if national accountants use intermediate data sources such as balance of payments, consolidated statements of financial institutions prepared by the monetary authorities and agencies supervising insurance companies and schemes, or consolidated government budget data prepared by the Ministry of Finance, the national accounts compilation stage would start at the point where the consolidated data are received by the national accountants. The same may be valid when national accounts are compiled by a public institution (e.g. the Central Bank) which receives industrial surveys and agricultural data in consolidated format from other government agencies. On the other hand, if the national accounts department is more in control of the micro data collection and processing, the conversion to national accounts format may be applied to a more detailed intermediate data set, and thus the final reconciliation data would have repercussions for intermediate data at a more detailed level of aggregation. Also, in some countries intermediate data sets such as balance of payments or financial statistics are compiled by the same government agency as national accounts and in those circumstances, it is very well possible that even some stages of the compilation of the BOP

or financial statistics prior to their final internal reconciliation could be integrated with the national accounts data compilation. As a consequence the national accounts and the balance of payments are reconciled at a more detailed level.

80. The distinction between the second and third stages, i.e. between the compilation of intermediate industry and sector accounts and the final reconciliation, is an important and distinctive feature of the compilation approach presented here. In its pure form the second stage should focus entirely on the compilation of integrated industry and sector accounts. No data reconciliation should take place at this stage, not even between industry and sector data. The aim of this stage of the compilation is to obtain data from a maximum number of independent sources of information, so that the final reconciliation would take into account a maximum number of data checks and, thus, produce an optimal reliability of the final national accounts estimates. If data regarding some of the industry or sector accounts of the system are not available from basic data sources, it may still be possible to make preliminary crude estimates which reflect the underlying economic structure of the industry or the sector.

81. As is explained in the next sections of this chapter, the last stage of the reconciliation would start with an explicit set of statistical discrepancies between estimates of industry and sector accounts data based on independent data sources. It is the objective of the last stage to eliminate these statistical discrepancies through appropriate adjustments of the data.

82. From the general description of features of the compilation approach above, it is clear, that the compilation framework is not primarily an "analytical and conceptual accounting framework" in which accounts are structured, concepts are defined and classifications of transactor and transactions are elaborated. This is the aim of the presentation of the 1993 SNA. The emphasis in the present report is on a "compilation framework for statistical processing" in which basic and intermediate data can be incorporated, processed and reconciled. The compilation therefore may include industry and sector classifications and other breakdowns that do not form part of the conceptual construct of the SNA, but are needed in order to compile in practice the analytical measures that define the SNA. The ultimate aim of the compilation framework is to arrive at a set of national accounts measures that are internally consistent at the level of detail reflected in the framework. This will serve then as a data bank, from which more aggregate national accounts tabulations for analysis and publication can be derived.

3. The use of computers in the national accounts compilation

83. In recent years, a marked increase in the extended use of computers for national accounting has been seen in many countries; in particular micro computers and system networks, which make it possible now not only to store, but also to process a large amount of data very quickly are increasingly being used. National accounts, with its complex and manifold data inputs, are a typical example where computers can be used in an efficient manner. Presently the use of computers is, however, limited to (a) basic data aggregation and manipulation, and (b) to the re-arrangements of final national accounts data after reconciliation, for purposes of alternative presentations and/or publication of the data.

84. It is argued in this subsection that the use of computers can be extended beyond the areas mentioned in the preceding paragraph. For instance, some of the "conversion" tasks of national accountants are fairly standard and repetitive each year. Once the correspondence between a specialized data system (such as BOP) and the national accounts has been established in form of a bridge table, the preliminary conversion of the specialized data to national accounts format can be entrusted to the computer. Also in the stage of data reconciliation, the computer can play a more important role: It can provide national accountants with a comprehensive overview of all statistical discrepancies between data obtained from different independent sources and, thus, provide them with all the information necessary to make the decisions about data adjustments in order to eliminate statistical discrepancies during the reconciliation process. Once national accountants have taken a decision to adjust one or more particular data items, the computer provides them, in a quick and comprehensive manner, with the changes in all aggregates and calculates the new statistical discrepancies. It is essential to note that it is not proposed in the compilation approach presented below that the computer be used to make adjustments in an automatic manner.

85. One of the main objectives in developing the compilation approach was to systematize existing methodologies of national accounts compilation and thus facilitate their incorporation in compilation software. It must be emphasized at this point that the compilation approach itself, which was developed by UNSD, is not a ready-to-use national accounts compilation software; however, in order to illustrate its structure and its use, increasingly sophisticated worksheets and tables have been designed in electronic format using various spreadsheet software (such as LOTUS, QUATRO PRO or EXCEL). These individual worksheets and tables are connected via an extensive network of formulas, reflecting the data flow and national accounts definitions and identities. In order to facilitate the use of the worksheets and tables in practice, for selected country projects an underlying programme structure has been created, using macro-programming, which facilitates the operation of the table system, by allowing, for instance, easy passage from selected worksheets to final tables and vice-versa.

86. Although the compilation approach constitutes the logical nucleus of a compilation software based on the 1993 SNA, it has never been fully developed. However, work on the compilation approach has permitted UNSD to formulate criteria of what a national accounts software based on the 1993 SNA should be able to accomplish:

(a) Store intermediate data related to groups of economic agents, i.e. industries and sectors in electronic worksheets in their original format;

(b) Use the worksheets to convert the intermediate data obtained from different sources (censuses, surveys, administrative data sources, and intermediate statistical data sets such as BOP and GFS data) from their specific format to the format of the national accounts and record all adjustments made to the data, creating, thus, a complete compilation history;

(c) After conversion to the national accounts format, calculate appropriate national accounts aggregates. Faithful to the principle of the industry and sector orientation, the information for the total economy should be obtained only through aggregation of the resident sectors and industries;

(d) Check the data compatibility across industries and sectors by identifying statistical discrepancies in a central SNA framework with the help of built-in national accounts identities;

(e) Provide helpful tools for the process of the final data reconciliation, e.g. by including data links between worksheets and the central framework tables, so that the impact of adjustments to the data in the worksheets is reflected immediately in the central SNA tables, where remaining statistical discrepancies can be checked;

(f) Generate working tables, which are helpful during the reconciliation process, e.g. transaction matrices in which for each transaction, other flow or stock, the resources and the uses (or assets and liabilities) of different sectors are confronted (see sect. B.4.a below).

87. A number of software approaches are being developed at present. The first one is the ERE-TES (*Equilibres ressources emplois, Tableaux entrées-sorties*) database software developed by a French consultancy firm at the University of Lyon, in cooperation with the *Institut national de la statistique et des études économiques* (INSEE) and Eurostat. A second one is IAS (Integrated Accounts System) software developed by a group associated with the Institute of Social Studies (ISS) in The Netherlands. And a third type of software, known as SNAPC (System of National Accounts on a Personal Computer) is the product of Statistics Sweden. All three approaches have been used in technical cooperation projects: ERE-TES has been applied in French-speaking countries in Africa, IAS in Aruba and the Netherlands Antilles, and an earlier version of the software was used in Pakistan, and SNAPC is being used in a number of Swedish projects in countries in Southern Africa. Furthermore, similar computer applications are being developed, as more and more countries make increasingly use of further sophistication built into general purpose software.

88. The INSEE and ISS database approaches include three elements: (a) the use of database software (SYBASE, ORACLE and PROGRESS), (b) selection of SNA and compilation attributes (transaction categories, sector and industry categories, identification of current or constant prices, data source, etc.), and (c) worksheets and tables within which data conversion and reconciliation takes place. The selection of the attributes and the design of the tables determine the approach to national accounts compilation. Both differ between the ERE-TES and the IAS systems. The UNSD approach, which is mainly concerned with the design of worksheets and tables, could be combined in principle with the more sophisticated database approaches of ERE-TES and IAS. The approach developed by Statistics Sweden uses EXCEL software and, in that sense, is closer to the UNSD approach. A main difference between the UNSD approach and the three software cited above, is that none of the latter include explicit links between intermediate data and the national accounts format[14].

89. For any kind of national accounts compilation software, the problem of adaptation to country specific circumstances and as well as of adaptations over time persists. There is usually an installation phase during which the general format is fitted to the national circumstances. During this period, programming expertise is needed. It is, however, desirable thereafter that all the standard functions - such as introducing data, aggregating data and generating analysis tables

for the reconciliation process - may be easily performed by the users after a short instruction period, even without knowledge of the underlying programming structure.

B. Compilation framework

90. In this section, a closer look is taken at the detailed elements of the compilation framework. It is based on the comprehensive SNA framework presented in table 0.1 above. It should be emphasized at this point again, that this is by no means to be considered as the only compilation framework. As a matter of fact, chapter II presents examples of how the accounting framework as a whole may differ between countries in its design in response to different analytical and policy needs and taking into account differences in the statistical base. Also, annex I to this report, which presents various examples of country practices based on the present approach, clearly highlights the differences between the accounting frameworks applied. The compilation approach and its framework are conceived so as to allow for a maximum degree of flexibility: In this sense, the elements introduced in the following sections and subsections should be considered as "illustrative building blocks", the importance and contents of which need to be defined and/or adapted individually for every country.

1. Overall schematic presentation

91. The compilation framework presented here consists of the following three elements which are graphically illustrated in table I.2:

(a) The worksheets for industries and sectors (left hand side of table I.2). Separate worksheets for each industry and sector are distinguished in the framework. The main purpose of these worksheets is to generate industry and sector accounts in SNA format that can be incorporated in the appropriate column of the SUT or IEA respectively. Therefore, in every industry and sector worksheet intermediate data relating to the industry and sector at hand are accommodated, and the conversion to SNA format is performed. The worksheets will also include adjustment columns, in which data corrections made in the conversion process or in the subsequent reconciliation process can be recorded;

(b) The central framework contains the SNA tables, which will be the final product of the entire compilation process. These SNA tables define the accounting framework that is being used. They include the three main components of the economic core of the SNA, i.e. the Supply and Use Table (SUT), the Integrated Economic Accounts (IEA) and the Cross-Classification by Industries and Sectors (CCIS) for common data related to production that are included both in the SUT and IEA. As the SNA tables are used to integrate and reconcile the data, this part of the compilation framework also makes explicit "statistical discrepancies" between the data at different stages of the compilation;

(c) Transaction matrices and product balances are instruments to facilitate reconciliation. They confront the information of the paying (creditor) sector with the information of the receiving (debtor) sector for a given transaction or the

value of the total supply and the total use for a given product, respectively. Once all the data have been introduced into the system and aggregated into the central framework, transaction matrices and product balances can be generated to verify the equilibrium for selected transactions and products.

92. A somewhat invisible element of the framework is the underlying "data flow structure", which is indicated in table I.2 by arrows; they show that the central framework receives its information from the worksheets. Transaction matrices and product balances derive their inputs from the IEA and the SUT of the central framework respectively. After reconciliation of the inter-sectoral data has taken place in the transaction matrices or after the equilibrium between products supplied and used has been established, an adjustment to the original data in the sector and industry worksheets is made. This in turn generates a new flow of information to the central SNA tables. The overall process of adjustment and review may involve various stages of iteration until all statistical discrepancies have been eliminated.

93. Mechanically, these data flows are either organized via a network of inter-table formulas or through programme elements. Solid arrow lines from the worksheets to the central tables and from there to the transactions matrices (product balances, respectively) indicate thereby that these links may be computerized, i.e. should be automatic. However, the link from the transaction matrices and the product balances back to the worksheets (broken line arrows) should be under the control of the compiler, as they constitute decisions on adjustments to the data.

94. In the following three subsections the basic elements of the compilation framework are elaborated in detail. Subsection 2 examines the sector and industry worksheets and discusses their structure and function. In subsection 3 the central framework (right hand side box in table I.2) is presented, where the information for the total economy is calculated and the reconciliation takes place. Finally, in subsection 4 the instruments for reconciliation are explained.

2. Basic worksheets

95. The basic worksheets have three functions: (a) intermediate data systems are entered here, (b) data are converted to SNA format, and (c) adjustments to the meso data, which become necessary during the reconciliation process are recorded here. A variety of formats for the worksheets are of course conceivable and are indeed used in practice. The following two sub-sections discuss and present a general format for sector and industry worksheets, which can fulfill the three functions mentioned above. The illustrative tables (tables I.3 and I.4) contain data that are derived from and are therefore compatible with the data set included in the 1993 SNA publication.

a. Sectoral worksheets

96. The system includes one sectoral worksheet for each institutional sector (domestic and rest of the world) or sub-sector distinguished in the central framework as the purpose of each worksheet - using the "systems language" - is to generate one sector column of the IEA. An example of how a sectoral worksheet may look like for the non-financial corporate sector is presented in table I.3. It illustrates the general format of such worksheet including some

fictitious data on consolidated financial statements of enterprises, which lead, however, to the exact numerical example used in the 1993 SNA for the non-financial corporate sector.

97. The institutional sector worksheet starts on the left hand side with a pre-aggregated grouping of micro data for the sector, in a classification which is determined by the sources of these micro data. In the example chosen for the presentation of table I.3 the meso data structure is derived from business accounting: the profit and loss statement of enterprises, the balance sheets, and supplementary data on net equity and other elements of the financial statements. The profit and loss statement refers to one period only (year n) and the balance sheets include data for present and previous accounting periods (years n and n-1). In the data conversion to SNA format on the right hand side of the table, most of the financial statement data presented are utilized. The "bridge" used in the conversion is not explicitly presented, but can be derived from the data included. The conversion of the profit and loss data is the easiest, i.e. each data category of the financial statement on the left hand side of the table is allocated to one SNA category. The balance sheet items are used in compiling the opening and closing balance sheet data of the SNA. The difference between the balance sheet data of consecutive years are used to arrive at a first approximation of the value of the transaction categories in the capital and financial accounts. Both calculations are illustrated in the textbox (Note on illustrative examples of the deviation of national accounts categories from NFC data) included in table I.3. At this stage of the compilation, generally no estimates are made for other changes in assets, covering other volume changes and revaluations, except if explicit items are available. In general, items of these accounts are estimated with help of adjustments incorporated later on. The links between business accounts and national accounts are elaborated further in a UNSD handbook on this topic[15].

98. A similar conversion would be applied to other sectors. Thus, government records are used in the conversion to government sector accounts, household survey data may be used to derive household sector accounts, etc. In some instances more than one data source is used to compile the sector accounts. For example, government budgetary records may be used to compile the accounts up to and including the capital account, while other government data on debts incurred and financial assets acquired is used to derive the financial accounts and also the financial components of the balance sheets. In the case of the household sector, no direct information on production by household production units may be available from household surveys. In that case, only revenue and expenditure data are available to compile the income generation and distribution accounts. The external sector data would be mainly derived from BOP data, and they would need to be integrated with data on merchandise imports and exports from customs statistics.

99. For the elaboration of the worksheets it has been assumed that the micro information has been aggregated to a meso level: In principle of course, the accounts and tables of each micro transactor unit (enterprise, household, local government, etc.) could be handled separately. However, clearly, this would render the compilation unnecessarily complex and inflexible, and, as was stated before, final reconciliation of data at this detailed micro level is impossible and therefore not recommended in this report.

100. The decision on which level of pre-aggregation should be chosen for a certain sector, ought to be guided by practical considerations: First, certain intermediate formats (such as BOP

and GFS) may be easily and regularly available. Second, as the level at which reconciliation shall take place is already determined by the format of the central framework, a criterion for pre-aggregation is to present sector information in such a way that it is helpful for the reconciliation phase. Initial editing, i.e. purification, verification and aggregation of micro data, which do not play a role in the further reconciliation process should, therefore, not be considered here.

101. The column on the right hand side of the worksheet presents the SNA classification. It should be emphasized again that, whereas the basic classification may be different for the individual institutional sectors, this SNA classification is identical for all sectors, in order to integrate the data for all sectors in the central framework. In this column the concepts and balancing items of the national accounts such as value added ("output" minus "intermediate consumption") are defined through formulas. Establishing a formula link between the meso data and the SNA concepts may also be possible, provided the micro data are available in the same basic format on an annual basis.

102. An adjustment column to the right hand side of the table is supposed to accommodate adjustments needed at the SNA format level. In general, these adjustments are made during the reconciliation process in the central framework, when data corrections are needed in order to achieve consistency between the data of different sectors. Some adjustments - e.g. adjustments for conceptual refinements required by the SNA, such as imputations - may be made prior to the final reconciliation.

103. In general, adjustments that are a consequence of the inter-sectoral reconciliation process will be made to the data vector after conversion to SNA classification. However, this does by no means imply that these adjustments may not be carried through to the meso data level and thus carried out in the classification of the meso data. In some specific cases, making the adjustment at the meso level may even be more convenient as this is the level with which micro data experts are familiar and communication could take place. This may be convenient, for instance, when the micro data do not cover the entire universe, or if timing adjustments are needed.

104. The last column of the worksheet is the horizontal sum of the SNA data and the adjustment column. These adjusted data in the final SNA format can now be directly transferred to the appropriate sector column in the IEA of the central framework, where they will be merged with similar information of other sectors. The product information that is available in the government, household and NPISH sector worksheets with regard to final consumption and capital formation and in the worksheet of the external sector with regard to exports and imports will be transferred to the corresponding columns of the SUT and used thereafter in the product balances.

b. Industry worksheets

105. Using the analogy of the sector worksheets presented above, a similar process can be conceived for industries, where establishment data are converted to industry accounts. In the practice of the country experiences with this compilation approach, no standard industry worksheets of this type have been developed so far. However, there is a clear parallel with the sector accounts, based on the dual concept of economic agents in the 1993 SNA: Establishments are grouped to industries and institutional units are grouped to sectors. The purpose of the industry worksheets is, thus, to "generate" the industry columns of the SUT to the extent possible

in an independent manner, before submitting the information to the vertical balancing check: This check is derived from the equilibrium condition that total supply equals total use for all product categories.

106. An industry worksheet would thus contain the data on output, intermediate consumption and value added for establishments of a particular industry. For the basic lay-out of such a worksheet, a similar structure as described above in the case of the sector worksheets could be conceivable. First of all, some space is needed to accommodate whatever basic or intermediate information is available for the industry. Furthermore, some columns, in which this information may be adjusted or completed if necessary, need to be included. The standard format to which the data input for the different industries needs to be "converted" is the column format with the specified product detail of the SUT. Finally, some adjustment columns for corrections made in the process of the reconciliation of supply and use of products would need to be part of such a worksheet.

107. For illustrative purposes table I.4 shows a simplified example, where the data of the 1993 SNA have been consolidated into three "industries", corresponding roughly to what is referred to traditionally as primary, secondary and tertiary "sectors" of the economy[16]. The following information has been included for these three industries in the worksheet: In the lower part of the table, are the aggregate data that are available by industries on output, intermediate consumption and value added components. Both output and intermediate consumption are further broken down by products in a supplementary segment of the industry worksheets, which is presented for each industry at the top of the worksheet. Each column of table I.4 represents data that are extracted from one separate worksheet.

108. The presentation of the industry worksheet data in table I.4 suggests some extensions that are not compiled by most countries at present. These include data on employment, capital formation and stock of fixed capital, and space is left open for other extensions, that may be utilized in satellite accounting, such as data on depletion and degradation by industries, which are used in environmental accounting. Also, in the upper part of the worksheets of each industry a classification of gross fixed capital formation by products is included, which is not a basic requirement of the 1993 SNA.

3. The integration of data in the central framework

109. Tables I.5, I.6 and I.7 show how the data generated by the worksheets are integrated into the SUT, CCIS and the IEA, respectively. This subsection takes a closer look at each of these three tables of the central framework, the global context of which was introduced in table I.2. The central framework tables, as presented here closely resemble the elements of table I.1 depicting the overall framework of the 1993 SNA. There is, however, one important difference: As the central framework is the place where the national accounts reconciliation takes place, one of its important elements are the sets of statistical discrepancies, which have been added at some of the margins. They reflect the consistency conditions of national accounts and can be used during the process of reconciliation to determine at any point in time how far the reconciliation process has been advanced. At the end of the reconciliation procedure, all statistical discrepancies should ideally be zero. One can distinguish between various types of statistical

discrepancies, depending, for instance, on whether they relate to discrepancies between data on supply and use of products, discrepancies between industry and sector data, discrepancies between data within the same sector, or discrepancies between data across sectors. The distinction between different types of statistical discrepancies is important as a basis for elaborating a reconciliation strategy, as is discussed below. Examples for the different types of discrepancies are given in section C.3 below, and in annex II.

110. If the central framework is computerized, appropriate links for the data flow from the corresponding worksheets should be included. Great care must be taken to define the internal structure of all the tables in the central framework. The format for the central framework is the model on the basis of which the worksheets and other tables of the compilation framework are designed.

a. Supply and Use Table (SUT)

111. The SUT of table I.5 integrates the data on product flows and value added that were included in the industry and sector worksheets. In the centre of the table are the three columns with industry data derived from the corresponding columns from the industry worksheets (table I.4). These worksheets are also the data source for the columns on gross fixed capital formation (GFCF) and changes in inventories by products. The data in the columns for final consumption of households, government and NPISHs by products are taken from the corresponding sector worksheets, where it is assumed that this kind of detailed information is included. Similarly, export and import data by products are based on the corresponding data detail from the worksheet for the rest of the world.

112. The actual presentation of the SUT, in practice, would include extensive details with regard to activity breakdowns based on ISIC; these are applied to the columns of output, intermediate consumption and value added. For the rows of the supply as well as for the use table, product detail based on the CPC is introduced. The value added rows show a breakdown by cost components.

113. A number of global data are added, which cannot be obtained from the separate worksheets of industries. As the supply section includes information on output in basic or producers' values and imports c.i.f., separate columns for margins of trade, and transport and taxes less subsidies on products have to be included. These adjustments are necessary in order to link the supply information in basic or producers' values to the information in the use table which is valued in purchasers' values, including margins and product taxes. Further global adjustment columns refer to FISIM and to the data column of gross capital formation on valuables.

114. The SUT also includes a separate column on statistical discrepancies between supply and use. As the illustrative data are drawn from the 1993 SNA publication, including the global adjustments, no statistical discrepancies are left in this particular data example. In practice, of course, such situation is unlikely. As the industry and sector worksheet data have been compiled independently, inconsistencies are unavoidable in practice. This would then require adjustments of the data, either in the global adjustment columns inside the SUT or in the underlying product data stemming from the various worksheets.

b. Integrated Economic Accounts (IEA)

115. As mentioned above the accounting structure for the IEA is based on SNA Table 2.8: "Integrated Economic Accounts" (see 1993 SNA, p. 60). The columns of this table correspond to the institutional sectors that have been identified: They include the five sectors of the resident economy (non-financial corporations, financial corporations, etc.) and the "sector" of the rest of the world[17]. A priori, the columns for every sector should include two sub-columns for resources (R) and uses (U) relating to all the transactions that will be identified in the horizontal classification. However, for ease of representation, the data of all transactions for one sector have been consolidated (receivable less payable) and are simply listed in one column. A column for the total economy has been added, which is derived line by line as the horizontal sum of all the resident sectors.

116. With regard to its horizontal structure, the IEA includes comprehensive information covering the production accounts, distribution and use of income, and accumulation accounts as well as the balance sheets for sectors and the total economy. Further specific sub-accounts may be distinguished. Boxes representing the various accounts in table I.6, indicate the name of the account and the main transactions contained therein as well as the balancing item.

117. In its complete version the rows contain further detail regarding the transactions, assets and balancing items. For the corresponding SNA classifications, see 1993 SNA, Annex V, Part I.B-I.D. Special consideration should be given to the transaction detail chosen: As the central framework is the place where the reconciliation takes place, a decision on transaction detail included in the IEA is a decision on which level of detail reconciliation is intended to be achieved. This should be determined by the analytical and policy uses of the national accounts. On the other hand, as all the transaction detail contained in the IEA will have to be generated for each institutional sector, data availability and historically used transaction classifications in a country may, therefore, impose certain restrictions.

118. Boxes containing sets of statistical discrepancies have again been wrapped around the data blocs: On the left hand side of the table, for example, a column indicates statistical discrepancies between sectors. In many instances, uses and resources, or assets and liabilities should balance between the total economy and the rest of the world, so that in the column for the total economy an amount appears that is opposite in sign with the amount presented in the rest of the world. Thus, for instance, total compensation of employees paid by all resident producing sectors minus compensation of employees received by the domestic household sector yields the net compensation of employees paid abroad. This must be equal to the net receipts of the external sector. The same logic applies to property income, and current and capital transfers, as well as to transactions, other flows and stocks of financial assets, which generally should balance between assets and liabilities[18].

119. However, the horizontal balances will of course not be valid in the IEA, as long as the data are inconsistent between the sector worksheet data. This is precisely why the column on statistical discrepancy has been added; the latter are only included in this column for those rows (i.e. flows and stocks), for which identities should hold[19]. Therefore, there are no statistical discrepancies for the product flows (see 1993 SNA, SNA Classification Category P (products),

p. 586) that are included in the goods and services account. The same applies to stocks, including stocks of produced and non-produced assets in the balance sheets and the changes in those stocks, as recorded in the other changes in assets accounts. Also, there are no statistical discrepancies for balancing items, such as value added, disposable income, saving, etc. Finally, no statistical discrepancies have been included for financial assets and liabilities, as the detail presented does not allow for separate identification of SDRs and monetary gold for which there are no liabilities.

120. Table I.6 includes, in addition to the column on "between sectors" statistical discrepancies, three other types of discrepancies, which are presented at the bottom of the table. The first type are vertical "within sector" statistical discrepancies, which refer to inconsistencies between net lending estimated as a balancing item in the capital account and the same estimated as balancing item in the financial account. A second type is a statistical discrepancy between the changes in the balance sheet and the total of changes that are recorded in the capital, financial and other changes in assets accounts[20]. A third type of statistical discrepancy included in the IEA refers to differences between the values of items in the IEA and the SUT; these include statistical discrepancies for exports, imports, final consumption and capital formation, all of which might be compiled on the basis of different data sources in the IEA and the SUT. In the table, all three groups of statistical discrepancies are different from zero, which is an indication of inconsistencies in the data base of the industry and sector worksheets. They will be further examined in section C.3 below, where the use of the compilation framework in reconciling data is illustrated.

c. Cross-Classification of Industry and Sector Data (CCIS)

121. The central information for the SUT are the industry accounts based on establishments as units of production, whereas the data of the institutional sector accounts refer to the institutional units. The two data sub-systems show different breakdowns of the same national aggregates, i.e. output, intermediate consumption, value added and its components. Without the CCIS, the only link between the aggregates based on the industry accounts of the SUT and the sector accounts of the IEA is that the common elements should be equal for the total economy. This type of weak link was implicit in the dual sectoring of the 1968 SNA.

122. The cross-classification of industry and sector data newly introduced in the 1993 SNA greatly improves the possibilities of integration of industry and sector data. The purpose of table I.6 is to intensify the link between the establishment and the enterprise type data. In practice, it amounts to introducing the institutional sector dimension into the SUT. This implies, for instance, that it will be necessary to distinguish for the agricultural production activities between those that have been performed by a non-financial corporate enterprise (non-financial corporate sector) and enterprise units that are included in the household sector.

123. In addition to the elements of the production account and the generation of income account, the elements of the asset accounts (capital formation, consumption of fixed capital, capital stocks) may be cross-classified. Furthermore, for the sake of completeness and for compilation purposes, the CCIS may also include the remaining elements of the "goods and services" account, which are common to the SUT and the IEA, i.e. exports/imports and final consumption. There is, of course, no industry breakdown for these items, although it is

noteworthy that the SUT indicates their institutional dimension of, i.e exports and imports are transactions of the "rest of the world" sector exclusively. Final consumption is broken down in the SNA, by government, households and NPIs serving households.

124. Table I.7 presents a simplified version of the corresponding SNA table (see 1993 SNA, Table 15.3: "Cross classification of production account items by industries and institutional sectors", p. 358). It cross-classifies output, intermediate consumption and value added by economic activities and institutional sectors. Table I.7 is based on a tentative allocation of the industry worksheet data of table I.4 to the same institutional sector grouping as is used in the IAE (table I.6). The industry totals in the row before the last grouping are directly derived from the production accounts data of the three industry worksheets data of table I.4 and, therefore, are consistent with the corresponding data in the SUT of table I.5. Similarly, the sector totals in the column before the last one are based on the production accounts data of the IEA (table I.6).

125. The initial allocation of the sector totals in the rows of table I.7 is based on an assumed allocation of industry worksheet data to individual cells of the table corresponding to sector rows; thus, the column total of agriculture, etc. has been initially allocated to the household sector, and the row total of manufacturing, mining, construction, etc. has been allocated to the non-financial corporations sector (NFC). For the services, the allocation has been based on the sector data as follows: government sector data have been entirely allocated to services, etc., and the same applies to the financial corporations (FC) sector data. Production, intermediate consumption and value added data related to the services of owner-occupied dwellings have been allocated to the household sector. All other production data of the services column have been included in the cell corresponding to the row of non-financial corporations.

126. As a result of this initial allocation of production data on industries to sectors, statistical discrepancies will be observed in the last column of table I.7 between the sector totals in the column before the last one - corresponding to IEA data in table I.6 - and the totals of the individual elements in each row. These are identified as the statistical discrepancies between CCIS-IEA. The other statistical type of statistical discrepancies recorded in table I.7 is between the cell data of each column and the industry total in the row before the last one, which are the same as those in the SUT of table I.5. These statistical discrepancies of CCIS-SUT are not present in the illustrative database used.

127. From the above, it is apparent that the CCIS acts as a kind of buffer between the SUT and the IEA. The detailed design of the CCIS depends crucially on how the compiler wants to define the link between these two data systems. The intensity of the link can be expressed in two ways: (a) by the number of items of the production and generation of income account that are cross-classified, and (b) by the level of industry or sector detail that is put on the margins of the CCIS.

128. With regard to the number of cross-classified items, the SUT and IEA may be linked for all possible items of the production accounts of industries (i.e. output, intermediate consumption, value added components) as suggested in the 1993 SNA, or the industry-sector link may be extended to gross capital formation and even other items of the asset accounts. The link may also be less comprehensive and only include value added and its components, total value added only, or operating surplus only. These considerations determine how many items will actually be cross-classified. It is, however, strongly recommended to expand the cross-classification to

include output and intermediate consumption as this would bring the institutional dimension into the application of the industry accounts and, thus, into the commodity flow confrontation between supply and use of products.

129. With regard to the industry detail, the most comprehensive links may require that, for each activity, the institutional dimension be identified. This implies full integration of the SUT and the IEA at the most detailed industry level of aggregation used in the SUT, and the most detailed sector level of aggregation used in the IEA. This undertaking may, however, be very difficult for many countries and, consequently, a lower degree of integration will have to be chosen. For instance, if the SUT used ISIC at the two- or three-digit level of detail, the link with the IEA - through the CCIS - may be established only at the one-digit level. Similarly, if the IEA had a very detailed breakdown by sectors and sub-sectors, the link with the SUT included in the CCIS may only be done at the level of the five main sectors of the SNA. Some countries may not be able to identify NPIs and, in that case, the link on the sector side would include households and NPIs in one sector. Even further aggregations of sectors in the CCIS may be considered; for instance, the industry-sector link may only be established for the government, the financial corporate and a select part of the non-financial corporate sector (e. g. enterprises which are registered at the stock exchange or all public enterprises), while the remaining link is only defined for the remaining part of the non-financial private corporations and the household sector together.

130. Summarizing the presentation above, the extent to which the institutional dimension is introduced into the total SUT will depend on the ability to identify the sectoral origins of the economic activities accurately. If at the present state this link can not yet be fully established one of the less integrated versions of the compilation approach will have to be applied. For the long run, however, the compilation of basic statistics should be reoriented in order to provide the necessary inputs for a more fully integrated system.

4. Instruments to facilitate reconciliation

131. Once all the information has been incorporated into the system, the analysis of the statistical discrepancies can begin. In this context two important instruments for the reconciliation have been developed, i.e. transaction matrices and product balances; they are presented together in this subsection, as they have a number of common characteristics. They serve to analyse individual discrepancies of the central framework; they extract all data from the framework in a manner that is helpful to analyse the problem at hand; and, if necessary, they can accommodate additional outside information.

a. Transaction matrices

132. Transaction matrices are an instrument of reconciliation at the level of the individual transactions in the IEA[21]. They may be constructed for the transactions contained in the distribution of income accounts, for purchases/sales of non-produced assets, for the financial instruments in the financial account and for the stocks of financial assets and liabilities contained in the balance sheets. They are used when payments and receipts (or acquisition of assets and incurrence of liabilities, or stocks of financial assets and liabilities) are not equal at the level of the total economy combined with the rest of the world. These matrices have proven to be a powerful aide in the horizontal reconciliation between sectors, which is carried out in the IEA of the central framework.

133. Transaction matrices are (N+1) * (N+1) square matrices (N = number of sectors in the IEA) that represent cross-classifications by sector of receipt and payment. The basic design features are represented in table I.8, taking compensation of employees as an example. The IEA only contains information on the marginal totals of this matrix, but does not give details from which sector to which sector payments were made. Thus, in the column of the transaction matrix are recorded the receipts of compensation of employees by the household and external sector (non-resident workers), and in the row the payments of compensation of employees by all sectors employing workers including the external sector (resident workers employed abroad). After the margins of the transaction matrix have been filled with these totals, the matrix may be used to evaluate and if necessary to adjust this information in the light of potential links between the paying and the receiving sectors. In other words, the objective is to fill in the interior of the matrix, thus identifying the inter-sectoral flows. For this purpose, it may be necessary to use additional sources of information and/or consult the experts responsible for the basic data. Once the interior of the matrix is filled with data, the marginal totals can be recalculated and the necessary adjustments can be incorporated in the corresponding sectoral worksheets.

134. Filling in the interior of the matrix may seem to be a difficult task, starting with only the marginal totals. However, for some transaction matrices, selected boxes in the interior can be blacked out for those flows that are conceptually impossible. For instance, compensation of employees can only be received by two sectors: the household sector and the external sector. Furthermore, the sectoral worksheets may contain additional information for sectors which present accounts that identify the counterparts of certain transactions. A typical example are government budgets and public corporation accounts, as well as financial institutions accounts.

135. For some transactions (e.g. financial account) it may be the case that both sectors (creditor and debtor) have records relating to the same flow (two entries for the same box). If they are not identical, they need to be investigated in order to decide which one is the more appropriate information according to the national accounts definitions.

136. As the errors that are identified in the transaction matrix of a selected transaction may be caused by errors in classification between transactions or by differences between cash and accrual registration, some transaction matrices may have to be analysed together with groups of related transactions (e.g. current and capital transfers).

137. The size of the transaction matrix increases strongly with the number of sectors. Consequently, it may be recommended to define intermediate levels of sector groupings, and to divide the reconciliation process into two steps: first, reconciliation between large sector groupings and, second, reconciliation between all sectors. An example of such a larger sector grouping is the public sector, comprising the general government and public corporate enterprises. Royalties paid by the public oil company to the government would then not appear in a presentation of flows between the larger sector groupings. Only after a first balance between sector groupings has been established, these more detailed flows would be identified and allocated to the appropriate sub-sectors.

b. Product balances

138. Like transaction matrices are used to arrive at equilibria between uses and resources with regard to transactions and other flows and stocks, product balances are used to arrive at equilibria between supply and use for each product or homogeneous groups of products. The number of separate product balances depends on the detail in which products are classified. In some countries, this may result in 200, 300 or even more product balances being incorporated in the compilation framework. The generic format of the product balances is presented in table I.9; this format may be used for each product or product group to incorporate data on supply and use in different types of "valuations". In the rows of the table are presented all elements needed to establish the equilibria between supply and use, i.e. output, imports and intermediate and final uses, as well as data on taxes and subsidies and trade and transport margins. The columns of the table present the different elements that constitute the type of valuation of product flows: values in the previous year, volume indicators, values in the present year in prices of the previous year, price indices, and values in the present year. The product balances also include in the last row statistical discrepancies between supply and use; this information is used in the reconciliation of data regarding each product group. The reconciliation of the data in the product balances can be carried out in terms of current values and volumes, as well as in terms of constant prices in the case of annual and quarterly compilation and when product groups are more heterogenous.

139. To the extent that such data are available, the product information is derived from the industry and sector worksheets, as indicated by the straight-line arrows in table I.2. In the ideal case industry worksheets would include product data on output, intermediate consumption, and in some cases also product data on capital formation, changes in inventories, even including stocks of produced capital with product specifications (see chap. II, sect. C). Maintaining those industry and sector links during the compilation process is important, as it would result in integrated data sets for industries and sectors, which is valuable information for analyses of industry and sector "behaviour".

140. The links between the product balances, on the one hand, and the industry and sector worksheets, on the other, can be maintained better during the compilation process, when more detailed information is available and the information originates in the industry and sector worksheets. This might be the case in benchmark years (see chap. III, sect. A.1). For estimates for those years, only some columns of table I.9 are used, which include data in volume terms (column 2), prices (column 4) and values (column 5), respectively. For some products, only

value information is available and, for a few other products, only volume indicators and price indices can be used to extrapolate the data from a previous period.

141. In the case of annual and quarterly compilations (see chap. III, sect. A.2), for most products only limited information is available in the form of volume indicators and price indices. For those years, all columns of table I.9 are used. In this case the point of departure in the estimation of data are the values of the product flows in the benchmark year or a more recent year n-1 (column 1), and volume indicators (column 2) and price indices (column 4) are used to extrapolate the values of the benchmark year , or year n-1, to the more recent period n (column 5). As this compilation procedure emphasizes the extrapolation of product flows, it is more difficult than in benchmark years to establish or maintain industry and sector links of the product flows during the compilation process. The volume indicators are generally not sufficiently detailed or based on a sufficiently broad survey scope to accurately identify the industries where the products have been produced.

142. The product links with the industry and sector worksheets cannot be well maintained, in particular, in the following circumstances:

(a) Product detail on intermediate consumption, final consumption, capital formation, or even output is not available in the industry or sector worksheets or is not used in the product balances. In this case, product specifications of total intermediate consumption, gross fixed capital formation and changes in inventories are derived for the total of all industries together, as a result of the reconciliation in the product balances, and no industry specification is available. The same applies to the estimates of final consumption, which as a result of the indirect derivation with the help of product balances, can only be specified by product but not identified separately for the sectors of households and NPISHs, and, therefore, cannot allocated to their respective worksheets;[22]

(b) Overall adjustments are made in the product balances to products and product groups with regard to some data elements, which cannot be easily specified by industries or sectors. This applies in particular to product taxes and subsidies, trade and transport margins, and FISIM. In each case, however, some effort should be made to incorporate this information in the industry and sector worksheets. Thus, product taxes and subsidies in the 1993 SNA are directly charged to the intermediate or final user, without being incorporated in the value of output of producers. In this case, the taxes should be included in the worksheets of the government, which is the receiving sector, and as Aof which@ items in the worksheets of the paying industries and sectors, i.e. those which purchase the products at prices that reflect the taxes and subsidies. Similarly, trade an transport margins, once calculated in the product balances, may be allocated to output of the respective industries producing the trade and transport services, and included as "of which" items in the worksheets of the industries and sectors purchasing the products on which the margins are levied. This is valid also for another overall adjustment - FISIM - if allocated to industries and sectors (one of the options in the 1993 SNA). Allocation may be accomplished in the product balances pertaining to the financial intermediation services, and once the amounts are

derived, they may be allocated to the worksheets of industries and sectors using those services.

C. Design and use of the compilation approach

143. Whereas the previous section introduced in detail the building blocks of the compilation approach, the present section will focus on the actual use of those in the national accounts compilation process, highlighting, thus, some of the aspects related to the practical implementation of the approach. First, some criteria for the appropriate framework design need to be discussed (subsection 1 below); then the process of data collection and intermediate data compilation needs to be addressed (subsection 2), before outlining the basic principles of the reconciliation process (subsection 3). As already done in section A.2 above and in table II.1, an important distinction is made here between the compilation of intermediate sector and industry accounts in the worksheets, and their reconciliation across industries and sectors in the SUT, CCIS and IEA. Before entering the detailed discussion of the subsections, the following paragraphs attempt to give a rationale for this distinction.

144. The main objective of the compilation of intermediate industry and sector accounts is to assemble information pertaining to the industries and the sectors that have been identified, without concerning itself immediately about the intra- and inter-sectoral compatibility of the data collected. The subsequent reconciliation phase then submits the aggregated intermediate data to a series of identity checks and balances that stem from the underlying national accounts methodology. In practice this strict separation of the intermediate data compilation phase and the reconciliation phase is generally not observed: National accountants, in compiling data for one sector, may use as a basis of estimation the counterpart data of another sector, e.g. national accountants may use government information on social transfers paid, to estimate social transfers received by the household sector. In doing so, the have already entered the reconciliation phase; they anticipate that there will be no statistical discrepancy between the counterpart data on this item in the government and household sectors.

145. The clear distinction between the two phases is, however, an important guiding principle for several reasons. In the first place, an effort should be made to obtain independent information for all sectors of the economy; only under such circumstances the maximum number of data checks will be available. It is recognized that in many instances such independent estimates may not become easily available. However, the assumption of equality between counterpart information in different sectors (e.g. between the government and household sectors) should be brought out explicitly, so that if in the future independent information becomes available - e.g. from household surveys - the assumption could be removed and statistical discrepancies explicitly introduced.

146. Furthermore, in the intermediate data compilation phase the number of assumptions and adjustments should be limited to a minimum, as the consequences of such adjustments on the overall system cannot be assessed accurately in an isolated context of, for instance, one institutional sector. Only in the reconciliation phase, sector and industry data are compared with each other within the framework of national accounts identities and corresponding statistical

discrepancies, which would make it possible to judge the discrepancies within the scope of a much more comprehensive data set.

147. A final consideration is that the principle of introducing a maximum amount of independent data in the compilation of intermediate data may lead national accountants to make - in the absence of hard data - rough estimates of the structure of a less known sector, and then, in the reconciliation phase, compare these structural data with counterpart information of another sector. In the end, the counterpart information may prevail, but such decision at least took into account the structure of the less known sector as a limiting consideration.

148. The consequence of the above procedure - i.e. separating the compilation of intermediate data from their reconciliation - is that a comprehensive set of statistical discrepancies is generated throughout the system. It is expected that careful study of all statistical discrepancies at the same time would lead to a more effective reconciliation procedure than the traditional one, in which statistical discrepancies are generally reviewed one at a time. By presenting the comprehensive set of statistical discrepancies together, it will possible to develop a reconciliation strategy. This idea will be developed further in subsection 3 below.

1. Design of the central framework

149. While the main features of the central framework and the worksheets are reflected in tables I.2 to I.9, the framework is by no means a standard framework which applies to all countries in a standard manner. Compilations carried out by UNSD in individual countries have resulted in national accounting frameworks that, even though based on the same basic design, are very different. Chapter II presents examples of accounting frameworks that have been developed by UNSD for use in various countries. The differences reflect the focuses in analysis, policy making and planning of a particular country, and various basic sources and compilation methodologies. When designing the system, one should always take into account that countries may already use some of the elements (input/output worksheets, etc.) of the compilation framework described here. They may already have a computerized system of input-output compilation and/or an extension of such to the institutional sector accounts. Wherever possible, efforts should be made to integrate these existing elements into the new overall framework.

150. In designing the central framework, a decision on the overall scope of the national accounts framework needs to be taken first. This involves discussions on the appropriate sectoring and industrial breakdown of the economy, the scope of the institutional sector accounts, the extent of integration between the industry and institutional sector accounts, and the extent to which the system will be "opened" for special satellite analyses (e. g. environmental accounting). Chapter II discusses in detail the options and the choice criteria that individual countries face.

151. The decision on the scope of national accounts has also a time dimension: Certain information elements of the national accounts need to be available more frequently than only once a year. On the other hand, certain special studies will only be conducted in intervals much greater than one year. Thus, different scopes of the central framework may be designed, each serving different compilations over time. Consequently, a comprehensive discussion of the national accounts compilation cycle, which is closely related to aspects of management of data

(survey frequency and design, etc.) supporting the national accounts compilation, is necessary. Chapter III discusses in detail these temporal aspects of the compilation framework.

152. After the global design of the framework has been determined, the "fine-tuning" needs to be done in terms of determining the classification details to be used. This refers to the four classifications used in the system:

(a) Product detail;

(b) Economic activities;

(c) Transactions, other flows and stocks;

(d) Sectorization of the economy.

These four classifications define the core framework, as it is discussed in this report. However, as mentioned before, in principle, the framework is open and flexible. Consequently, if a country decides to extend the system for purposes of special analyses, further classifications will become relevant. For instance, for satellite extensions, functional classifications of expenditures that address socio-economic concerns such as education, health, environmental degradation, poverty, etc. are needed. Also, classifications of labour by occupational and educational categories are important, as they are used in SAM (Social Accounting Matrix) type of analyses[23].

153. Concerning the classification detail for economic activities, products, transactions and assets, internationally agreed upon systems, such as ISIC, CPC and classifications defined in the SNA[24] itself should be consulted as guidelines. Regarding the sectorization of the total economy, the SNA distinguishes between five major resident sectors, plus the rest of the world. However, every country will have to disaggregate, or, in some cases, aggregate these sectors according to its own particular economic and statistical reality.

154. For instance, specific needs of countries may be taken into account by identifying important key sectors, such as the oil sector in an oil producing country, the tourism sector in a country where tourism is important, or any other key sector. These key sectors should be reflected both in the institutional and industry classification so that the two can be closely integrated with each other, and analyses of the key sectors vis-a-vis the rest of the economy may not only deal with production aspects but also with income and financial aspects of these sectors. Analytical and policy considerations thus may increase the sector and industry detail beyond what is included in the SNA.

155. Statistical considerations may either reduce or increase the sector detail. They may reduce it for all transactions when a specific sector is unimportant or little information is available. This may apply in many countries to the separation between non-profit institutions serving households (NPISHs) recommended in the SNA. The sectoring may also be partially reduced for specific transactions for which less sector detail is available. In the case of balance sheets, for instance, they may be compiled for public and large private non-financial and financial corporations separately, whereas for all other sectors (quasi-corporations, households, government) they need to be presented together as they are compiled residually. On the other

hand, more sector detail may be incorporated for statistical reasons. Thus, distinctions may be made between public and large private non-financial and financial corporations for which relatively extensive information is available through published financial statements and smaller - generally quasi-corporate - ones for which fewer data are available. For mixed analytical and statistical reasons, within the ISIC breakdown of the industry accounts, a distinction may be made between industries that mainly produce for own final consumption and others that mainly produce for the market. The guiding principle involved is that groupings of units for which different data sets are available and, thus, require different processing of data, would need to be kept separately in the compilation, even though in the analysis they may be treated together. An extension of this principle is that weak information with regard to specific industries or sectors should never be combined in the compilation with data on industries and sectors for which very reliable information is available. By mixing weak and strong information one would forego the opportunity to improve selected data, if more reliable information should become available in the future. It is also important for the reconciliation process that the source, and thus the reliability of the information, remain identifiable.

156. When designing the central framework, the question of the "degree of integration" should be addressed explicitly. The degree of integration of the framework is determined by the way in which classifications (single classifications and cross-classifications) are being used: Some classifications should be used throughout the system and be extensively reflected in the central framework as well as in the worksheets; others may be only partial and would be used at the working level and are, thus, not reflected in all parts of the compilation framework. In practice, deciding on integration implies deciding on the following issues:

(a) Which are the items of the production and generation of income accounts that will be cross-classified in the CCIS;

(b) What is the format of these CCIS: the cross-classifications may only be elaborated at the first digit level of ISIC and at the level of the main institutional sectors; alternatively, further details of those classifications may be included if available and relevant;

(c) Which is the degree of cross-classification between transactions (resources and uses) and sectors, or in other words, which are the transaction matrices that will be considered for reconciliation. In some cases only transaction matrices for aggregate transaction categories (e.g. property income) may be included, instead of the further breakdowns (e.g. interest, dividends);

(d) Related to (c) above is the question of what is the appropriate format of these transaction matrices. For some transaction matrices, more sector detail may be included than for others (e.g. for the items of the financial account more detail for the financial corporate sector can be compiled than is included even in the central framework; also more government sector detail for tax transactions may be included. This additional detail for the transaction matrices may facilitate the reconciliation at the working level.

157. In making the adaptation of the scheme to the requirements and possibilities of individual countries, it is important that a coherent and "complete" national accounts framework still results. In principle, the framework should include all important economic information, whether in aggregated or detailed form. All information included for one sector or industry should be matched by counterpart information of other parts of the economy, so that always economy-wide data are available; for instance, production of an industry should be matched by information of the destination of such production, or transfers paid by one sector should be matched by counterpart information on sectors that are the recipients of such payments. This criteria may cause some limitations on the information included in the framework; for example, intermediate data on the financial corporate sector may include detailed information on property income broken down by SNA sub-categories of interest, dividends and rents and royalties, while for other sectors such information is not available. In that case, one may include all property income detail for the financial corporate sectors, apply total property income to the other sectors, and carry out the reconciliation at the level of total property income. Similarly, the framework may not include detailed product data on imports and exports available from foreign trade statistics, or household consumption data from household surveys, if no matching detail is available from production statistics. The same may be true with regard to the scope of the system; there may be detailed information on the financial accounts and balance sheets of financial corporations - e.g. based on regulatory data compilations by the central bank and other government agencies supervising the banking and insurance activities in the country - while no such information is available for other sectors; in that case, one may decide not to include such information for any sector. On the other hand, loosing some of the details mentioned, might be considered inconvenient; in that case, specific arrangements are needed to make the framework "complete" again. Thus, the counterpart information in the examples given may be accommodated in aggregations of the remaining sectors or industries. Option "E" on integrated economic and financial analysis (see chap. II, sect. E) is an example of an accounting framework in which data are only compiled for selected sectors[25].

2. Design of the worksheets and the intermediate data compilation

158. Once the format of the central framework is available, the worksheets may be designed on the basis of intermediate data considerations. This entails further discussions on the data sources, compilation cycles, and work on the conversion of intermediate information to national accounts format, which is done in the system's worksheets.

159. In the case where the sectoral data stem from specialized statistics such as balance of payments (BOP) or government finance statistics (GFS), and in the future money and banking statistics (MBS), the definition of the corresponding sectoral worksheets is facilitated by the efforts that have been made to develop the conceptual links between these specialized statistics and the SNA[26]. In these areas, UNSD, together with the IMF, has developed in the past "bridge tables" that include in great detail the links between the components of the external sector accounts and general government accounts of the SNA with those of the BOP and GFS. In general, the bridge tables include for one or both systems greater detail than is included in each of the two original systems compared, because the present detail of the systems mentioned does not allow for the definition of one-to-one links between them.

160. Existing specialized statistics, such as industrial statistics, foreign trade statistics, statistics on BOP and GFS, official statistics on banking and insurance schemes, and statistics based on household surveys, are generally closer to the basic sources of data such as economic censuses and surveys, customs records on foreign trade, central bank records on foreign exchange transactions, government budgets, and financial statements of banks and insurance companies; therefore, they can serve as a useful intermediate compilation for the sector accounts. Thus, adjustments can be made to the aggregated intermediate data and there is no need to make adjustments to micro data. This procedure not only saves resources for developing countries, but also brings together the expertise of specialists in specific fields of statistics, which ultimately may result not only in improved national accounts estimates but also in the improvement of the specialized statistics.

161. Intermediate statistics may not be available for all industries and sectors of the SNA. This applies specifically to the compilation of data for the very important non-financial corporate sector. Only in a few countries, intermediate data compilations are made by regulatory agencies. In such instances, the intermediate data available could be converted to the SNA format on the basis of a standard procedure. If such intermediate data are not available, there is much advantage in trying to establish for this sector an intermediate system of accounts which would be closer to the format of financial statements of enterprises than to the format of the SNA. This would facilitate data compilation in particular for those - generally large corporate - units for which financial statements, including profit and loss accounts and balance sheets, are available. Such intermediate data framework could be used not only to compile, but also to analyse the non-financial corporate data in terms of the business accounting standards which are also used by enterprises when they analyse their operations.

162. The household and the non-financial corporate sectors are sectors for which no internationally standardized specialized statistics have been developed. However, UNSD has worked on links to incorporate data from household or industry surveys and business accounts into the corresponding non-financial corporate sector accounts[27]. As mentioned before, typically for these sectors a reasonable intermediate grouping of the micro data needs to be defined as a starting point of the compilation process. In some cases it may be possible to link the sectoral worksheets to other computerized sources that contain, for instance, survey results, tax records, establishment data, local government data, etc. However, this needs to be decided on an ad hoc basis.

163. After the sectoral worksheets of the system have been defined, the next step is to incorporate the semi-aggregated data into these worksheets for each sector separately. At this point, a thorough analysis of the individual sector worksheets is required in order to define the necessary adjustments to the intermediate sector data. These include, for example, the conversion of government data from cash to accrual basis, the conversion of enterprise and government data from fiscal to calendar year periods, and the conversion of household survey data from the period used in the survey to the annual basis required in the national accounts.

164. If the data flow of the compilation system has been fully computerized (i.e. the sectoral worksheets include the conversion "bridges" through spreadsheet formulas that convert the intermediate data format into the SNA format and this final SNA format is then transferred automatically to the central framework), at this stage of the compilation process the compilation

framework will generate automatically the preliminary SNA data, not only for the institutional sectors separately, but also the aggregated data at the level of the total economy, including all statistical discrepancies.

165. Before entering the inter-sectoral reconciliation process, some initial adjustments can already be made based on the knowledge about certain conceptual deficiencies of the intermediate data. For the household survey data this implies, for instance, inclusion of income in kind, inclusion of employers' contributions in the compensation of employees, adjustments to the treatment of life insurance and pension benefits, etc. For the government sector, it may include the incorporation of transfers in kind received from or donated to foreign governments, or deconsolidation of items that are treated in a consolidated manner in GFS. In the case of financial corporations, the adjustments may include the incorporation of the special treatment of financial intermediation services indirectly measured (FISIM) and insurance service charges.

166. The intermediate data compilation before the final reconciliation also includes the compilation of the columns of the SUT, i.e. aggregate data on industries and final demand categories. The independent industry and final demand information should ideally include:

(a) Classification of production account data by industries and identification of the corresponding institutional sectors within each industry, with a further breakdown of output and intermediate consumption by product groupings; this information is generated in the industry worksheets;

(b) Classification of final demand categories - capital formation, final consumption and exports and imports - by product groupings, and identification of the institutional sectors within each category, i.e. capital formation by non-financial and financial corporations, government, households and non-profit institutions (NPIs), and final consumption by households, government and NPIs; for exports and imports no further sector identification is needed, as these are components of the sector of the rest of the world.

167. The above process requires that ideally independent data are compiled for all columns of the SUT before the final balancing of the Table. This recommendation follows the same principle as suggested for the sectoral worksheets, i.e. incorporation of a maximum number of independent data before the final reconciliation, which can then be used as data checks in the final balancing of the SUT during the reconciliation stage. This recommendation deviates from the practices followed until now, in which the compilation of the SUT is very much a process where the intermediate data compilation stage and the final reconciliation are not independent of each other.

168. One of the methods for obtaining independent data for the SUT is to extrapolate previous year or benchmark data with the help of volume indicators and to revalue the information thus obtained with the help of price indices. The volume and price indices may be compiled in a detail that is required to develop data for separate industry groups. The ultimate objective of the compilation in this case are the current price data for industries and other columns of the SUT. A by-product of this procedure is that constant price data also become available. Once all extrapolations are made - in current and constant prices - they need to be reconciled with each

other in the SUT in terms of current prices. The product balances discussed in section B.4.b above play a role in this.

3. Data reconciliation

169. As mentioned before, the independently compiled industry and sector data need to be integrated in a reconciliation process. The crucial principle, upon which the approach presented here is based, is the realization that statistical discrepancies or certain patterns of statistical discrepancies will help to identify data deficiencies and thus assist in making the appropriate adjustments. This will be illustrated in annex II with the help of concrete numerical examples.

170. The reconciliation process itself is an iterative procedure: Once all the intermediate data are integrated into the industry and sectoral worksheets, the computer will convert and aggregate them automatically to the pre-specified SNA format, within which the reconciliation takes place. As the data for the different sectors are taken from a variety of sources, it can be expected that after this first integration, the system will exhibit considerable statistical discrepancies. A thorough analysis of the size and the relationship of the statistical discrepancies should point in the direction of possible reasons for these inconsistencies, such as missing data items, under-coverage of sectors, classification errors, etc.

171. Once the cause of certain statistical discrepancies has been identified, adjustments can be made to the intermediate data in the corresponding industry and sectoral worksheets. The adjusted data will then be integrated again, leading to a revised set of statistical discrepancies. This is then the starting point for the next iteration, which includes:

(a) Analysis of statistical discrepancies;

(b) Identification of potential reasons and remedies;

(c) Implementation of specific reconciliation steps in response;

(d) Recalculation of the statistical discrepancies.

172. During the reconciliation, additional information may be required in order to make certain "reasonable" specific data adjustments. So, for instance, a first analysis of the statistical discrepancies may lead to the conclusion that the data for the government sector, while being internally consistent, are not compatible with the remaining resident sectors. Consequently, one may wish to consult experts who are responsible for the generation of GFS, in order to obtain additional information on data breakdowns or compilation methods.

173. Another consideration that should be taken into account is the links over time between the data. It is often more important to reflect well the changes in the data over time than to measure their correct level. This particular aspect may have to be reflected already at the intermediate data compilation prior to the final reconciliation. If sector or industry data compiled do not measure well their changes as compared to last year's data, it may be necessary to introduce adjustments in the worksheets that correct for this inconsistency.

174. If volume indicators and price indices are used in the intermediate compilation (see sect. B.4.b on product balances above) of industry accounts and other columns of the SUT, the overall reconciliation can only be carried out in current prices, as the latter are the common denominators for all accounts, including the SUT and IEA. However, one part of the reconciliation may take place in constant prices, and that constitutes the balancing between supply and use. Such reconciliation in constant prices, however, assumes that the price changes over time do not differ between various uses of the same product; if this assumption is not valid, the supply/use reconciliation cannot be carried out in constant prices, as the supply is not necessarily equal to the use in constant prices. The overall reconciliation between supply and use, on the one hand, and value added, on the other, can never be carried out in constant prices, as the identity between final demand and GDP in constant prices does not necessarily hold.

175. A reconciliation strategy will usually include various steps, in which parts of the system are reconciled consecutively. For instance, the SUT may be reconciled separately first, or a first reconciliation may take place between sub-sectors of the public sector or between sub-sectors of the financial corporate sector. What is important, however, is that such sequential reconciliation not necessarily result in a fixed and final data sub-set: After establishing a preliminary balance between supply and use it may, for instance, be necessary to return to the SUT and make further - balanced - adjustments, if the data work in the sector accounts had resulted in data that are not compatible with the data in the SUT.

176. Furthermore, it may not be necessary to eliminate all statistical discrepancies, even at the end of the final reconciliation. For instance, it may be decided that property income receipts and disbursements are balanced between sectors only at the aggregate level and not at the detailed level, as was explained above. On the other hand, it is important that in principle reconciliation be carried out vertically as well as horizontally. Vertical reconciliation by economic agents (industries and institutional sectors) is as important as horizontal reconciliation by products and transactions. The vertical data are the basis for behavioural analysis of sectors and industries, and such analyses cannot be based on unreconciled data. Horizontal data are the basis for many key aggregates, such as GDP, national income, consumption, capital formation, etc., which are used for policy making. Focusing only on horizontal reconciliation, however, would place too much emphasis on the key aggregates of macro analysis and would not give sufficient attention to the sectoral behaviour which has been further developed by the 1993 SNA.

177. In this context, it is also appropriate to emphasize once more what the compilation framework does and what it does not do, and, thus, to underscore the importance of the experience of the national accountant. The compilation approach will store the intermediate data, standardize its conversion into national accounts format, calculate aggregates and record adjustments made to the data. By calculating statistical discrepancies and printing out transaction matrices, it assists in the process, but it certainly cannot replace the judgement of the experienced accountant: The core of the reconciliation, the decision to go from the analysis of the discrepancy to a specific data adjustment, will always depend on the expertise of the accounting team. If used in an accurate manner, the compilation framework can prove a powerful tool for the reconciliation procedure; however, it should not be mistaken for an "automatic reconciliation instrument".

Table I.1 Schematic presentation of the compilation of national accounts

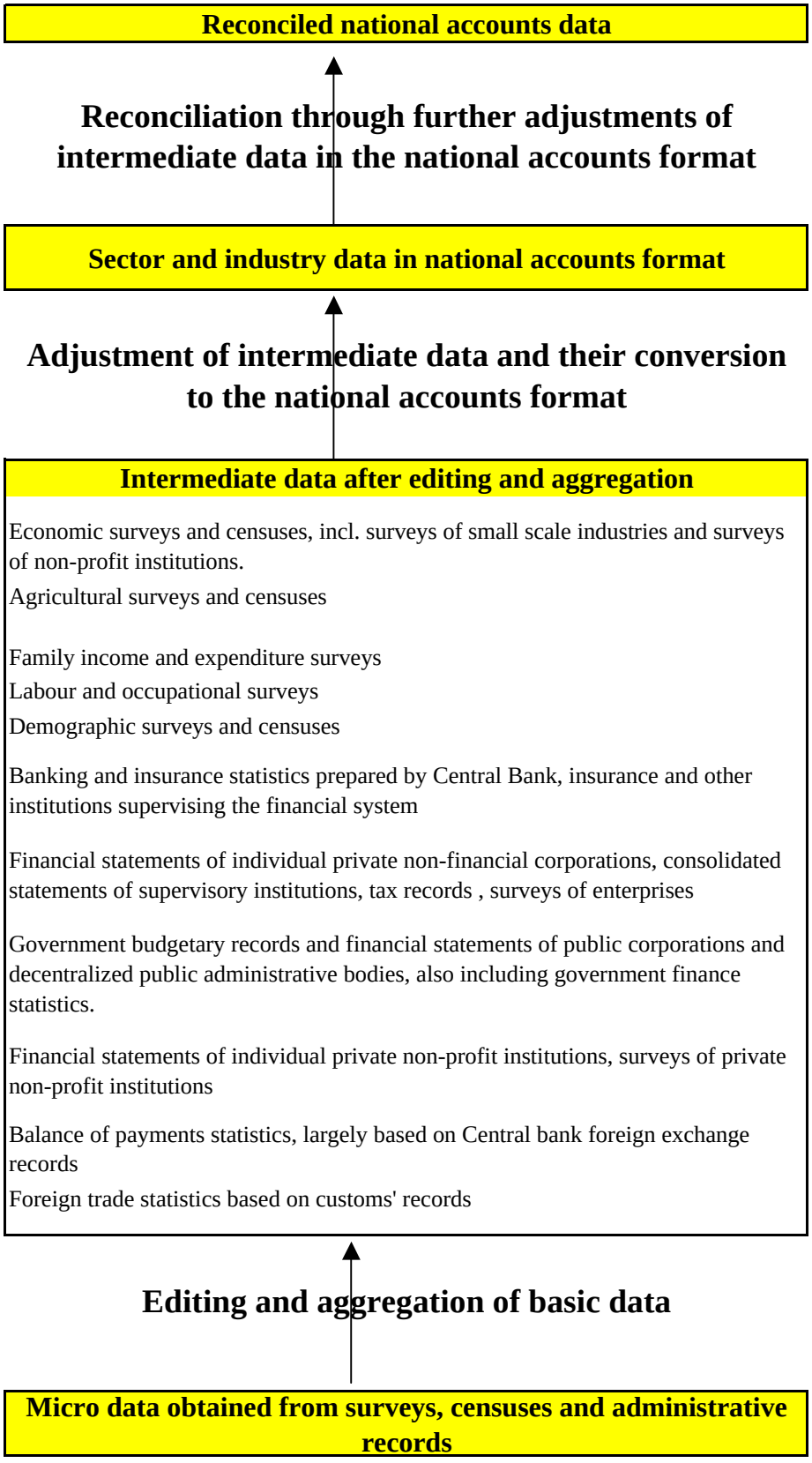


Table I. 2 Schematic presentation of a compilation framework: worksheets and central framework for reconciliation of data

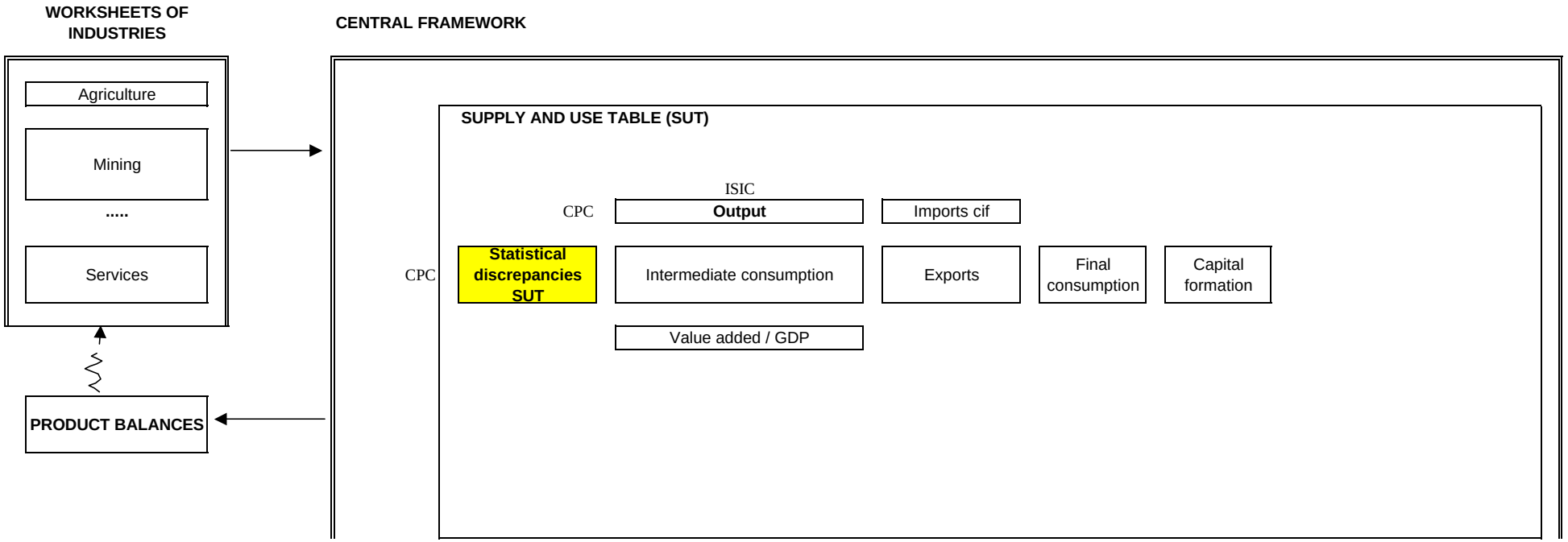


Table I. 2 (continued)

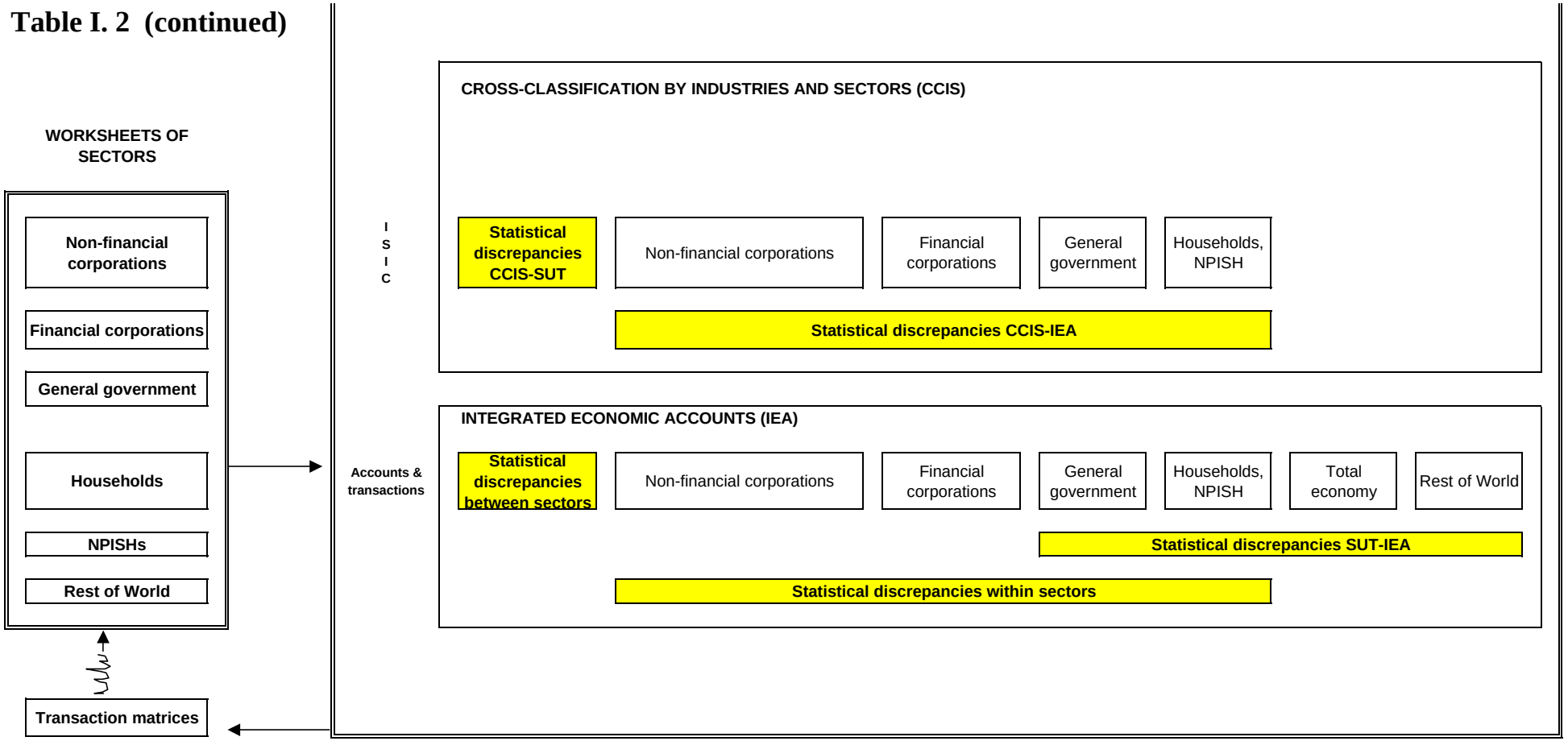


Table I.3 An example of a sector worksheet:

Use of worksheets in the conversion of non-financial corporation sector data to SNA format

INTERMEDIATE DATA		SNA DATA		Initial SNA data after conversion	Adjustments	SNA data after adjustment
FINANCIAL STATEMENTS OF ENTERPRISES						
PROFIT AND LOSS STATEMENT						
Sales, after discounts and returns of products, and excl. sales tax	1711	**Production account**	**output**	1709		
Final products (goods)	1212		**intermediate consumption**	865		
Services	369		**consumption of fixed capital**	137		
Traded goods (merchandise)	130		**VALUE ADDED, NET**	707		
minus:		**Income generation account**	**compensation of employees, payable**	535		
Cost of final products	674		**other taxes less subsidies on production**	51		
(+) Inventories of final products at the beginning of the period	175		**operating surplus/ mixed income, net**	121		
(+) Cost of production or processing	719	**Distribution of income accounts**	**property income, receivable less payable**	-54		
(+) Inventories of intermediate products at the beginning of the period	118		**current transfers, receivable less payable (incl. current taxes on income and social transfers, and also taxes less subsidies on production and imports receivable by government)**	-24		
(+) Primary products and raw materials	504		**DISPOSABLE INCOME, NET**	43		
(+) Direct services	51	**Use of income account**	**final consumption expenditure**			
(+) Direct labour cost	93		**Adjustment for the change in net equity of households in pension funds**	0		
(+) Depreciation of production equipment	77		**SAVINGS, NET**	43		
(-) Inventories of intermediate products at end of the period	124	**Capital account**	**gross capital formation**	313		
(-) Inventories of final products at end of the period	220		**of which: additions to the value of non-produced assets**	20		
Cost of merchandise sold	78		**less: consumption of fixed capital**	-137		
Gross results of sales	959		**acquisition less disposal of non-produced assets, net**	88		
minus:			**capital transfers, receivable less payable**	17		
Operational cost, general and administrative cost of sales	931		**NET LENDING**	-204		
Wages and salaries	115		**CHANGES IN NET WORTH DUE TO SAVINGS AND CAPITAL TRANSFERS**	60		
Payment for overtime	85	**Financial account**	**acquisition of financial assets**	81		
Emoluments	74		**incurrence of liabilities**	154		
Vacation pay	32		**NET LENDING**	-73		
Employer's social security contributions	112	**Other changes in assets accounts**	**produced assets**	0		
Collective life insurance	7		**non-produced non-financial assets**	0		
Support for education	3		**financial assets**	0		
Uniforms	4		**liabilities**	0		
Commissions on sales	73		**CHANGES IN NET WORTH DUE TO OTHER VOLUME CHANGES AND HOLDING GAINS AND LOSSES**	0		
Donations and contributions	3	**Opening balance sheet**	**produced assets**	3001		
Maintenance and repair of equipment	5		**non-produced non-financial assets**	2040		
Fuel and oil	35		**financial assets**	897		
Depreciation of transport and office equipment	60		**liabilities**	1817		
Travel cost	31		**NET WORTH**	4121		
Outlays on communication	17	**Closing balance sheet**	**produced assets**	3157		
Outlays on transport	21		**non-produced non-financial assets**	2148		
Electricity, water and gas	50		**financial assets**	978		
Office utilities	30		**liabilities**	1971		
Compensation for use of personal vehicles	5		**NET WORTH**	4312		
Payments to retirees	9					
Representation expenses	16					
Payments and fees to banks	5					
Professional technical services	18					
Casualty insurance premiums	9					
Legal cost	4					
Property tax	86					
Building taxes	4					
Provision for non-recoverable debts	18					

Table I.3 (continued)

Result of operations	28
Other revenues	146
Rent of offices	17
Royalties	8
Sales of machinery	
Casualty insurance claims	6
Subsidies	35
Rent and lease of land	41
Interest	33
Premiums of insurance and pension funds	2
Donations and contributions	4
Other outlays	88
Rent and lease of land	31
Interest	56
Claims of insurance schemes and pensions	1
Results of the period before taxes	86
Income tax	20
Results of the period after income tax	66
SUPPLEMENTARY INFORMATION ON NET EQUITY	
Dividends received	3
Dividends paid	24
Reinvested profits of foreign subsidiaries	4
Withdrawals from entrepreneurial income	24
Capital transfers received	
Investment grants	23
Other capital transfers	10
Capital transfers paid	
Other capital transfers	16

Table I.3 (continued)

BALANCE SHEET	Year n	Year n-1
ASSETS		
Current assets	779	710
Money and bank accounts	282	267
Cash	81	76
Demand deposits	201	191
Saving deposits	117	115
Bills and commercial paper outstanding	48	30
Commercial accounts payable	111	105
(-) Provision for unrecoverable debts	-30	-12
Unrecoverable debts to employees	66	50
Inventories	114	85
Dividends and interest due to be paid	46	45
Insurance premiums paid in advance	25	25
Permanent investments	272	260
Investments in bonds, etc	63	60
Shares	209	200
Fixed assets	5212	4956
Property, plant and equipment	3760	3499
(-) Accumulated depreciation	-908	-771
Intangible fixed assets	171	150
Works of art	41	38
Additions to non-produced non-financial assets	122	102
Non-produced assets	2026	1938
Long term loans	151	140
Total assets	6414	6066
LIABILITIES		
Current liabilities	467	412
Bills and commercial paper payable	46	44
Accounts payable between companies	111	105
Current portion of long-term bonds	195	179
Advances on sales	9	7
Taxes and withholdings payable	37	14
Interest and dividends due to be paid	17	11
Guaranteed deposits	40	40
Insurance reserves	12	12
Long term liabilities	805	748
Loans by banks	770	718
Bills and commercial paper payable	35	30
Total liabilities	1272	1160
EQUITY		
Capital paid up	729	687
Donations of capital	137	120
Reserves	47	36
Legal reserves	22	17
Other reserves	25	19
Results	4229	4063
Accumulated results	159	150
Results of the period	66	61
Revaluations and other changes	4004	3852
Total equity	5142	4906
Total liabilities and equity	6414	6066
Assets less liabilities and equity	0	0

Note: Illustrative examples of the derivation of national accounts categories from NFC data

Output (1709) = Sales of final products (1212) + sales of services (369) + sales of traded products (130) + inventories of final products at end less beginning of period (220-175) + inventories of intermediate products at end less beginning of period (124

Intermediate consumption (865) = Cost of final products: primary products and raw materials (504) + direct services (51) + operational cost: maintenance and repair of equipment (5) + fuel and oil (35) + travel cost (31) + outlays on communication (17)+ ou commissions on sales (73) + service charge on casualty insurance (0.12* 9) + legal cost (4).

Compensation of employees (535) = Direct labour cost (93) + wages and salaries (115), payments for overtime (85) + emoluments (74) + vacation pay (32) + employers' social security contributions (112) + collective life insurance (7) + support for education

Gross capital formation (313) = differences between balance sheet items in year (n) less (n-1) for plant and equipment (3760-3499) + additions to non-produced assets (122-102) + current assets, inventories (114-85) + fixed assets, works of art (41-38).

Acquisitions less disposals of land and other non-produced tangible assets (88) = differences between balance sheet items in year (n) less (n-1) for fixed assets, non-produced assets (2026-1938) .

Table I.4 Industry worksheet data, based on economic surveys / censuses and related data sources covering groups of establishments

	Agriculture, hunting, forestry and fishing				Mining, manufacturing, electricity, gas, water, construction				Services industries		
Product detail (CPC)	Output	Interme-diate con-sumption	Gross fixed capital formation	Change s in inven-tories	Output	Interme-diate con-sumption	Gross fixed capital formation	Change s in inven-tories	Output	Interme-diate con-sumption	Gross fixed capital formation
Agriculture, forestry and fishery products	87	3	2	1	0	71		0	0	14	
Mineral, manufacturing, electricity, gas, water and	2	36	9	0	2112	969	109	27	39	246	233
Services products	0	8	0	0	11	218	23	0	1353	318	
TOTAL											

Production account			
Output	89	2123	1392
Intermediate consumption	47	1258	578
Value added	42	865	814

Generation of income account			
Compensation of employees	9	407	346
Taxes less subsidies on production and imports	-2	49	11
Consumption of fixed capital	11	92	119
Operating surplus / mixed income. net	24	317	338

Other economic data			
Labor inputs ('man' hours	2058	37298	30013
Gross fixed capital formation	11	132	233
Changes in inventories	1	27	
Closing stock of fixed assets	159	2038	3586

Other data			

Table I. 5 Supply and Use Table (SUT)

SUPPLY by products (CPC)	TOTAL SUPPLY	Adjustments to supply: Trade and transport margins	Adjustments to supply: Taxes less subsidies on products	Adjustments to supply: FISIM	OUTPUT: Agriculture, hunting, forestry and fishing	OUTPUT: Mining, manufacturing, electricity, gas, water, construction	OUTPUT: Services industries	Im-ports
Agriculture, forestry and fishery products	128	2	2		87	0	0	37
Mineral, manufacturing, electricity, gas, water and construction products	2685	76	111		2	2112	39	345
Services products	1423	-78	20	*)	0	11	1353	117
TOTAL	4236	0	133		89	2123	1392	499

USE by products (CPC)	TOTAL USE	STATISTICAL DISCRE-PANCIES: SUPPLY MINUS USE	Intermediate consumption			Ex-ports	Final consumption expenditure: General govern-ment	Final consumption expenditure: House-holds	Final consumption expenditure: NPISHs	Gross capital formation: Gross fixed capital formation	Gross capital formation: Change in inven- tories	Gross capital formation: Acquisitions less disposals of valuables
Agriculture, forestry and fishery products	128	0	3	71	14	7	2	28	0	2	1	
Mineral, manufacturing, electricity, gas, water and construction products	2685	0	36	969	246	435	3	608	0	351	27	10
Services products	1423	0	8	218	318	98	363	379	16	23		
TOTAL	4236	0	47	1258	578	540	368	1015	16	376	28	10

*) The data presentation in this exercise is based on the assumption of full allocation of FISIM to industries and sectors using those services. If the allocation is to a nominal sector, negative adjustments to GDP are needed in the cells indicated.

	GDP	Adjustments to value added		Value added		
Compensation of employees	762			9	407	346
Taxes less subsidies on production and imports	191	133		-2	49	11
Consumption of fixed capital	222			11	92	119
Operating surplus / mixed income, net	679		*)	24	317	338
TOTAL	1854	133		42	865	814

	Other economic data		
Labor inputs ('man' hours worked)	2058	37298	30013
Gross fixed capital formation	11	132	233
Changes in inventories	1	27	
Closing stock of fixed assets	159	2038	3586

	Other data		

Table I.6 Integrated Economic Accounts (IEA)

		STATISTICAL DISCREPANCIES BETWEEN SECTORS	TOTAL ECONOMY	External sector	Non-financial corporations	Financial corporations	General government	Households	NPISHs	Goods and services
External account of goods and services	exports of goods and services			540						-540
	imports of goods and services			499						499
	EXTERNAL BALANCE OF GOODS AND SERVICES			-41						
Production account	output		3120		1709	102	0	1269	40	3120
	intermediate consumption		1849		865	29	252	694	9	-1849
	consumption of fixed capital		222		137	10	30	42	3	
	taxes less subsidies on products		133							133
	VALUE ADDED, NET		1182		707	63	158	533	28	
Income generation account	compensation of employees, payable	-10	752		535	15	140	39	23	
	other taxes less subsidies on production		191		51	3	2	2	0	
	operating surplus/ mixed income, net		679		121	45	16	492	5	
Distribution of income accounts	compensation of employees, receivable less payable		766	-4				766		
	property income, receivable less payable	-5	20	-25	-54	-26	-10	109	1	
	current transfers, receivable less payable (incl. current taxes on income and social transfers, and also taxes less subsidies on production and imports receivable by government)	0	162	29	-24	3	352	-203	34	
	DISPOSABLE INCOME, NET		1627		43	22	358	1164	40	
Use of income account	final consumption expenditure		1399				368	1015	16	-1399
	adjustment for the change in net equity of households in pension funds	0	0	0	0	-11	0	11	0	
	SAVINGS, NET		228		43	11	-10	160	24	
	CURRENT EXTERNAL BALANCE			-41						
Capital account	gross capital formation		449		313	9	40	68	19	-449
	of which: additions to the value of non-produced assets		22		20	0	2	0	0	
	less: consumption of fixed capital		-222		-137	-10	-30	-42	-3	
	acquisition less disposal of non-produced assets, net	95	95	0	88	0	2	4	1	
	capital transfers, receivable less payable	0	-3	3	17	-7	-28	18	-3	
	NET LENDING		-97	-38	-204	5	-50	148	4	
	CHANGES IN NET WORTH DUE TO SAVINGS AND CAPITAL TRANSFERS		225	-38	60	4	-38	178	21	

Table I.6 (continued)

Financial account	acquisition of financial assets	-4	651	50	81	237	120	181	32
	incurrence of liabilities		617	88	154	232	170	33	28
	NET LENDING		34	-38	-73	5	-50	148	4
Other changes in assets accounts	produced assets		58		0	0	17	35	5
	non-produced non-financial assets		76	0	0	2	26	45	3
	financial assets		79	7	0	57	3	18	1
	liabilities		59	3	0	53	6	0	0
	VOLUME CHANGES AND HOLDING GAINS AND LOSSES		154	4	0	6	40	98	10
Opening balance sheet	produced assets		6047		3001	104	1001	1698	243
	non-produced non-financial assets		3875	0	2040	40	590	1124	81
	financial assets		6792	573	897	3508	396	1819	172
	liabilities		6298	297	1817	3384	687	289	121
	NET WORTH		10416	276	4121	268	1300	4352	375
Closing balance sheet	produced assets		6310		3157	103	1026	1759	264
	non-produced non-financial assets		4068	0	2148	42	620	1173	85
	financial assets		7523	630	978	3802	519	2018	205
	liabilities		6974	388	1971	3669	863	322	149
	NET WORTH		10927	242	4312	278	1302	4628	406
	STATISTICAL DISREPANCIES WITHIN SECTORS								
	net lending / borrowing: real minus financial		131	0	131	0	0	0	0
	net worth: changes in balance sheets minus flows		131	0	131	0	0	0	0
	STATISTICAL DISCREPANCIES: SUT - IEA								
	exports			0					
	imports			0					
	final consumption expenditure						0	0	0
	gross capital formation		35						

Table I.7 Cross-Classification by Industries and Sectors (CCIS)

Institutional sectors		Industries: Agriculture, hunting, forestry and fishing	Mining, manufacturing, electricity, gas, water, construction	Services industries	TOTAL by institutional sectors	STATISTICAL DISCREPANCIES: CCIS - IEA
Non-financial corporations	Output	0	2123	710	1709	-1124
	Intermediate consumption	0	1258	268	865	-661
	Consumption of fixed capital	0	92	56	137	-11
	Value added, net	0	773	386	707	-452
Financial corporations	Output	0	0	102	102	0
	Intermediate consumption	0	0	29	29	0
	Consumption of fixed capital	0	0	10	10	0
	Value added, net	0	0	63	63	0
General government	Output	0	0	440	440	0
	Intermediate consumption	0	0	252	252	0
	Consumption of fixed capital	0	0	30	30	0
	Value added, net	0	0	158	158	0
Households	Output	89	0	100	1269	1080
	Intermediate consumption	47	0	20	694	627
	Consumption of fixed capital	11	0	20	42	11
	Value added, net	31	0	60	533	442
NPISHs	Output	0	0	40	40	0
	Intermediate consumption	0	0	9	9	0
	Consumption of fixed capital	0	0	3	3	0
	Value added, net	0	0	28	28	0
TOTAL by industries	Output	89	2123	1392		
	Intermediate consumption	47	1258	578		
	Consumption of fixed capital	11	92	119		
	Value added, net	31	773	695		
STATISTICAL DISCREPANCIES: CCIS - SUT	Output	0	0	0		-44
	Intermediate consumption	0	0	0		-34
	Consumption of fixed capital	0	0	0		0
	Value added, net	0	0	0		-10

Table I.8 An example of a transaction matrix: compensation of employees

\\\\\\\\\ Sectors of \\\\\ Uses & \\\\\\\\\ Assets \ Sectors of \\\\\\\ Resources & \\\\\\\ Liabilities \\\\\\\	Rest of the world	Non-financial corporations	Financial corporations	General government	Households	NPISHs	TOTAL resources & liabilities
Rest of the world							2
Non-financial corporations							
Financial corporations							
General government							
Households							766
NPISHs							
TOTAL uses & assets	6	535	15	140	39	23	768 758

Statistical Discrepancies 10

I.9. Generic format of a product balance for a selected product or groups of products

	Value in benchmark year or year n-1 (1)	Volume measures or indicators (2)	Value in year n, in prices of benchmark year or year n-1 (3)	Prices or price indices (4)	Value in year n in prices of year n (5)
Output at basic prices					
Imports cif					
TOTAL SUPPLY IN BASIC PRICES					
Trade and transport margins					
Product taxes and subsidies					
TOTAL SUPPLY IN MARKET PRICES					
Intermediate consumption					
Final consumption by government					
Final consumption by households					
Final consumption by NPISHs					
Gross fixed capital formation					
Changes in inventories					
Exports					
TOTAL USES IN MARKET PRICES					
STATISTICAL DISCREPANCIES					

II. ADAPTATION OF THE COMPILATION APPROACH TO ALTERNATIVE OPTIONS OF SNA IMPLEMENTATION

178. The complete scheme of the 1993 SNA, i.e. the full sequence of accounts for all sectors, has been used when explaining the compilation methodology in chapter I. However, compilation of such an extensive scheme may not be immediately feasible nor relevant for many countries, as it would include compilation of data that do not necessarily respond to the specific circumstances and policy priorities of each country. Furthermore, it may not be possible for countries to compile the same comprehensive scheme at all times, as is explained in chapter III: The comprehensiveness of the national accounts framework will differ depending on whether it is a benchmark compilation, a satellite study, an annual compilation of national accounts, a constant price compilation or the preparation of advance estimates shortly after - or even before -the year ends. Each of the compilation options have their own data detail and scope and, therefore, they differ in their need for data sources. This fact should be reflected in the design of the central framework and worksheets of the compilation framework as well as in the data reconciliation, as discussed in chapter I (see sect. C). Application of the options would depend on the stage of SNA implementation in each country, which are measured with the help of the six "milestones" adopted by the Statistical Commission, that were discussed in the Introduction (see sect. B).

179. The 1993 SNA is designed in a flexible manner, making it possible to respond to the above concerns and tailor the System to specific analytical needs of countries while taking into account statistical limitations. The flexibility of the System is particularly reflected in the hierarchical structure of the classifications for transactions, transactors and assets. Furthermore, separate chapters deal with "Application of the integrated framework to various circumstances and needs" (see 1993 SNA, chap. XIX), alternative presentations in the form of "Social Accounting Matrices" (idem, chap. XX) and "Satellite analysis and accounts" (idem, chap. XXI).

180. The present chapter develops a series of implementation options of the 1993 SNA which draw on this flexibility of the System. These options differ in the following respects:

(a) The availability of basic data supporting the implementation;

(b) The scope and detail in which the accounts are implemented;

(c) The extent of integration of the data, in particular between industries and sectors, and thus the number of data checks available, as reflected in the statistical discrepancies between independent data;

(d) The type of policy analyses that are supported by the data compiled.

181. Six alternative compilation options (sects. A to F of this chapter - options "A" to "F", respectively) are presented below to illustrate how the compilation framework and procedures discussed in the previous chapter might be adapted to specific uses of the SNA in countries. The six options, though representing a wide range of possibilities, are merely examples and should not be considered as an exhaustive list of possibilities to apply the SNA. Option "A" refers to a number of alternative implementations of GDP within the framework of the SUT, corresponding to milestone 1, and largely based on present national accounts compilations described in sections

C.1 and C.2 the Introduction. Options "B" to" D" are further extensions of the SUT of option "A" which refer to accounts for key sectors, a supply table for dynamic input-output analysis, and environmental accounts, respectively; they can only be compiled if the country has at least reached milestone 1. Options "E" and "F" are alternative versions and extensions of an integrated compilation of the SUT, IEA and CCIS, as discussed in chapter II; they can only be implemented by countries which already apply the integrated accounting approach as described in section C.3 of the Introduction, and which have at least reached milestone 4 covering the implementation of institutional sector accounts for all sectors[28]. Option "E" is a compilation of the comprehensive SNA with emphasis on the accounts for government, financial corporations, external sector and large non-financial corporations, and their integration through the CCIS with the SUT data. This option may be particularly useful for SNA compilations by Central Banks and may also be used in a more aggregated version for short-term analysis by those countries following the integrated approach of described in section C.3 of the Introduction. Option "F" emphasizes the compilation of household sector accounts and could be considered as the framework for the integration of social and economic analyses.

182. The options are presented below in order of increasing complexity regarding the compilation of data. The first options require the least amount of data, incorporating a small number of identities only and, thus, making explicit a limited number of statistical discrepancies. The more complex the options become, the more data are required for their compilation and the more data sources are compared with each other through identities. As each option adds not only data but also data checks, the reliability of the data may be improved when more complex options are being compiled. The more complex options are in terms of data compilation, generally the more realistic they are in describing the socio-economic structure and development of a country, and the better they respond to policy and analytical uses. In particular, they differ in their ability to integrate production analyses with income, financial, fiscal and monetary as well as with social and environmental analyses and policies based thereon. It shown below that the compilation methodology described in chapter I can be adapted to each option.

183. As it is explained in chapter III, in the context of a compilation cycle, the simple GDP-SUT option (option "A") and the more extensive option (option "E"), which deals with the integration of accounts for real, fiscal, financial, and monetary analyses, are also relevant in the early and later phases of the annual compilation cycle, or for years with limited data availability. The more comprehensive options are relevant for the extensive compilations during benchmark years as well as for extensions of the system to serve satellite and other special analyses.

184. When describing each of the options below, attention is paid as to how these options differ in relation to the four aspects listed in paragraph 180 above. Particular attention is paid to the adaptation of the worksheets, central framework tables and data reconciliation, which were described in general terms in chapter I (see sect. C).

A. GDP analyses within the framework of the SUT

185. The first group of versions of option "A" reflected in table II.1 refers to milestone 1, as defined by the Statistical Commission. They all deal with the compilation of GDP in current and constant prices with breakdowns by activities and expenditures. However, they include a variety

of versions, which only differ in the extent to which product detail is available and used in the reconciliation of data.

186. The simpler versions correspond to the practices which were described in the Introduction (see sect. C.1) as production-expenditure-income approaches. They include data blocks on output and intermediate consumption only for some industries (generally goods producing industries), while for other industries (mainly services industries) only estimates of value added are available. Furthermore, for some industries value added components may be available, while for other industries, only the total value added is estimated. Further elaborations may also cover a breakdown of GDP by expenditure components, including final consumption by government and households (including final consumption of NPISHs), gross capital formation broken down by gross fixed capital formation and changes in inventories, and exports minus imports. In this version, an overall reconciliation of the value added and expenditure data is carried out on the basis of the national accounts identity between total GDP by industries and total GDP by expenditure categories.

187. When applying the compilation approach to the last version mentioned above, the SUT is restricted to the format of table II.1 excluding the output and intermediate consumption elements, and only three types of worksheets may be included:

(a) Industry worksheets (including worksheets for government) with limited data on output, intermediate consumption and value added; their scope and detail may differ from industry to industry;

(b) An external sector worksheet with limited product detail on exports and imports;

(c) A simple product balance with separate detail on products destined for gross fixed capital formation and government consumption. These simple product balances may be used to make global estimates of the remaining expenditure aggregates, i.e. gross fixed capital formation, changes in inventories, and private final consumption.

188. More comprehensive versions of option "A" include the data blocks for all industries on output and intermediate consumption. In these versions the two data blocks are matrices based on industry (ISIC) and product (CPC) detail. The product detail is the same for the supply categories (output and imports) and the use categories (intermediate and final consumption, exports and gross capital formation). Thus, the reconciliation between supply and use can be carried out at the level of product detail. This is the so-called commodity flow method that was described in the Introduction (see sect. C.2). In practice, the detail of the product categories may vary from one application to another and the matrix detail of output and intermediate consumption cross-classified by industries and products may not be available; instead, only two separate breakdowns of total intermediate consumption by industry and by product categories are compiled. In this version of option "A", the comprehensive SUT of table II.1 is used including the output and intermediate consumption elements, and covering the following types of worksheets:

(a) Worksheets for all industries with data on outputs, intermediate consumption and value added. In more comprehensive versions, product detail may be included for output and intermediate consumption of all or selected industries, also including separate value added components for all or selected industries;

(b) Worksheets for government, households and external sector with product detail on final consumption expenditures for government and households and with product detail on exports and imports;

(c) Detailed product balances for separate products, including product detail on intermediate consumption of for all or selected products.

189. The statistics needed to compile the simple application of option "A" in which only GDP and its industry breakdown are compiled, include survey data for agriculture, manufacturing, and other goods-producing industries and services. In the case of agriculture, manufacturing and goods-producing industries, data are usually available on output and the total of intermediate consumption, while for the service industries generally only value added is obtained.

190. When option "A" is extended to the expenditure breakdown, independent data are incorporated with regard to government consumption and exports minus imports, based on government records and foreign trade statistics. Gross fixed capital formation is generally derived in an indirect manner based on two sources: (a) the output of the construction industry and of some important producers of capital goods, and (b) foreign trade data in which the net imports of capital goods can be identified. Thus, for capital formation a version of the commodity flow method is used. Changes in inventories are based on independent information from agricultural surveys and surveys of other goods producing industries. Final consumption is often derived as a residual. To the extent that product detail is available on output and intermediate consumption of production by agriculture and the goods producing industries, a limited application of the commodity flow method may be applied, both to reconcile data as well as to estimate data in an indirect manner.

191. A more extensive version of option "A", which includes the data blocks on output and intermediate consumption, requires an application of the commodity flow method, in which reconciliation between supply and use is carried out in a more systematic manner. Thus more extensive data with product detail are needed in particular for final consumption by households based on household surveys, and also on output and intermediate consumption for services. If intermediate consumption is not cross-classified by industries and by products, intermediate consumption broken down by products is frequently derived in an indirect or residual manner through the application of the commodity flow method, and then reconciled with the direct information on the total of intermediate consumption by industries (see also chap. I, sect. B.4.b on product balances).

192. The version of option "A" without expenditure detail can only be used for simple analyses which identify the contribution of each economic activity to GDP and to the growth of GDP over time. If, in addition, information is available on value added components, it is possible to construct simple production functions for each industry, which explain the growth of value added (or output) as a function of each factor of production (labour and capital).

193. When adding the expenditure detail to such analyses, simple growth models of a Harrod-Domar type can be constructed, which include a link between output and capital formation. This can explain, in a simple manner, growth of GDP over time not only on the basis of the contributions of each industry, but also using information on the extent to which GDP is used for gross fixed capital formation.

194. When adding data on output and intermediate consumption and the product detail in more extended versions of option "A", the analytical potential of the data is vastly increased: It is possible to derive input-output tables for static and limited dynamic I-O analyses. Consequently, not only the contributions of each industry to GDP and GDP growth can be assessed, but also the product links between the industries can be determined via the cross-classifications of output and intermediate consumption.

195. The variety of versions of option "A" may be applied by countries not only in isolation, but rather as part of a more comprehensive programme. Thus, in the context of an integrated approach to national accounting (see the Introduction, sect. C.3), option "A" may serve as a starting point for a more comprehensive compilation in which also institutional sector accounts are being compiled. Furthermore, the version of option "A" without the output and intermediate consumption detail may be used as a first step in the annual cycle of national accounts compilations (for details, see chap. III); at that point in time, only limited data are available describing GDP development of the year which has just finished, or will end soon. The extensive version of option "A" with product detail on output and intermediate consumption may be used at a later stage of the annual cycle when more statistics are available or in a benchmark compilation when additional data sources are being used.

196. In the above example, reference is made only to current price accounting; however, the same options may also be applied in constant price accounting. Thus, product flows in the base year on output and intermediate consumption specified by industries, or final demand categories specified by products, may be extrapolated with the help of volume indicators or, alternatively, current price estimates of these product flows may be deflated with the help of price indices. In either one of the two approaches - which may be applied alternatively to different industries - current price estimates compiled according to the methods described above, form the basis of the constant price compilations. The constant price estimates are compiled with the help of only one type of worksheet, i.e. the product balances, which can accommodate price indices and/or volume indicators specified by products (see chap. I, sect. B.4.b).

197. The constant price estimates thus derived in the product balances may be incorporated in a more limited version of the SUT, in which constant price estimates of value added are derived from the product flows in constant prices. Identities between the supply and use of products that are valid between the current price estimates of supply and use of product flows in the more comprehensive options described above, are not valid in this limited version of the SUT, as different price indices and/or incompatible volume indicators may have been applied to supply and use components.

B. Accounts for key sector[29] analyses

198. Once countries have extensive experience in the compilation of SUTs, they will be in a position to introduce further refinements that would enhance the analytical potential of the national accounts. The first such extension refers to the compilation of key sector accounts, such as accounts for tourism, agriculture and other special products generated in the country, accounts for health and education, accounts for environmental protection, etc.

199. Regarding option "B", satellite accounts for key sector analyses as presented in table II.2 introduce a number of additional specifications of the economic information, which is used in section D below, dealing with environmental accounting, and in section F, dealing with human resource satellite accounting. In general terms, key sector analyses would identify economic data that are not made explicit in general purpose national economic accounting. To do this without losing the general purpose economic analysis based on the national accounts, additional "of which" rows and columns are introduced in order to identify information that is included in the national economic accounts but that would require special statistical efforts to be separately identified for analysis of selected segments of the economy as referred to above.

200. The "of which" rows and columns in table II.2 - and also in the tables presenting the later extensions for environmental (table II.4) and human resource accounts (table II.6) - identify three types of related information, i.e. expenditures on key outlays, key products and key industries. Thus, in the case of tourism, these would be outlays by tourists, typical products purchased by tourists, and industries characteristically manufacturing products for tourism. In the case of health accounts, these would be outlays on health, typical health services, and industries producing characteristically health services. The three types of information should be identified in a coordinated manner among the categories of three classifications, i.e. ISIC, CPC and the group of functional classifications of expenditures. All three types of information are needed to carry out an effective key sector analysis. An important further extension of key sector analysis, which is not reflected in table II.2, would be to identify key sub-sectors in the IEA.

201. The impact of tourism, for instance, can only be assessed well if, at the same time, the following items are identified: expenditures by tourists (resident tourists as well as foreign tourists); expenditures on typical tourism products; and economic activities that are characteristically producing those tourism products (hotel and restaurant services for tourists, handicraft products, services of travel agencies, car rentals, tourist taxis and other transport services for tourists, etc.). Similarly, the impact of health and/or educational activities on the economy can only be assessed well if typical health services are separately identified among the expenditures of households, government, NPISHs and enterprises, the health services and products of the CPC on which the expenditures are made, and among the industry categories of ISIC that characteristically produce health services. What is important to note is that the scope of expenditures, products and activities identified in each of the examples mentioned, is not the same; the extent to which those scopes do not coincide is a quantitative expression of the integration of key sector activities with other activities of an economy.

202. To compile the key sector accounts of table II.2 as a further specification of the SUT illustrated in table II.1, the worksheets of the compilation framework need to be adjusted in the following manner:

(a) Industry worksheets need to be specified for selected industries comprising the key sector, e.g. industries characteristically producing tourism products or, alternatively, educational services;

(b) Key sector products (e.g. characteristic tourism products or health products) need to be identified - as "of which" categories - in the industry worksheets within the output of key sector industries and other industries, where they are produced as non-characteristic products;

(c) Key sector outlays need to be identified as "of which" categories in the worksheets of all industries with regard to intermediate consumption and capital formation, and in the worksheets of the household sector with regard to final consumption on key sector outlays (e.g. outlays by tourists, or outlays on education). Also, in the external sector worksheets, exports of key sectors products may need to be identified separately.

203. Key sector outlays by industries may not be restricted to intermediate consumption or capital formation as assumed in the preceding paragraph. There may be also outlays on compensation of employees, consumption of fixed capital on equipment used in key sector activities, or interest payments on loans financing such equipment. As these activities are not treated as separately establishments in the core SNA analysis of the SUT but rather as ancillary activities, they may need to be separated out for key sector analysis. This applies in particular to key sector analysis dealing with environmental protection, health and education, which are often dealt with as ancillary activities of an establishment. In this case, expenditures of industries related to key sector outlays need to be identified in the industry worksheets. Also, when processing the data of the worksheets, adjustments need to be made, in order to add imputed output to the output of the industry where such products are characteristically produced, and, at the same time, to intermediate consumption of the industries where such outlays are made.

C. Extension of the SUT, including asset accounts for dynamic input-output analyses

204. A further advanced version of the SUT, called an Extended Supply and Use Table (ESUT) is presented in table II.3, which illustrates option "C". It contains, in addition to the previous SUT elements, asset accounts for produced assets, including information on flows and stocks of produced assets. The link between this flow and stock information is used in dynamic input-output analysis. The information on flows and stocks would need to be available in a classification by industries so that production factors of industries can be developed.

205. In traditional growth theory, it is assumed that the stocks of produced assets change as a consequence of two factors that are recorded in detail in the national accounts, i.e. gross fixed capital formation and consumption of fixed capital. These are indeed the most important changes in the stocks of produced assets and, thus, form the link in production analysis between the flows that are a consequence of generation of production and value added, and the distribution to gross fixed capital formation of part of the product flows and that part of value added which is

reserved for replacement of produced assets through consumption of fixed capital. It should be recognized, however, that there are two other changes in produced assets that are important causes of changes in the stocks of those assets. These include - what are called in the SNA - other volume changes of assets caused by external non-economic causes such as wars, natural disasters as well as obsolescence due to technological innovations, and holding gains and losses on assets that are caused by inflationary processes. The asset accounts, as included in table II.3, record all changes that would have to be taken into account in growth analyses. It follows from the above that not only gross fixed capital formation and consumption of fixed capital would have to be classified by industries in order to develop production functions corresponding to economic activities, but that the entire non-financial asset accounts would have to be broken down by industries, so that stocks and all changes in stocks could be incorporated in the individual production functions.

206. For the limited version of the ESUT to be used in dynamic I-O analysis, the following adjustments of the worksheets of the compilation framework are needed in line with the specifications of table II.3:

(a) Industry worksheets need to include additional data on gross fixed capital formation, other changes in produced assets and stocks of produced assets, so that all information on stocks and other flows of produced assets can be classified by industries;

(b) Worksheets for produced assets, which would include all data on flows and stocks of produced assets, may be introduced.

207. The data on asset accounts by industry, as indicated on the left hand side of table II.3, do not distinguish between different assets, nor is such breakdown included in the presentation of the asset accounts in the table. The breakdown, however, may be needed if a more refined analysis of production functions were attempted, in which a distinction were made between different capital goods, for instance between machinery and equipment, on the one hand, and buildings, on the other. In that case, asset accounts by industries would also have to be classified by type of capital goods and a similar breakdown would need to be introduced in the table for the column of asset accounts. Of course, similar breakdowns of the asset accounts would need to be reflected in the worksheets mentioned above.

208. There are two other considerations that should be taken into account when developing the asset worksheets. The first consideration, already mentioned above, is that asset accounts cannot be assigned to industries in all cases. The most important exception are the assets owned by the government. These assets, such as roads, bridges and other parts of the general infrastructure of a country generally cannot be allocated to the production function of one industry only. They are public goods that serve all production processes. The second consideration is that asset accounts to complement analyses based on production functions, generally cannot be limited to produced assets only. The most obvious extension is land, which clearly plays a role in the generation of production and value added. Thus, for instance, agricultural production cannot take place without agricultural land; forestry uses the land on which the trees are grown, mining uses the land where the mineral deposits are held, and manufacturing and services also use built-up land as the basis for buildings and production plants. Thus, land, even though not produced, may play an

important role in production analysis and, accordingly, might be included when developing asset accounts. The extension of asset accounts to non-produced assets such as land would be a first step in the introduction of environmental accounting which makes extensive use of asset accounts not only for land but also for other natural assets (see sect. D below). Thus, dynamic input-output analyses may not necessarily require the development of asset accounts for produced or non-produced assets, but only for those assets that can play a role in production functions of individual industries. In view of this, the asset accounts in table II.3 only refer to a selection of produced assets - i.e. those that can be classified by industries using those assets - and do not include any non-produced assets.

209. Introduction of separate worksheets for assets, as suggested above, is based on the assumption that national accounts and their extension to macro accounts including satellite accounts, does not only record the interactions among groups of economic agents (i.e. among sectors and among industries), but also may reflect the interactions between economic agents and other agents which, in this case, refer to produced assets, and in section D below on environmental accounting, to non-produced natural assets. The interactions in the present case are the addition of produced assets through production and gross fixed capital formation, the use of produced assets as reflected in consumption of fixed capital, and the obsolescence of produced assets reflected in other volume changes. Introduction of worksheets for produced assets may not always be needed, but may be useful under certain circumstances. In particular, if stocks of produced assets are derived from flow data through the Perpetual Inventory Method (PIM), the worksheets may be used to reflect this compilation process and record in the columns of the worksheet the successive iterations of the PIM based on a time series of gross fixed capital formation data for the years 1 to n.[30] In this case, different worksheets would be needed for different types of assets (not necessarily by ISIC categories of industries using the assets), and would result in asset worksheets for different types of assets, beyond what is suggested in table II.3.a. The format of the asset worksheets that may be used in the PIM derivation of stocks of produced assets from flows, is presented on the right hand side of the table. Worksheets for produced assets may also be used independently of the PIM, when separate information is available on flows and stocks of produced assets (e.g. through wealth surveys) and the two types of data need to be reconciled.

D. Integrated Economic-Environmental Accounts

210. According to option "D", integrated economic-environmental accounting requires a further extension of the SUT, as reflected in the scheme that is presented in table II.4. In this case, columns are added for asset accounts of non-produced assets, in a manner similar to what was explained in section C above with regard to the ESUT for dynamic I-O analysis. The environmental accounts extensions of the ESUT are identified in the shaded segments of the table and explained below; they include the following four elements:

(a) Outlays on environmental protection, presented as "of which" elements in a separate row of intermediate and final uses;

(b) Industries with major environmental impacts, presented as "of which" industries in a separate column to the right of the column for total industries;

(c) Environmental impacts caused, presented as an additional row of elements corresponding to the uses of natural resources reflected in degradation and depletion;

(d) Asset accounts for selected natural assets affected by environmental impacts, presented as a separate column on the right hand side of the table.

211. The first extension covering environmental protection outlays was already referred to above, when key sector analysis was dealt with (see sect. B above). This extension refers to expenditures on environmental protection presented as "of which" elements below the row of intermediate and final demand; they include, for instance, outlays on sanitation services, recycling services, filters, etc. When using this information in analysis, environmental protection efforts could be expressed as percentage relations between the expenditures by industries, government, households and NPISHs on environmental protection to their total expenditures on intermediate and final consumption and gross fixed capital formation.

212. To carry out analysis of environmental protection efforts effectively, the data should at least include three further refinements:

(a) Ancillary environmental protection activities should be identified as separate establishments and the corresponding intermediate consumption, value added and capital components should be allocated to the "of which" industry columns classified by ISIC categories, and should be imputed for each output, generally to be based on cost. This is by no means an easy task, as it would require to identify the units in SNA type of establishments of enterprises - or even in headquarters' general expenditures - and their corresponding cost and capital investments related to ancillary environmental protection activities. If this is done, however, the "of which" element of intermediate consumption on environmental protection by industries would only include the total value of environmental protection services produced by ancillary units and not the component cost separately; the latter would be included in the "of which" element corresponding to environmental protection activities of establishments and ancillary units;

(b) Capital invested in environmental protection equipment should be reflected in the pricing of products through consumption of fixed capital. This may be obvious for those activities with output of products for which there are market values, although it is less obvious for government environmental protection services and ancillary environmental protection services provided by corporations. It is for this reason that in table II.4 the box on total outlays regarding compsuntion for environmental protection only refer to "final and intermediate" consumption expenditures, as it has been assumed that these expenditures reflect the capital formation expenditures through consumption of fixed capital that is incorporated in the valuation of the products on which the expenditures are made;

(c) Environmental taxes and subsidies should be identified separately as further efforts to reduce environmental impacts. In the table this information is presented

as a separate "of which" row in the value added segment of the table. Their quantification allows to determine the overall government effort to finance the environmental protection effort and/or limit the environmental impacts.

213. The second extension of the ESUT of table II.4 is the separate identification of "of which" industries with considerable environmental impacts, such as the mining and logging industries in the case of natural resource depletion, and electricity production, transport and other selected manufacturing activities with pollution impacts. By presenting these industries in a separate "of which" column, it is possible to determine what part of value added and output would be affected if more stringent environmental measures were implemented, and how these effects would work through in the economy. Instead of identifying activities with considerable environmental impacts, as is done in the table, alternatively products with environmental impacts could have been identified as a separate "of which" row corresponding to supply. The latter presentation would provide the possibility of analysing not only the economic effects of more stringent environmental measures on resident production of such products, but would also facilitate analysis of economic impacts of restrictions on imports of products which pollute or deplete the external environment.

214. The third extension of the ESUT are the uses of natural resources, which are included in table II.4 in an additional row below the data block of value added components. It includes three types of environmental impacts or uses of natural resources, i.e. depletion, degradation and the addition of new resources (economic appearance), which are caused either by industries or by final consumers. The first type of impact, i.e. depletion, includes depletion of minerals by mining companies and sometimes by small mining of gold and other minerals by individuals, as well as depletion of forests by logging companies and also as a consequence of small scale fuel and other wood gathering by households. The second type of impact, i.e. degradation, covers the contamination of water and air as a consequence of pollutants by solid, liquid and gaseous emissions, including also erosion and other impacts on land, caused by shifting and other inefficient agricultural techniques, forestry logging and also pollution of beaches and recreation land caused by extensive use by tourists. The total of these two types of impacts are recorded as total uses in the column of the affected natural resources. In the same column and row are recorded impacts of the third type, i.e. the economic appearance of natural assets, which refers to the finds of new mineral reserves, as well as to the natural growth of forests, fish and other animals, and other renewable natural assets. The elements in the row are generally recorded first in physical terms and, only at the time of analysis, values my be applied, so that eco-value added also indicated in the table can be derived; if environmental impacts are recorded in physical terms only, the latter concept cannot be measured.

215. Asset accounts for selected natural assets affected by environmental impacts of economic activities are the fourth extension of the ESUT of table II.4; they appear on the right hand side of the table. In the format in which these accounts are included in the table, they are more extensive than what is included at present in the System of Environmental and Economic Accounts (SEEA), as they bring together all environmental impacts caused and environmental protection responses, including those that are counterpart entries of the elements that were already identified above, and confront this information with the stocks of natural assets and changes therein in quantity or quality terms.[31]

216. The asset accounts, as shown in table II.4, provide a basis for a comparative analysis for each of the assets between the total changes in the assets, on the one hand, and the economic causes of changes (impacts caused) and the economic responses, on the other. Thus, for forests, a comparative analysis could be made between the total changes in forests in terms of quantity and quality, on the one hand, and, on the other, the effects of timber extraction, of forest clearance due to agricultural practices and urbanization, and of the effects of pollution, as well as the economic response in terms of reforestation. Similarly, in the case of air, the total changes in air quality could be compared, on the one hand, with the impacts of pollution and, on the other, with the environmental protection expenses and the environmental taxes and subsidies that may prevent some of the pollution. By the use of more refined classifications and the inclusion of more quality indicators, the effectiveness of this sort of analysis can be increased.

217. The compilation of the ESUT of table II.4 requires similar adjustments of the worksheets of the compilation framework, as those mentioned in section C above on the ESUT for dynamic I-O analysis. They include the following adjustments and additions to the worksheets:

(a) Industry worksheets need to be added for "of which" industries which are identified as having considerable environmental impacts;

(b) All industry worksheets need to include additional information on environmental impacts caused (in physical terms) and on environmental protection expenses, including those outlays made for the purpose of ancillary activities on environmental protection carried out by each establishment internally;

(c) Worksheets of households need to identify in addition to final consumption expenses, "of which" on environmental protection, and environmental impacts caused (in physical terms);

(d) Worksheets for natural assets may be added, so that all interactions between the natural assets and economic activities (cause-response-effect analysis) can be recorded.

218. The format of the asset worksheets for different natural assets may be based on the content of each of the columns of table II.4.a. In this table, four types of selected natural assets are distinguished, i.e. minerals, forests, land, and air and water. The table presents examples of what each of the categories may include for each of the assets. Each of the groups of assets is identified by type and quality characteristics, through either reflecting these characteristics in classifications or in indicators. Thus, for instance with regard to land a distinction may be made between virgin land, land under agriculture and built up land, and, for each of the categories, environmental quality indicators may be included. In the case of air, only quality indicators may be included. Minerals may be classified by type.

E. Integrated Economic Accounts for joint "real", fiscal, financial and monetary analyses

219. Option "E", presented in table II.5 illustrates a satellite framework in which the economic accounts traditionally compiled by national accountants are linked to the monetary, fiscal and financial analyses. The latter is referred to as "financial programming", and is carried out by

Central Banks much more frequently than in national accounts compilation[32]. In those countries where the national accounts are also compiled by Central Banks, this option. is particularly relevant. In the same circumstances, this option may also be used, in more limited detail, for the integration of short-term indicators of production, on the one hand, and monetary, fiscal and financial indicators used by the Central Banks for short-term analyses, on the other.

220. The accounting framework for option "E" requires extension of the SUT framework of table II.1 to institutional sector accounts, and generally can only be implemented if countries have reached at least "milestone" 4 as defined in the Introduction (see sect. B above). In table II.5, the SUT is not included because it would make the presentation unnecessarily complex. However, it is assumed that the scheme would be compiled together with the SUT of table II.1.

221. "Financial programming" is generally restricted to analyses of the financial interactions among two resident sectors of the economy, and between those and the rest of the world. The resident sectors are the banks, including the Central Bank, which are the main source of credit by resident institutions and the resulting money supply, and the public sector, including the government sector and public enterprises, which generally finances its operations through taxes and credits acquired through Central Bank operations. The external sector is included as another important source of (external) finance, which may become a drain on resident resources when payments of interest and repayment of debt need to be made. While the private sector - meaning non-financial corporations, households and non-profit institutions serving households - might be another source of resident finance, it is generally not studied in any detail in the "financial programming" analyses mentioned. The Central Banks, in their analyses of "financial programming", do take account of GDP developments. However, the GDP information is not integrated with the financial, fiscal and monetary data.

222. The aim of the satellite framework of table II.5 is to achieve a major integration in an accounting sense between the "real" economy data and the "financial programming" analyses. This is done by incorporating, in an integrated framework of the IEA, the three SNA sectors that correspond to the sectors of "financial programming", i.e. the financial corporate sector, the government sector and the external sector. However, added to those sectors is a part of the non-financial corporate sector, i.e. the public enterprises and the large private corporations, which are often those registered at the stock exchange. The latter part of the non-financial corporate sector is included, mainly, because it generates the major part of GDP in the country, and also because it includes the large corporate units that are also a major group of actors in the resident and external financial market, particularly through direct investments. Thus, by including a large part of the non-financial corporate sector, the major link between production and financial flows is incorporated, which implies that a more direct relation is established between the financial flows and stocks and production, which is an improvement to the analyses carried out until now, in which GDP was incorporated as a separate variable, which is only loosely related to the data used in "financial programming".

223. A number of other features of the framework presented in table II.5 should be mentioned. The first one is that the SNA sectoring used in the table does not entirely correspond to the one used in "financial programming", which distinguishes between the public sector - including government and public enterprises - and banks. The financial corporate sector of the SNA also includes insurance and pension schemes, and financial auxiliaries, while in the non-financial

corporate sector, public enterprises are included together with large private corporations. When compiling this framework, insurance and pension schemes and financial auxiliaries, as well as public enterprises, may be presented separately, so that they can be regrouped into the sectoring used in "financial programming".

224. It should be noted that in the satellite accounts of table II.5 for the government sector only the "financial" balance sheet and an account for other changes in financial assets are included respectively. The "financial" segments of the balance sheet and other changes in assets only include financial assets and liabilities, while the non-financial segments refer to non-financial assets only. The new concept called "financial net worth" is defined as the stock of financial assets of a sector less its liabilities and, thus, is the accumulated (i.e. stock) equivalent of net lending in the financial (flow) accounts of the SNA. Accordingly, net lending plus "other changes in financial net worth" is equal to the difference between the "financial net worth" figures of two successive "financial" balance sheets. Financial net worth would be the counterpart of non-financial net worth; the latter is equal to the total stock of non-financial assets owned by a sector. Financial net worth plus non-financial net worth is equal to net worth as defined in the SNA (see 1993 SNA, para. 10.1, p. 217). The subdivision of the balance sheet and the introduction of the new concept of "financial net worth" are done in order to facilitate links between the SNA analysis and "financial programming", which only deals with financial flows and stocks.

225. Compilation of financial and non-financial segments of the balance sheet of public and large private corporations is suggested, as their financial statements include information on both. In the case of non-financial corporations, the information of the non-financial segment of the balance sheet is important in the analysis of table II.5, as the stock of non-financial assets together with the labour component is the basis for production generated by this sector. The exclusion of the non-financial segment of the balance sheet for the government sector is justified, mainly because compilation of data on the stock of non-financial assets for the government sector is more difficult, since it would require data on the value of the stock of roads and other infrastructure as well as data on non-financial assets such as land, mineral, forest and other natural reserves, and other economic non-produced non-financial assets. The compilation of non-financial balance sheets of government is, furthermore, less meaningful analytically, because non-financial assets of government are not related to production of government services, but rather serve as production factors in the production functions of other sectors (e.g. roads and other parts of the country's infrastructure, land held by the government), and as a result most of these non-financial assets held by the government do not generate any property income that would be reflected in this sector's balance of primary income. Compilation of non-financial asset stocks of the government would only become meaningful if they could be assigned to the sectors where they play a role as production factors (see also sect. C on dynamic I-O analysis above).

226. Finally, it should be noted that non-comprehensive accounts are included in table II.5 for the smaller non-financial private corporate sector and for the household sector. However, in order to establish the full link between the analysis of the table and the traditional GDP analysis, production and generation of income accounts for these sectors are included, by regrouping economic activity breakdowns of production data into institutional sectors. It is for this reason that the CCIS is included, as it establishes the link between the industry and sector breakdowns of production data.

227. The satellite accounts framework of table II.5 also includes the "price" information on interest rates and exchange rates; this is done, because this information plays an important role in monetary analysis. Making explicit the exchange rate data used in net national accounts, insures that monetary analysis uses the exchange rate data that are compatible with those used in the compilation of national accounts. Including interest rates in the presentation would oblige national accountants to apply checks to relations between the "financial" balance sheets data of the sectors that are included in the framework and the property income flows. These checks are generally not made by national accountants, but would be required in the type of analysis suggested by the table.

228. The compilation framework needed for this option is mostly the same as described in chapter I, except for the following adaptations:

(a) Industry worksheets need to be compiled in detail, which would permit, in particular, the identification of industries related to small private non-financial corporations, public and large private non-financial corporations, and households and NPISHs, so that production-related data can be derived for all sectors distinguished in table II.5;

(b) Sector worksheets need to be compiled only for public and large private non-financial corporations, financial corporations, government and rest of the world. All accounts covered for these sectors, including balance sheets, but excluding the so-called non-financial balance sheets of the government. For small private non-financial corporations, and households and NPISHs such worksheets are not needed, as for these sectors no complete accounts are compiled. As a consequence of this limited application of the sectoral worksheets, statistical discrepancies across sectors of the IEA would not be included in the compilation framework.

F. Human Resource Accounts (HRA)

229. A last option (option "F"), dealing with so-called Human Resource Accounts (HRAs), is a satellite extension of another institutional sector, i.e. the household sector. The option is reflected in the presentation of table II.6; it covers not only the household sector part of the IEA, but also includes extensions of final consumption expenditures in the SUT, and includes more detailed information in the CCIS than was explained in chapter I.[33] The objective of HRAs is to incorporate in one accounting scheme economic as well as social factors, so that a joint socio-economic analysis can be carried out. The satellite scheme incorporates further detail and extends the household sector accounts as incorporated in the 1993 SNA. The scheme has some similarities with the environmental accounts discussed above (see sect. D above), in that it also uses assets accounts as the centre of the analysis; however, in this case, the asset accounts do not refer to natural assets, but rather to selected social aspects of human capital incorporated in households. Similarly as in environmental accounting, it identifies the expenditures that, in this case, are the economic responses to social concerns. The expenditures could be linked to products on which those expenditures are made and to the economic activities that are

characteristic of producers of those products, as was done in key sector analysis (see sect. B above). However, this industry and product detail is not reflected in the table.

230. The socio-economic satellite accounts for analysis of the interactions between human conditions and economic activities are included in order to carry out studies of poverty and related issues, which would identify the social characteristics of different groups of households and household members, and determine the extent to which those social characteristics are changing over time as a consequence of: (a) the participation of each household group or members thereof in the economic process (receipt of wages and salaries, mixed income); (b) spending patterns of households (household consumption) which change their social characteristics, (c) deliberate policies of government and NPISHs which influence the social characteristics of the households or members thereof, and (d) the influence of enterprises on the social characteristics of households through their social support of employees, their families and sometimes other members of the local community.

231. The scope and classification of human resource accounts incorporated in the accounting framework is reflected in the shaded areas of table II.6, and includes the following characteristics:

(a) The centre of the satellite extension for socio-economic analysis is the breakdown of the household sector accounts in the IEA by social classes. These include all household sector accounts from production, through income and use of income, and capital, through financial accounts. This segment of the human resource accounts would permit analysis of the spending (=consumption) patterns of different social classes of households, and juxtapose those with the sources of revenues of each household class (mixed income from own production, compensation of employees from employment, social transfers, and property income), and show the extent of saving or borrowing of each household class;

(b) A second data set of the satellite accounts identifies the expenses by government, NPISHs and corporations, as well as households themselves, causing changes therein, or are a consequence of the characteristics of households corresponding to the social protection classes selected. These expenses are reflected in an "of which" expenditure row of the SUT, and in separate "use of adjusted disposable income" and "redistribution of income in kind" accounts of the IEA. The main element of this data set is the actual final consumption of households, which is represented by the shaded element in the main expenditure (intermediate and final consumption expenditure) row of the SUT, and also in the "use of adjusted disposable income" account of the IEA. The corresponding adjustments of final consumption expenditure of households, government and NPISHs, in order to arrive at actual final consumption of these sectors, are recorded as "social transfers" in kind in the "redistribution of income" account of these sectors in the IEA. Further detail is provided in a separate "of which" row of the SUT. The latter identifies separately the intermediate and final "social protection" expenditures, and presents those in a breakdown by detailed functional categories of expenditures that correspond to the selected social protection classes. The social protection expenditures thus identified and classified in the SUT are outlays

by industries, gross fixed capital formation, and, furthermore, final consumption outlays by government, households and NPISHs. In line with the SNA concepts, it is assumed that enterprise current and capital outlays are reflected in the cost of products, including products of "quasi-NPISHs" (see 1993 SNA, chap. XIX, sect. C) on which households, government and NPISHs spent for purposes of social protection;

(c) A third element is the data set that describes the "social balance" of the population at the beginning or end of the period of account. By classifying and cross-classifying households by social classes, this module includes, for each class of households distinguished, the number of households and other social characteristics that are relevant to the analytical orientation of the human resource accounts but which are not identified in the classification of households. The classification and cross-classification categories should be the same as those used in sub-sectoring the household sector, so that an integrated analysis of social characteristics and economic causes and consequences can be carried out for each household sub-sector. Also the sub-sectoring of the households thus established, does not only apply to the accounts in the IEA, but also to the classification of actual final consumption of households in the ESUT; as a consequence, the latter is cross-classified by CPC categories of products and social classes of households;

(d) What will be called the "SAM link" (see 1993 SNA, chap. XX) is the last element of the satellite extension presented in table II.6. It consists of two separate data elements in the SUT. The first one, located in the ISIC column of industries, cross-classifies compensation of employees and mixed income - the two types of "labour" income in the SNA - as well as wage rates and employment, by industries (ISIC) and occupational and similar categories (e.g. manual workers vs. blue collar workers, male vs. female, workers with different educational qualities, residents vs. non-residents, etc.). A second data set of the SAM link is located in the ESUT column corresponding to the household sector. This data set is based on a cross-classification of labour income - i.e. compensation of employees and mixed income - by the same occupational categories used in the previous data set, but this time cross-classified with the social classes of households to which individuals that are employed belong. When using the two data sets in SAM analysis, a circular link is established between consumption by household classes, individuals employed, income generated by industries through employment of individuals, and products produced by industries, and used in consumption by households. By incorporating the SAM link in the present analysis, it is possible to relate, at the same time, social protection issues to the employed population and to the population at large.

232. The development of the satellite extension for socio-economic analysis might be based to a large extent on data from family income and expenditure surveys. Such surveys include economic data for establishing the SNA household sector accounts, including the measurement of household final consumption expenditure, and also covering property income, transfer and other revenue and expenditure, and, in some instances, limited functional data. Furthermore, in some household surveys, data are included on own account production, intermediate cost of production and value added, and on consumption of own account production. In addition, the household surveys include social data on members of the households, such as level of education, health characteristics, nutritional and qualitative consumption data, age, gender, marital status of the household members, housing conditions and ownership of land and household durables, and health characteristics. Included as well is information about economic activities in which households are involved, either as owners of small scale establishments, as own account workers or as employees. The latter information may be used to define the social classes of households in line with the social protection issues that are selected and the link with economic activities analysed in the traditional national accounts, and may also provide additional social indicators, insofar as these are not yet reflected in the social classes of households. In addition to the family income and expenditure surveys, social data may also be derived from population censuses and demographic surveys. Furthermore, the economic data of from household surveys may be complemented by occupational and employment data from employment and labour force surveys, and by production data from small scale and informal sector surveys.

233. The satellite extension discussed in this section presents a very powerful instrument for studying the interactions between poverty, economic activity and policies aimed at alleviating the consequences of poverty. Such analysis can be based on a detailed socio-economic data set on household groups with "SAM links" between household income and employment of household members in economic activities. The data may be used not only in describing the socio-economic conditions of households and household members as part of "static" poverty analysis, but also in estimating parameter links (=coefficient matrices) of functional relationships between socio-economic flows and stocks, which together constitute elements of dynamic growth analyses. The parameter links based on the data set established may thus include the following:

(a) Link for different household groups between actual consumption towards selected social protection issues, income and (assumed) changes over time in the social characteristics of households;

(b) "SAM link" between elements of household income (compensation of employees and mixed income) and production by economic activities;

(c) Link between changes over time in the social characteristics of households, employed household members, and (assumed) changes in their productivity (i.e. employment-output ratio).

234. Some of the links mentioned above are assumed links based on projected changes in the social characteristics of households and household members. Thus, alternative scenarios may be designed to determine how growth would be affected, under varying assumed changes in the socio-economic characteristics of households, by changes in the productivity of household members. If the human resource accounts compilation is repeated over time - e.g. every five years - the assumed changes may be replaced by actual changes over time that are measured with the help of data for two successive periods.

235. When designing the worksheets for the compilation of HRAs, it should be taken into account that the data for the household sector originate in four types of data sources, i.e. surveys of small scale establishments, family income and expenditure surveys, employment surveys, and demographic surveys. This information should be include in two types of worksheets:

(a) Industry worksheets, which identify for each of the economic activity groups, those that include small scale household establishments. The data to be included are those obtained from the surveys of small scales establishments. An important type of information to be recorded is employment, as it is the common element included all or most data sources, and, therefore, serves as the basis for reconciling the data between the different data sources;

(b) Sector worksheets for subsectors of households, in which the data from the three other data sources with regard to households and individuals in those households will be incorporated. This information would include data on employment, that can be confronted with the corresponding establishment data, data on incomes and expenditures of households, and thus socio-demographic data on households and individuals in those households.

236. The scope of the statistical discrepancies needs to be expanded as compared to the description given in chapter I. The additional discrepancies can be accommodated by expanding often the scope of the CCIS to include data on employment, compensation of employees, and mixed income. All three types of information are available from the establishments surveys as well as from the combined use of family income and expenditure, employment and demographic surveys. Generally, the three types of surveys are linked through a common sample frame and, as a result, there should not be any inconsistencies between the figures that result from either one o the surveys. However, there are instances in which the employment survey is not based on the same sample frame as the demographic/family income and expenditure surveys, but rather on the sample frame of the establishment surveys; in that case, the employment data between the employment and establishment surveys may be inherently consistent and no statistical discrepancies should be created between them.

Table II.1 GDP analyses within the framework of the SUT

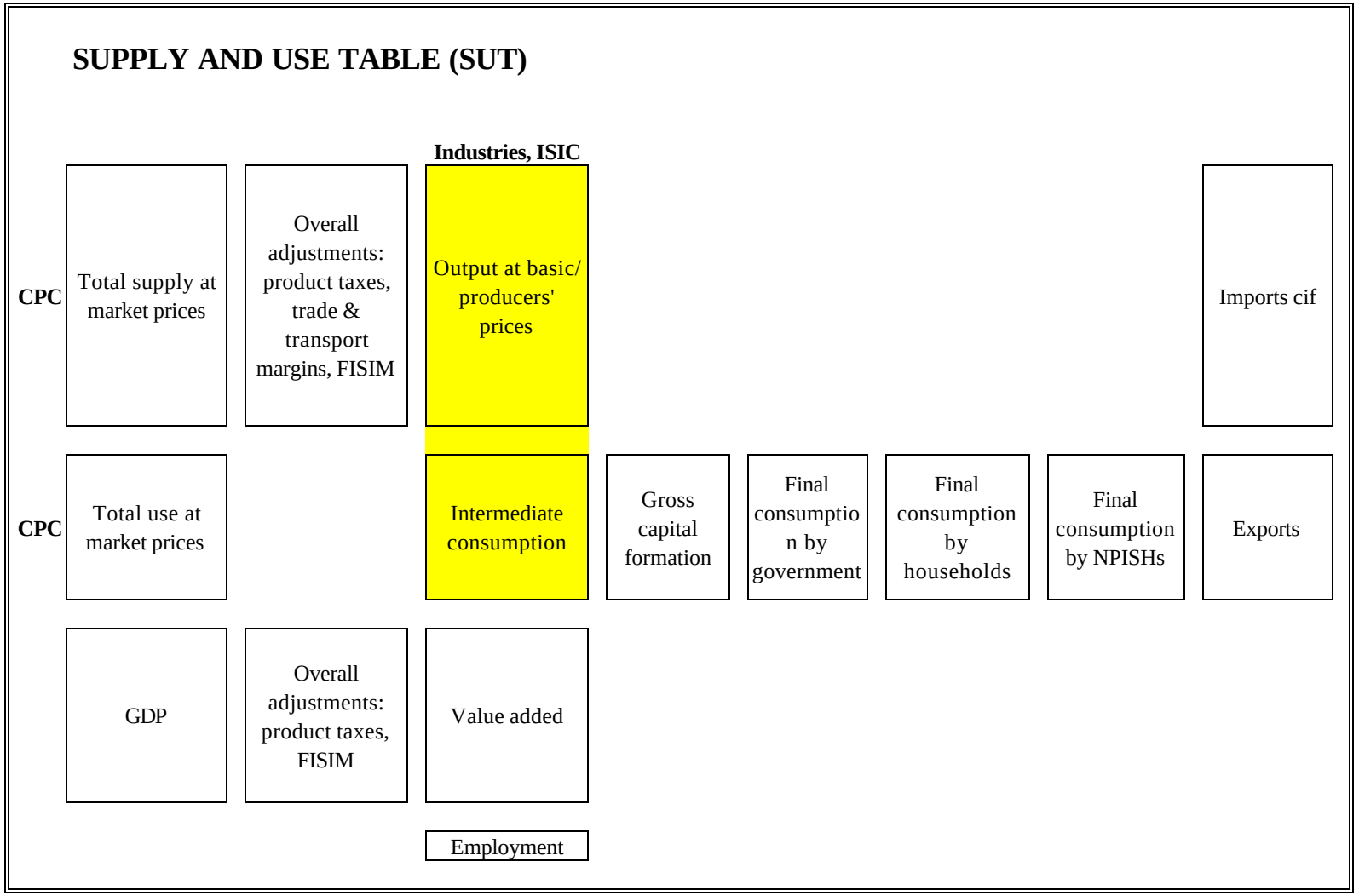


Table II.2 Accounting for key sector analyses (e.g. tourism accounts)

SUPPLY AND USE TABLE (SUT)

			Total industries, ISIC	**of which: Key industries (incl. ancillary activities)**					
CPC	Total supply at market prices	Overall adjustments : product taxes, trade & transport	Output at basic/ producers' prices						Imports cif
			of which: Key products of resident industries						of which: Imports of key products
CPC	Total use at market prices		Intermediate consumption		Gross capital formation	Final consumption by government	Final consumption by households	Final consumption by NPISHs	Exports
			of which: Key outlays by industries		of which: Gross capital formation by key industries	of which: Key outlays by government	of which: Key outlays by households	of which: Key outlays by NPISHs	of which: Key outlays by non-residents
	GDP	Overall adjustments : product taxes, FISIM	Value added components						
			Employment						
			Wage and salary rates						
			of which: Consumption of fixed capital						
			Changes in inventories						
			Gross fixed capital formation						
			Stock of fixed assets at end of year						

Table II.3 Extended supply and use table, including produced asset accounts, for dynamic I-O analysis

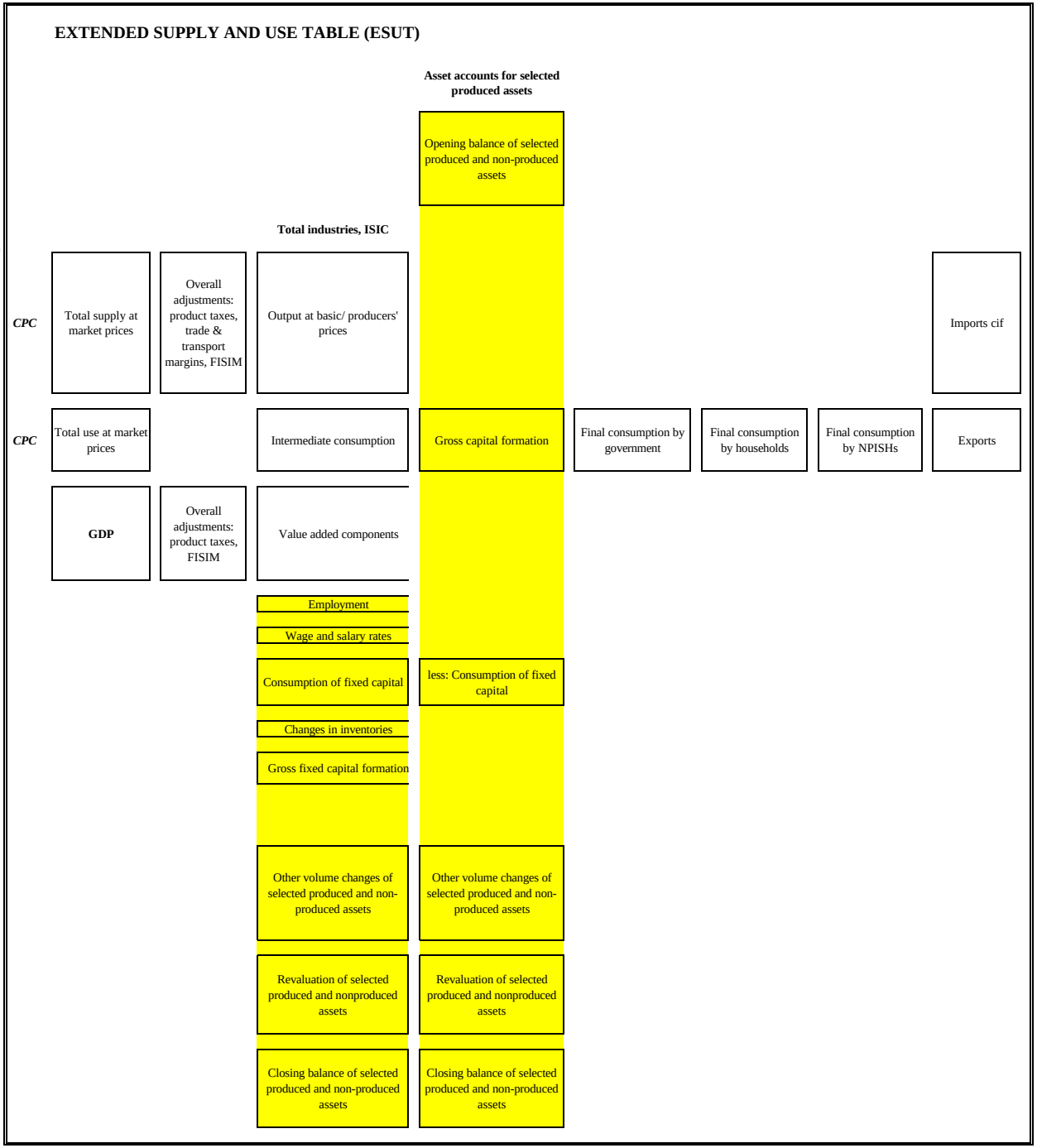


Table II.3.a Worksheets for a selected group of produced assets for use in the Perpetual Inventory Method (PIM)

	Data for individual years							Accumulated totals for
	year 1	. . .	year n-4	year n-3	year n-2	year n-1	year n	year n
Opening stock		. . .						
Gross fixed capital formation		. . .						
Consumption of fixed capital		. . .						
Other volume changes		. . .						
Revaluation		. . .						
Closing stock		. . .						

Table II.4 Integrated Economic-Environmental Accounts

EXTENDED SUPPLY AND USE TABLE (ESUT)

			Total industries, ISIC	**of which: Industries with high levels of environmental impacts: depletion and degradation**		**Asset accounts for selected non-produced natural assets, economic and other assets, by type of asset (in physical units)**				
						Opening stock of selected non-produced natural assets (in physical units)				
CPC	Total supply at market prices	Overall adjustments: product taxes, trade & transport margins, FISIM	Output at basic/ producers' prices							Imports cif
CPC	Total use at market prices		Intermediate consumption		Gross capital formation		Final consumption by government	Final consumption by households	Final consumption by NPISHs	Exports
			of which: intermediate consumption for environmental protection by industries		of which: Gross fixed capital formation on environmental protection equipment	Total outlays on consumption (intermediate and final) for environmental protection	of which: Outlays on consumption by government for environmental protection	of which: Outlays on consumption by households for environmental protection	of which: Outlays on consumption by NPISHs for environmental protection	
			Consumption of fixed capital		less: Consumption of fixed capital					
	NDP	Overall adjustments: product taxes, FISIM	Value added components							
			Use of natural resources, depletion and degradation by industries (in physical units)			Total use of natural resources: depletion and degradation (in phys. units)	Economic appearance plus growth of natural resources (in phys. units)	Use of natural resources: depletion and degradation by households (in phys. units)		
			Eco-Value added							
			of which: environmental taxes and subsidies on production			Environmental taxes and subsidies on production				
						Total changes in volume of natural assets, other than depletion, degradation and economic appearance (in physical units)				
						Closing stock of selected non-produced natural assets (in physical units)				

Table II.4.a Asset worksheets for selected non-produced natural assets, economic and other assets, by type of asset (in physical units)

		Mineral deposits, type of mineral	Forests, type and quality characteristics	Land classified, type and quality characteristics	Air and water, type and quality characteristics
Opening stock of non-produced natural assets (in physical units)		Opening stock of mineral assets	Opening stock of forests by type and quality characteristics	Opening stocks of land by type and quality characteristics	Quality characteristics of opening stock of air and water, quality characteristics
Economic causes: Changes of natural assets due to economic decisions, capital accumulation	**Total use of natural resources: depletion and degradation (in physical units)**	Depletion of mineral deposits through extraction	Extraction of timber from natural forests, forest clearance due to shifting agriculture, urbanization, etc., pollution of forests due to solid, gaseous and liquid wastes	Pollution of land due to solid, gaseous and liquid wastes, including land erosion caused by shifting agriculture, urbanization, etc.	Pollution of air and water due to solid, liquid and gaseous wastes
	Economic appearance & reclassification of natural resources (in physical units)	Changes in proven mineral deposits due to exploration and price changes in minerals		Reclassification of land due to changes in land uses from virgin land to agricultural use of land to land use for urbanizations	
Economic responses to degradation of natural assets	**Total outlays on consumption (intermediate and final) for environmental protection**		Expenses on reforestation, forest improvements, etc.	Expenses on land improvement, including outlays on cleaning of soil, prevention and elimination of soil erosion, etc.	Expenses on environmental protection of air and water: filters, recycling, sanitation, etc.
	Environmental taxes and subsidies on production				Environmental taxes and subsidies
Total effects on natural assets resulting from economic causes and responses and other impacts		Total changes in mineral deposits, including changes due to non-economic causes: revision of estimates of mineral deposits, changes due to natural disasters, etc.	Total changes in the quantity and quality of forests	Total changes in quantity and quality characteristics of land	Total changes in quality of air and water
Opening stock of non-produced natural assets (in physical units)		Closing stock of mineral assets	Closing stock of forests by type and quality characteristics	Closing stock of land by type and quality characteristics	Quality characteristics of closing stock of air and water

Table II.5 Integrated economic accounts for joint 'real', monetary, fiscal and financial analysis

CROSS-CLASSIFICATION BY INDUSTRIES AND SECTORS (CCIS)

Total economy	Small private non-finan- cial corpo-rations	Public & large private non-finan-cial corpo- rations	Financial corporations, public and private	Central and local government	Households & NPISHs
Output, intermediate consumption, value added components, employment					

INTEGRATED ECONOMIC ACCOUNTS (IEA)

Total economy	Small private non-finan- cial corpo-rations	Public & large private non-financial corporations	Financial corporations, public and private	Central and local government	Households & NPISHs		Rest of the world
Production account	*Production account*	*Production account*		*Production account*	*Production account*	e	*External account of goods and services*
Gross Domestic product (GDP)	Value added		Value added	Value added	Value added		External balance of goods and services
Generation of income account	*Generation of income account*	*Generation of income account*		*Generation of income account*	*Generation of income account*	x	*External account of primary incomes and current transfers*
Value added components	Value added components		Value added components	Value added components	Value added components	c	

Table II.5 (continued)

Allocation of primary income account National Income	*Allocation of primary income account* Balance of primary income	*Allocation of primary income account* Balance of primary income	h		
interest rates					
Secondary distribution of income account National disposable income	*Secondary distribution of income account* Disposable income	*Secondary distribution of income account* Disposable income	a		
Use of disposable income account National saving	*Use of disposable income account* Saving	*Use of disposable income account* Saving	n	g	Current external balance
Capital account Changes in net worth due to saving and capital transfers Net lending	*Capital account* Changes in net worth due to saving and capital transfers Net lending	*Capital account* Changes in net worth due to saving and capital transfers Net lending	e	r	*External capital account* Changes in external net worth due to saving and capital transfers Net lending to abroad
Financial account Net lending	*Financial account* Net lending	*Financial account* Net lending	a		*External financial account* Net lending to abroad
	Other changes in volume of assets account Changes in net worth due to other changes in volume of assets	*Other changes in volume of assets account : FIN. ASSETS & LIABILITIES* Changes in net worth due to other changes in volume of FINANCIAL assets	t	e	*Account for other changes in volume of external financial assets and liabilities* Changes in net worth due to other volume changes of external financial assets and liabilities
	Revaluation of assets account Changes in net worth due to holding gains/losses	*Revaluation account: FINANCIAL ASSETS AND LIABILITIES* Changes in net worth due to holding gains/ losses of FINANCIAL ASSETS	s		*Account for revaluation of external financial assets and liabilities* Changes in net worth due to holding gains/losses of external financial assets and liabilities
	Opening and closing balance sheet Net worth	*Opening and closing balance sheet: FINANCIAL ASSETS & LIABILITIES* Net worth FINANCIAL ASSETS - LIABILITIES			*Opening and closing balance sheet of external financial assets and liabilities* External net worth

Table II.6 Human Resource Accounts (HRAs) for integrated socio-economic analysis

EXTENDED SUPPLY AND USE TABLE (ESUT

					Asset accounts for human resources			
					Subsectors of households			
			Total industries, ISIC		Social balance			
CPC	Total supply at market prices	Overall adjustments: product taxes, trade & transport margins, FISIM	Output at basic prices		**Individuals by occupational categories**	Compensation of employees & mixed income		Imports cif
CPC	Total use at market prices		Intermediate consumption	Gross capital formation	Final consumption expenditure of government	Final consumption expenditure of households	Final consumption expenditure of NPISHs	Exports
			of which: outlays by industries on selected classes of social protection	of which: Gross fixed capital formation in selected classes of social protection	Actual final consumption of government (after deduction of selected expenditures for social protection transferred in kind to households)	Actual final consumption of households (incl. selected expenditures for social protection paid for by govt. and NPISHs)	Actual final consumption of NPISHs (after deduction of selected expenditures for social protection transferred in kind to households)	
	GDP	Overall adjustments: product taxes, FISIM	Value added components					
		Individuals by occupational categories	of which: compensation of employees, mixed income, wage and salary rates, employment					

CROSS-CLASSIFICATION BY INDUSTRIES AND SECTORS (CCIS

	Total economy	**Non-financial corporations**	**Financial corporations**	**General government**	**Households by subsectors**	**NPISHs**
ISIC	Output, intermediate consumption, Value added components, Employment					

Table II.6 (continued)

INTEGRATED ECONOMIC ACCOUNTS (IEA)

Total economy	Non-financial corporations	Financial corporations	General government	Households: classified by social groups	NPISHs	Rest of the World
Production account Gross Domestic product (GDP)	Production account Value added		Production account Value added	Production account Value added	Production account Value added	External account of goods and services External balance of goods and services
Generation of income account Operating surplus	Generation of income account Operating surplus		Generation of income account Operating surplus	Generation of income account *of which: compensation of employees & mixed income* Operating surplus	Generation of income account Operating surplus	External account of primary incomes and current transfers
Allocation of primary income account National Income	Allocation of primary income account Balance of primary income		Allocation of primary income account Balance of primary income	Allocation of primary income account Balance of primary income	Allocation of primary income account Balance of primary income	
Secondary distribution of income account National disposable income	Secondary distribution of income account Disposable income		Secondary distribution of income account Disposable income	Secondary distribution of income account Disposable income	Secondary distribution of income account Disposable income	
			Redistribution of income in kind account *Social transfers in kind* Adjusted disposable income	Redistribution of income in kind account *Social transfers in kind* Adjusted disposable income	Redistribution of income in kind account *Social transfers in kind* Adjusted disposable income	
Use of disposable income account National saving	Use of disposable income account Saving		Use of disposable income account *Final consumption expenditure* Saving	Use of disposable income account *Final consumption expenditure* Saving	Use of disposable income account *Final consumption expenditure* Saving	Current external balance
			Use of adjusted disposable income account *Actual final consumption* saving	Use of adjusted disposable income account *Actual final consumption* saving	Use of adjusted disposable income account *Actual final consumption* saving	
Capital account Changes in net worth due to saving and capital transfers Net lending	Capital account Changes in net worth due to saving and capital transfers Net lending		Capital account Changes in net worth due to saving and capital transfers Net lending	Capital account Changes in net worth due to saving and capital transfers Net lending	Capital account Changes in net worth due to saving and capital transfers Net lending	External capital account Changes in external net worth due to saving and capital transfers Net lending to abroad
	Financial account Net lending		Financial account Net lending	Financial account Net lending	Financial account Net lending	External financial account Net lending to abroad

III. CYCLES OF NATIONAL ACCOUNTS AND SUPPORTING COMPILATIONS OF MICRO (ECONOMIC) STATISTICS

237. In the preceding chapters, the main elements of a national accounts compilation approach have been described: the central framework and the supporting sector and industry worksheets; the compilation procedure and the role of statistical discrepancies therein; and the different options for the scope of the national accounts compilation framework. The present chapter deals with the missing link, i.e. the collection, editing and aggregation of micro data to arrive at the intermediate meso data that are the starting point of the compilation approach.

238. The discussion of the micro data is presented at the end of this report, because micro data requirements can only be properly assessed after their analytical use has been defined. Ideally, this order of the Technical Report is also the order in which national accounts programmes should be designed and implemented: First, the national accounts should be designed in scope and detail - based on analytical and policy considerations - and, second, the national accounts compilation procedure should be established and only thereafter it should be determined what micro data sources are needed in support of the national accounts compilation. Of course, in practice, micro data are already available prior to the design of national accounts, for historical reasons and also because they are used for other purposes as well. In that case, the design of the compilation framework and procedure should take the present data availability into account, but it should not necessarily be restricted by it. The design of the framework may require additional micro data.

239. In this chapter, in particular two elements concerning the collection and processing of micro data are discussed:

(a) The establishment of a 5- to 10-year cycle of national accounts compilations, consisting of benchmark and recurrent annual compilations covering current and constant price compilations, and including as well as satellite and other extended national accounts compilations;

(b) A supporting programme of data collection and processing of micro (economic) data, consisting of infrequent census enumerations, baseline and annual inquiries as well as administrative data.

240. In contrast to present practices in most countries which annually compile and publish national accounts in the same detail and scope, it is suggested here that a national accounts compilation cycle should be implemented covering, for instance, a period of 5 to 10 years, in which scope and detail of the national accounts vary over time. In the concept of a compilation cycle, the scopes discussed as options in chapter II would be separate elements in such a cycle. In support of this concept, considerable thought should be given to the integration of the periodicity of the scope and detail of the national accounts with a cycle of a data collection programme of micro data. Implementation of a cycle of national accounts compilations, together with the use of cost-effective sampling and survey techniques, will result in more elaborate data bases available over time for policy and analytical uses of national accounts. Limited financial and manpower resources thus may be used in the most effective manner.

241. Section A of this chapter deals with the elements of a national accounts compilation cycle, in which benchmark compilations of national accounts (subsection 1), a short-term cycle of recurrent annual compilations (subsection 2) and satellite and other extensions of the national accounts (subsection 3) play a role. Section B elaborates various aspects of a supporting data compilation programme; in subsection 1 an integrated programme of economic surveys supporting the cycle of national accounts compilations is suggested; to supply data in a cyclical manner, in subsection 2 it is argued that the scope, the content, and the list and area sampling frames for censuses and surveys should be adapted; and, similarly, in subsection 3 a review of how the questionnaires may adapt to a cyclical data collection is presented. Section A should be read in conjunction with chapter II, in which various scopes of the national accounts were presented as options to implement the SNA. In section A, the options are dealt with as SNA scopes that could be implemented in different stages of the compilation cycle.

A. Elements of the national accounts cycle

242. The proposal presented in this report for the introduction of a cycle of national accounts compilations using different scopes of the national accounts over time, follows from a review of country experiences: In many cases, recurrent national accounts estimates for a particular year could be further extended, as more elaborate and detailed calculations based on larger-than-usual representative survey data for that particular year are available. Still, in past practices, the same scope and detail of the compilation is frequently maintained. It is argued here that the availability of more extensive representative micro data at a particular point in time should be reflected in increased scope and detail of the format of the national accounts to enhance their analytical potential. Also, different time series could be established for national accounts with different scope and detail if the cycles of national accounts compilation and data collection are coordinated well.

243. The national accounts cycle described in this section includes three elements, i.e. the benchmark compilation, a short-term cycle of recurrent annual compilations, and a long-term cycle of satellite and other special extensions of the benchmark compilations.

1. Benchmark compilations

244. The purpose of the preparation of benchmark estimates is twofold:

(a) They provide the most detailed compilation of the national accounts based on large representative censuses and surveys, and, as such, the most detailed description of the structure of an economy;

(b) They form the base year to which the consecutive recurrent annual compilations at current and constant prices are linked.

245. The benchmark compilations could be carried out in a long-term cycle with 5- to 10-year intervals. Rebasing of the base year is only warranted if structural changes in the behaviour of sectors (affecting the structure of the IEA) and/or changes in technological structures (affecting

the industrial and product compositions of the SUT and CCIS) occur. However, with a normal pace of economic development, the convention of the preparation of benchmark estimates in a 10-year interval may suffice.

246. Baseline inquiries supporting the preparation of benchmark estimates for enterprises[34], are characterized by their infrequent nature in a decennial or quinquennial cycle, and their comprehensiveness in terms of data items collected and coverage of enterprises across size (including unincorporated enterprises) and kind of economic activity. Reasoning along similar lines, a long-term cycle of household inquiries could be adopted consisting of a long questionnaire form and a more comprehensive geographical representation for the baseline exercise, interspersed with a short-term cycle (see subsection 2 below) of data compilation on households, using a short questionnaire form and based on a less comprehensive geographical representation of households. Similarly, administrative records for other sectors, such as government and financial corporations, may also be examined in more detail for benchmark periods than for recurrent compilations, not because the data are not available, but in order to save resources. More detailed information on the data collections supporting the benchmark compilations is provided in section B of this chapter.

2. The short-term cycle of recurrent annual national accounts

247. The short-term cycle of recurrent annual national accounts compilations may cover a period of, say, two years. The following steps could be distinguished: first, provisional national accounts estimates of a very limited scope and detail would become available 3 months before the accounting year has elapsed; then, these estimates would be revised systematically and would thus improve gradually over time in scope, detail and reliability; at the end of a 2-year period, final estimates would be published.

248. In table III.1, simultaneous annual national accounts compilations for different reference periods are shown in a two-year cycle. The example is based on the compilation of national accounts in Pakistan[35]. For each year's national accounts estimates consecutive data compilations are envisaged, which over time improve the reliability, scope and detail of the national accounts estimates. The data resulting from the consecutive data compilations are generally referred to as provisional, revised and final national accounts estimates for a particular reference year.

249. The accounting period in the example given in the table corresponds to a calendar year, covering the period from January through December. October of year t+1 and June of year t+2 are chosen as the months of release of the estimates. In the case of other countries, the short-term cycle may refer to longer or shorter periods, use fiscal year cycles, be based on an extended or reduced cycle and/or may include more or less frequent releases of data. Also, the scopes (to be indicated hereafter) of the national accounts applied in the different stages of the cycle may be more extended or reduced, depending on the scope, coverage and timely availability of basic data collection schemes, and the specific policy requirements of each country at each point in time.

250. In the example, in October of year t, provisional estimates are made for year t, i.e. two months before the year ends. At the same time a second revision of national accounts estimates for the year (t-1 year) are being prepared, i.e. 10 months after the end of the year. For example in

October 1997, provisional estimates for the year 1997 and the second revised estimates for the year 1996 are being prepared. Accordingly, in June 1998, the first revised estimates for the year 1997 and the final estimates for the year 1996 should be available.

251. The above cycle of national accounts statistics is a reflection of the availability of source data at particular points in time. The national accounts estimates made 2 months before, and 6, 10 and 18 months after the year ended, are based on available monthly, 6-month and 12-month (audited) data from non-financial and financial corporations and households, as indicated in table III.2. Within the 2-year cycle, not only the coverage of the enterprises by size and economic activity and of households is extended, but also the scope and detail of the information content.

252. In general, the cycle is less dependent on the basic data for general government and rest of the world sectors because those data tend to be available in a timely manner. For instance, the budget data for the provisional estimates of the government sector should be available before the beginning of the accounting year.

253. With reference to the 12-month statistics compiled in the context of recurrent annual compilations in a short-term cycle, the data collection may focus on a summary of data items based on audited information, such as the value of sales, changes in stocks, gross fixed capital formation, wages and salaries, depreciation, net profit, net interest and dividends, loans and deposits, i.e. the main categories of the items of the profit and loss statements and the balance sheets of the non-financial and financial corporate sector with a 12-month reference period. These data, together with the detailed structural profile of the economy provided by the benchmark estimates, can be used for the compilation of the recurrent annual national accounts estimates.

254. The recurrent information could be collected through a short version of a comprehensive questionnaire administered for the preparation of benchmark estimates. The long form could replace the short form if the statistical processes are efficient, albeit with a more limited coverage of enterprises across size and kind of economic activity for the short-term cycle. In that case, the comprehensive version of the questionnaire could cover the complete detail of data in the profit and loss statements and in the balance sheets of the corporate financial and non-financial sector.

255. In the example given, the collection of 6-month statistics primarily focuses on data items from the corporate sector. The same short form utilized for the collection of 12-month statistics could also be used to collect data from a sample of smaller enterprises. If feasible, intermediate survey results from household and unincorporated enterprise inquiries should be included in the preparation of the estimates. In particular, for the household inquiries information may be available from quarterly data collection rounds introduced by many countries to monitor seasonal fluctuations in household expenditures and receipts.

256. Early provisional national accounts estimates are based on a data collection cycle of monthly statistics. Those statistics may be expressed to a large extent in price and volume indices. For some industries and other elements of the SUT, comprehensive data may be available, particularly, if the period of reference is further in the past. On the other hand, for other elements of the SUT, the coverage may be incomplete and the existing data can only be treated as representative indicators of how the data for the comprehensive coverage are changing over time. When using such indicators at least partly, not only current price data can be derived

with the help of price indices, but also constant price data can be obtained as by-product for those elements of the SUT for which this extrapolation method is used. For other elements of the SUT - particularly product flows related to services - current price estimates are the first result of the compilation and constant price data are obtained in a second step after application of price deflators.

257. A suggested scope and detail of the national accounts based on the data which becomes available over time is presented in table III.3. The scopes which change over time, presented there, may correspond to the options discussed in chapter II. The provisional estimates which become available in October before the year has ended, may be restricted to the traditional GDP breakdowns by industry and final demand components (see the Introduction, sect. C.1). The estimates could be based on the commodity flow approach, or alternatively on separate production and expenditure approaches. If the commodity flow approach is applied, estimates may be made by updating an SUT of a previous year with the price and volume indices to obtain new estimates at current and constant prices.

258. The revision 1 estimates for year t, compiled June of year t=1 including an SUT, key aggregates of the IEA for the total economy and the rest of the world, represent the consolidation of the preliminary balanced and reconciled estimates of detailed institutional sector and the rest of the world accounts. The summary statistics might include the balancing items of the income, use of income and capital accounts, i.e. balance of primary income, disposable income, saving and net lending. The preparation of these estimates should make appropriate use of data relations among institutional sectors and the rest of the world, as well as data relations within each institutional sector, obtained from benchmark estimates or more recent year data.

259. After incorporation of an improved coverage of the household and corporate sectors, the individual institutional sector accounts estimates might be published in the second revision, showing improved estimates of the inter-sectoral flows. At the end of the 2-year cycle, the final estimates should present the estimates of the comprehensive national accounts, consisting of the SUT, CCIS and IEA.

3. Satellite compilations and other special extensions of the national accounts

260. In addition, special extensions which serve as a basis for satellite and other studies as discussed in chapter II, may be carried out on an ad-hoc basis, or may follow a long-term cycle, depending on the availability of data and on the policy and analytical needs. The satellite and other extensions of the benchmark compilations may be implemented at the same time or separately from the benchmark compilations, depending on resources available.

261. An example of a common extension of the benchmark compilation, is work carried out on an extended input-output table in a longer cycle. Such benchmark table should provide a more detailed view on the production structure of the economy, than that provided by the consolidated SUTs in the recurrent annual compilations and may even be more detailed than a benchmark compilation of an SUT. If the extended input-output compilation is carried out jointly with the benchmark compilation of national accounts - which includes an SUT - it is obvious that the two should be compatible with each other both in detail of industries and products as well as in the

data that are being elaborated. However, in some instances, it may be decided that the extended input-output compilation be carried out separately from the national accounts; for instance, a research institute may compile an input-output table for a year in which no national accounts benchmark compilation takes place. In that case, the benchmark data and detail of the SUT as part of the benchmark compilation may not be compatible with the separate compilation of an input-output table. Nevertheless, new insights in the production structure should, of course, be reflected in the ongoing compilation of the annual estimates.

262. As was shown in chapter II, the SUT is the starting point for several satellite extensions: key sector analyses (sect. B), dynamic I-O (sect. C) and environmental accounting (sect. D). Other satellite studies may be initiated as further extensions of the benchmark compilations that include the IEA and CCIS: satellite accounts for joint economic and financial/monetary/fiscal analyses (sect. E) and human resource accounts (sect. F). Like the benchmark compilations, satellite extensions are structural analyses which generally refer only to selected accounting periods and are not continued over time; they may establish how indicators on poverty and income distribution, gender, environment and human resources, are structurally related to economic data that are regularly compiled within or outside the framework of the national accounts.

263. The satellite studies are not only useful in themselves, but they also show how the national accounts could be used as a point of departure for further data elaborations and thus can serve special types of analyses. An appropriate selection of the studies could be instrumental in establishing links between the office responsible for national accounts compilation and other government or non-governmental agencies that carry out such satellite studies generally as research projects. While the office responsible for national accounts compilation could assist in or coordinate the work on the satellite studies, expertise would be needed from other specialized agencies to elaborate the data further or to link them up with special data sets only available with them. The emphasis of the studies should be on bringing together existing economic and other data bases.

B. Supporting data collection programme of economic statistics

264. From a survey of country practices[36] on the collection of economic statistics through inquiries with units of the non-financial sector, it has been recognized that most countries do not align the cycle of data collection with the cycle of national accounts compilations. However, as was argued above, such synchronization of national accounts and micro data development is indispensable, in order to be able to develop, within the limited resources available, a comprehensive national accounts compilation approach, such as the one described in chapter I (table I.1).

265. An integrated programme of economic inquiries, including the collection of administrative data, would focus on the development of new standard formats of reporting micro data and should reflect integrated methods of survey and sampling techniques aligned with a national accounts compilation cycle. In doing so, such programme would also serve as a vehicle for further discussions already taking place in specialized statistical areas, e.g. industrial (establishment) statistics under the World Programme of Industrial Statistics, household statistics

under the National Household Survey Capability Programme or labour statistics under the Employment Programme. The main issues in these discussions have long been the creation of standard formats and the exploration of linkages between the data and their uses for analysis and policy formulation.

266. In the following subsections, the presentation of a programme of economic inquiries and administrative data focuses on the survey design, the sampling techniques and the type and detail of data items to be collected at different stages in the cycle of national accounts compilation. The present section particularly focuses on data compilation for benchmark years which is the basis of the annual cycle of national accounts compilations, and the point of departure for compiling the national accounts extensions. Emphasis is placed on the compilation of data for enterprises and households, as these two sectors are crucial for improving the national accounts estimates. Some attention has been paid to the compilation of data for governments. Source data of the general government and the balance of payments are generally readily available in comprehensive databases suited for the compilation of the institutional sector accounts of the general government and the rest of the world.

1. An integrated census and survey methodology

267. Three types of census enumerations generally establish the statistical universe that support the national accounts, i.e. agricultural censuses, economic censuses for non-agricultural production units, and population censuses for households. In order to establish the statistical universe for enterprises with identification of size, economic activity and location, the establishment is used as the survey unit through which information is collected, because it is the smallest production unit which can be characterized by location, size and kind of economic activity[37].

268. An agricultural census generally concentrates on crop-producing establishments (i.e. farms), but sometimes also includes livestock establishments. It provides the frame of agricultural establishments by canvassing the economy with the help of a short questionnaire to the establishments identifying summary statistics, such as location, areas cultivated, uncultivated, under crop, irrigated/rain-fed, number of persons engaged, etc. This census operation is generally followed by a sample enumeration which uses a longer questionnaire. The information obtained through the longer questionnaire may be raised to the statistical universe on the basis of the area frame established through the agricultural census.

269. Ideally, the statistical universe of the non-agricultural establishments with a fixed structure/location, is determined by an economic/establishment census in countries where the registration of non-agricultural establishments by size and kind of economic activity is not compulsory or cannot be easily enforced. By nature, economic production activities of a mobile type are excluded which could in certain countries result in the exclusion of a significant part of non-agricultural activities, particularly in terms of employment. In general, those establishments are concentrated in the industries of construction, retail trade, road and water transport and other personal services.

270. An economic census is usually based on a brief questionnaire generating specific information on individual establishments, such as location, name, address, kind of economic activity, legal and ownership status, and number of persons employed. The classification by kind of economic activity may be based on the International Standard Industrial Classification (ISIC)[38]. Like the agricultural census, the canvassing of non-agricultural establishments in an economic census should be carried out within well-demarcated areas of the national territory, which normally include a large number of statistical units.

271. The population census, generally carried out together with the housing census, follows a similar pattern of census enumeration, with the purpose of establishing a statistical universe of the population and housing characteristics, respectively. The population census is carried out with the household as the statistical unit, and provides the frame for sampling of households.

272. Each of the census enumerations mentioned above - a significant statistical operation in terms of time, finance and manpower - are normally carried out in a decennial cycle. From a recent survey of country practices, it could be concluded that economic/establishment censuses in most countries are not cost-effective from a cost-benefit point of view. Since the costs are determined by the travel to and from the enumeration areas and by the location of the statistical units within the enumeration areas, significant cost reductions might be achieved if different census operations would be implemented simultaneously in a coordinated manner. Administratively, the simultaneous execution would require coordination between different government departments, especially in establishing a common geographical frame of demarcated enumeration areas.

273. Considering the unfavourable cost-benefit ratio of establishment/economic censuses, it is not an uncommon practice in some countries, to use the population census as the sample frame for surveys of small and household establishments regarding a number of economic activities. The enumeration areas to be included in the sample are then identified by the number of households, the number of persons employed or the number of economically active persons outside agriculture. This procedure replaces the number of persons employed or the number of establishments in an enumeration area as the measure of size that is commonly used when the economic/establishment census is the sample frame.

274. In the case of government, the administrative records would provide the requisite information to establish the statistical universe of general government. However, when establishing the statistical universe, care should be taken in the preparation of the list of local lower level government bodies, such as municipalities, with respect to the consolidation of revenue and expenditure budgets with higher level governments. This universe has to be built-up on the basis of a list frame, which should not only incorporate the name and addresses but also the legal status in terms of the administrative responsibilities, and some scale variables related to revenue and current (non-development) and capital (development) expenditure budgets. Those scale variables would allow for stratification in enumeration, for instance, using complete enumeration above a cut-off point and sampling below the cut-off point. For some countries, other variables might be introduced in the list frame to reflect more country-specific administrative characteristics applicable to stratification.

275. If the cycle of annual (or more frequent) economic surveys has to be aligned with the annual national accounts compilation cycle, as described in section A.2 above, countries might have to adopt a survey approach in which large units are given priority in the data collection through the surveys, so that a comprehensive scope of national accounts industry and sector data is arrived at early on in the cycle. The distinction between small and large establishment/enterprise units in the design of an integrated survey approach is thus important. The following paragraphs present considerations to be taken into account in the elaboration of an integrated survey approach. The steps involved are diagrammatically represented in table III.4.

276. The point of departure of an integrated survey approach may be an agricultural census for agricultural establishments and an economic or population census for non-agricultural establishments. Subsequently, the sample frame is split into sub-universes: "large" and "small". The first sub-universe consists of a limited business register of large production units with an appropriate representation of the diversification by kind of economic activities characterized by their value added generation or by the number of persons employed. If GDP estimates by economic activities are required, the diversification may be reflected at the first digit level of ISIC. The criteria used to define the universe of large enterprises might differ by economic activity, but should be operational in terms of the creation and maintenance of business registers. The sub-universe of small enterprises might consist of the area frame of establishments, excluding the establishments included in the group of large units.

277. An important consideration in deciding about an operational definition of the cut-off point between large and small establishments is that the groups should be easily identifiable and practical for use in the field collection. Therefore, the number of persons engaged in the establishment or the value of fixed assets might be considered. It is important that the identification characteristic is applicable to all units. Consequently, the value of paid-up capital should not be used because this concept is not applicable to enterprises that are not incorporated.

278. Whether all enterprises in the list are enumerated depends on the subject matter under study. Census enumerations for all the economic activities should be considered in case a database has to be established for the compilation of benchmark estimates in the decennial (or quinquennial) cycle of the national accounts. In a short-term compilation cycle of, for instance, two years of recurrent national accounts estimates, complete census enumerations might not be warranted or not feasible. Stratification by size and by economic activity is then an acceptable sampling procedure. A second best method would be complete enumeration for the largest enterprises and simple random sampling for the smaller enterprises.

279. In countries where business registers have not been well established and where the economic activities taking place in medium and small enterprises are significant, the enumeration of those enterprises through area sampling becomes important, if a comprehensive measurement of economic structure and growth is the goal. In order to reduce the cost of those field operations, the simultaneous administration of data collection for different economic activities could be introduced, as already suggested. This approach would even increase the reliability of the estimates, for example, if in a country separate surveys are carried out for manufacturing and retail services, bakers and shoe-makers may be covered in both surveys and thus counted twice. Accordingly, the cost-efficiency aspect and the potential for data quality

improvements constitute the most important reasons for extending the scope of the survey exercise to a wide range of economic activities in the sampled enumeration areas.

280. In the simultaneous administration of a survey for a range of economic activities based on area sampling, some basic considerations have to be taken into account when determining the scope of economic activities to be included. Conventionally, a distinction is made between the agricultural and non-agricultural establishments; this distinction is a reflection of the different geographical distribution of the activities. With the objective of collecting production-related representative data for agricultural establishments, sampling techniques are applied after the demarcation of the different crop-zone and livestock zones in the country as separate strata. In general, those strata are distinctively different from the rural strata identified for surveys of non-agricultural establishments. For this purpose, the agricultural census provides the area frame of the universe for the measurement of agricultural activities. For similar reasons, if mining and quarrying activities are within the scope of data collection, they are sampled separately from the range of other non-agricultural activities sampled simultaneously because of their concentration in specific mining regions.

281. To capture establishments not operating from a fixed location or structure, specific considerations apply. This concerns particularly countries where a substantial proportion of the livestock population is kept by nomads moving from one geographical area to another. In those instances, specific purpose surveys have to be initiated preferably based on the seasonal movement of the nomads. This aspect is also relevant for non-agricultural activities; for instance in trade, transport and other personal services, it is a common phenomenon that those activities are taking place without a fixed location. A complicating factor in the case of those mobile units is that they are generally not captured in census operations, like population, agricultural or economic censuses. For mobile non-agricultural production units, it is not uncommon to assume a close relationship between the number of households or establishments and the number of mobile units in an enumeration area. If this assumption is valid, additional questions have to be asked from the households during the listing phase of the sampled enumeration areas, in order to identify household members engaged in mobile economic operations and to carry out follow-up interviews.

282. Apart from extending the scope of a survey exercise to a wider range of economic activities in the sampled enumeration areas, it is feasible to extend the scope of data items to be collected from each statistical unit: The 1993 SNA recommends an accounting framework which goes beyond the pure production analysis. Consequently, it is necessary to extend the collection of data items to include information on income distribution, financial transactions and balance sheets. For the questionnaire design, it is thus important to take into account what kind of information can be obtained from a specific statistical unit for the reference period. Moreover, if a country's objective is to align the cycle of data collection with the cycle of national accounts compilation, the kind of information available at various points in time has to be taken into consideration.

283. With respect to the enterprises included in the business register, a complete set of data pertaining to all accounts and tables of the SNA could be obtained in a baseline collection effort to establish a structure through the compilation of benchmark estimates. In case of multi-establishment enterprises, efforts should be made to obtain production-related data for each

establishment, in order to generate more homogeneous production-related data for the classification by industries. For this purpose and also in order to prevent double counting, the identification of the parent-subsidiary relationships in the corporate sector is of paramount importance.

284. Conceptually, if a sampled unit of production (i.e. establishment) in the area sample does not coincide with the concept of single-establishment enterprise or if the single establishment cannot be consolidated with a multi-establishment enterprise, the unit may assumed to be an unincorporated private enterprise operated by a household. In that case, the information on the assets owned and liabilities incurred for the production of goods and services should be obtained in conjunction with the household as a legal entity.

2. List and area sampling frames for censuses and surveys

285. For the preparation of reliable national accounts estimates, it is important to determine the statistical universe of:

(a) Enterprises by size, kind of economic activity and location;

(b) Households by location; and

(c) Government bodies by location and type.

286. Once the statistical universe is determined, sample frames can be prepared to provide the instruments with which economy-wide representative information can be collected timely, using particular sampling methods which are compatible with an adopted national accounts compilation cycle.

287. In most countries, area frames are prepared from the infrequent census enumerations. Those frames are cost-effective instruments for the collection of information on a subject matter, using establishments/enterprises or households as the statistical unit of measurement. List frames or business registers of enterprises are generally prepared for the large scale segment of the economic activities and subsequently used as sub-universes. To complement the sub-universes determined by the list frames, area frames, which are generally based on small scale segments of the national territory, are prepared.

288. The advantage of using business registers is that non-agricultural enterprises or agricultural holdings on the list can be cost-effectively canvassed through mail inquiries. Depending on the cut-off point used for their inclusion, they normally constitute a significant proportion of the economic activity. However, the most serious drawback is that the creation and maintenance of the registers is usually not straightforward and often not successful.

289. In order to define the universe of the business register, a criterion, referred to as cut-off point, has to be identified. If this criterion is based on certain government policies on making registration dependent, for instance, on eligibility to receive specific privileges, benefits, etc.

establishments are likely to circumvent this criterion or simply ignore the requirement if enforcement of the regulation is weak.

290. Moreover, the maintenance of the business register is sometimes cumbersome, if different government agencies are involved and no centralized computer records are maintained. New entries or de-listing due to closures might not be processed at regular intervals, which would quickly outdate the register. Even changes in addresses or names might result in statistical sampling errors.

291. The maintenance of business registers at statistical offices is, in practice, feasible only if the registers are maintained for administrative purposes by other government or quasi-government agencies. Statistical offices do not normally have the resources available, nor the authority, to ensure full compliance by establishments with registration requirements. Important work on the creation and maintenance of business registers is currently being carried out through the International Round Table on Business Survey Frames[39].

292. For statistical work, registers will therefore only be useful if full coverage can be assured and updates are straightforward. In many countries, this limits the scope of such lists to the corporate sector, that is, to those enterprises incorporated as public or private limited liability companies and registered with the authorities accordingly. In addition, information on state-sponsored units is generally also readily available. For national accounting, directories based on these criteria are acceptable, as they conform to the institutional sector definitions used in the SNA. For the design of questionnaires, the cut-off is also suitable, as it provides a break between units included in the list that maintain complete business accounts and other units, most of which do not maintain modern accounts. For survey purposes, this is an important distinction, as the nature of the line of questioning and the type of information available that may be asked from units maintaining accounts in prescribed formats is quite different from those for units that do not maintain accounts.

293. An important basic consideration in the creation of business registers is the statistical unit. In principle, it is the data items to be collected that would dictate the selection of the statistical unit for any economic inquiry. The SNA refers to the establishment as the statistical unit as the unit for which the range of production-related data is normally available. The concept of establishment used in the SNA also coincides with the concept of agricultural holding applied in the 1990 World Census of Agriculture. Apart from the availability of the most homogeneous production-related data items at the establishment level, the single-location characteristic is considered important by many countries in order to establish a geographical mapping of the economic activity. This location characteristic, when coded by enumeration area, allows for the adjustment of the area frame as a distinct statistical universe of establishments, which complement the lost frames of enterprises/establishments in the business registers.

294. However, some countries prefer to use the enterprise as the statistical unit at the expense of a more precise characterization of the geographical dimension and classification by kind of activity. These countries consider it more important to direct the inquiries to units that can not only provide production-related information but also information on balances of assets and liabilities and other non-production related transactions with other units. Also, with the enterprise as the statistical unit, the ancillary activities of the enterprise are captured more easily than at the

establishment level. It has also been suggested that, in certain circumstances, the enterprise should be the statistical unit of more-frequent-than-annual industrial inquiries because the required information on new orders, volume of sales and fixed capital formation is not available at the establishment level.

295. In practice, however, the difference between the two statistical units is not that large. Countries that use the multi-establishment enterprise as the unit of measurement, try to consider the smallest level of the enterprise, i.e. the unit at which level the required combined profit and loss and balance sheet information is available in a format that is not consolidated with the data on the parent enterprise. In those countries, the statistical offices make considerable efforts to determine the parent-subsidiary relationships in business accounting. Moreover, in developing countries where the bulk of employment and economic activity takes place in the small-scale sector, the multi-establishment enterprise structure is almost absent, and therefore the two statistical units coincide. The same inference can be drawn even for the large-scale sector in developing countries, because the complex multi-establishment enterprise structures have not yet matured.

296. In order to establish a non-overlapping integrated database for the various economic activities, duly reflecting their characteristics by size and location, a sample framework needs to be adopted. The criteria for the development of such a framework are threefold: (a) it should generate information for the measurement of structure and growth in general, (b) it needs to generate the information in a timely manner, and (c) the information has to be usable for the conversion to national accounts, i.e. the compilation of a decennial (or quinquennial) cycle of benchmark estimates and an annual (or more frequent) cycle of current national accounts estimates consistent with the 1993 SNA. The sample framework described in this section is equally applicable to agricultural and non-agricultural activities, except government and household housing services.

3. Questionnaire design

297. The questionnaire designed for area sampling should also take into account the cyclical collection data. This implies that different questionnaires be designed for large units that are given priority in the data collection of the survey, as well as for small units. Also, more extended questionnaires could be used for benchmark enquiries, and shorter ones for the recurrent annual surveys. The diversity in questionnaires could be accommodated by including a principal questionnaire together with specific modules requesting additional information for specific sectors, large enterprises and benchmark enquiries.

298. To deal with a wide range of economic activities, sector-specific modules on typical incomes and outlays might be designed. Common items of information are asked in the principal questionnaire, which is submitted to all sampled enterprises engaged in different economic activities in the sampled enumeration area. The questionnaire design should also make optimal use of available information: For this reason, the line of questioning must reflect the respondent's qualifications to respond. Thus, a distinction needs to be made between the questions addressed to a enterprises maintaining accounts and those put to enterprises not maintaining accounts. From the former group, information referring to the specified reference period will be requested, for instance the last accounting year. From the latter group, the information is requested according to what can be most accurately supplied, e.g. information regarding taxes, on an annual basis; electricity and gas bills, on a monthly basis; and other data, possibly even on a weekly basis, in order to prevent memory lapses. Better integration of all economic data also requires that concepts and definitions of the data items be standardized in the design of questionnaires administered to different economic activities. For those data items collected for the compilation of national accounts estimates, definitions should comply with the SNA. These need to be supplemented with data items required for other applications of the data, such as those based on the international recommendations for industrial statistics and used for specific analytical and policy purposes.

299. In practice, the owner-operator of an unincorporated private enterprise not maintaining accounts would not be able to distinguish clearly between the expenditure and receipts of the non-production related transactions and those of the household. Consequently, no attempt should be made to introduce this distinction, but rather the scope of the data acquired from the household should be extended to include those pertaining to the production unit. Conceptually, the household sector becomes consolidated with the unincorporated enterprise sector, which is in line with the household concept in the SNA.

300. Already, it has become a regular feature in many countries to extend the contents of household surveys beyond the standard questions on income and expenditure and to include questions on productive activities in more detail, often in separate questionnaire modules. There are two main advantages to this approach: first, it significantly improves the quality of the data. Conventionally, in household surveys, the income questions are rather simple, and, typically, for each member of the household only a summary amount by source of income is asked. The use of special modules or more probing questions related to individual household members, who are owners-operators of unincorporated enterprises in economic activities, provide more detailed and, therefore, more accurate data on incomes generated and on expenditures associated therewith. Secondly, this approach allows the inclusion of all income-generating activities: Thus, not only the units without fixed location - that cannot be covered in regular establishment surveys - can be accounted for, but also the goods and services produced by the households for own consumption.

301. At the same time, caution is warranted in the use of household surveys for the indicated purpose, because the sample for such surveys is not designed to provide a representative coverage of economic activities, but only a representative coverage of households. It is likely that in many cases the two are different, as economic activities tend to be concentrated in commercial and industrial zones and are not spread across the areas in the same way as the population.

302. Thus, the use of household surveys probably does not provide accurate information on the absolute levels of the output of these different activities because of problems with the representativeness of the samples of household surveys for this purpose. Therefore, during the listing phase of the sampled enumeration areas for a survey covering a wide range of economic activities, enterprises need to be identified by accounting practices. From enterprises that maintain accounts the complete set of data items required for the compilation of the national accounts could in principle be obtained, while from enterprises not maintaining accounts the available data items are restricted to production-related information. Of course, the sampling for non-agricultural and agricultural enterprises should be done independently, the former being based on the population census or, if available, on the establishment/economic census, and the latter being based on an agricultural census. Despite this limitation, however, inclusion of establishment-type information in household surveys does improve the quality of the income data and should provide useful information on the relative shares of income generated by various types of activities, for example in mobile units as compared to those with a fixed location.

303. Schematically, the discussion of micro data, sample and questionnaire design considerations is summarized below in a data collection framework for economic statistics, as shown in table III.5. It shows the scope of the data items which could be collected for the SUT and the IEA by different types of units. This information is cross-classified by the area and list frames created from infrequent census enumerations, such as the population census, economic/establishment census and agricultural census.

304. Eight types of units have been identified (by numbers 1-8) in the table:

1) Household proper, excluding unincorporated enterprises but including own produced goods and services consumed, and resident services;
2) Enterprises not maintaining accounts with no fixed structure (mobile);
3) Enterprises not maintaining accounts with fixed structure;
4) Agricultural enterprises not maintaining accounts;
5) Non-agricultural enterprises not maintaining accounts;
6) Non-agricultural enterprises maintaining accounts (included in area frames of establishment/population census);
7) Agricultural enterprises maintaining accounts (included in list frames);
8) Non-agricultural enterprises maintaining accounts (included in list frames).

305. Additional classification indicators could be added, for instance, to differentiate market from non-market producers. This indicator would allow for the identification of non-profit institutions as a separate group of units.

306. It is also shown in the data collection framework that with the extended scope of data items in the questionnaire, the institutional dimension of the SUT can be introduced. This is valuable information for the construction of the CCIS tables described in chapter I (see sect. B.3.c). Extending the scope and detail of the data items to cover the complete information content from the sampled households and enterprises as statistical entities, has the advantage of introducing "editing checks" at the individual unit level at an early stage of data collection and processing (see chap. I, sect. A.2, and table I.1). Such integrated editing at the micro level would significantly improve the quality and reliability of the basic data. The disadvantage of such elaborate statistical inquiries is the volume of data. Therefore, an option could be a data collection cycle of baseline inquiries covering a more extended line of questioning in a long form interspersed with a short-term cycle of consecutive inquiries using a short form with a more restricted line of questioning but closely linked to the long form.

Table III.1 Status of national accounts estimates (year t refers to accounting year ending December)

Month of data publication	Provisional	Revision 1	Revision 2	Final
October of year t	t (2 months advance)		t-1 (10 months lag)	
June of year t+1		t (6 months lag)		t-1 (18 months lag)

Table III.2 Reference period of information content available from enterprises and households (year t refers to accounting year ending December)

Month of data publication	Provisional	Revision 1	Revision 2	Final
October of year t	Monthly statistics for year t		6-month (January-June) for year t-1 (improved coverage); (July-December) statistics for year t-1	
June of year t+1		6-month (January-June) statistics for year t		12 month (January-December) statistics for year t-1

Table III.3 Publication formats of national accounts estimates (year t refers to calendar year)

Month of data publication	Provisional	Revision 1	Revision 2	Final
October of year t	Summary GDP by economic industry & expenditure components, price & volume indexes for year t		SUT, CCIS & IEA for year t-1 (improved coverage)	
June of year t+1		SUT, key aggregates of the total economy & rest of the world of the IEA for year t		SUT, CCIS & IEA for year t-1

Table III.4 Schematic presentation of an integrated methodology

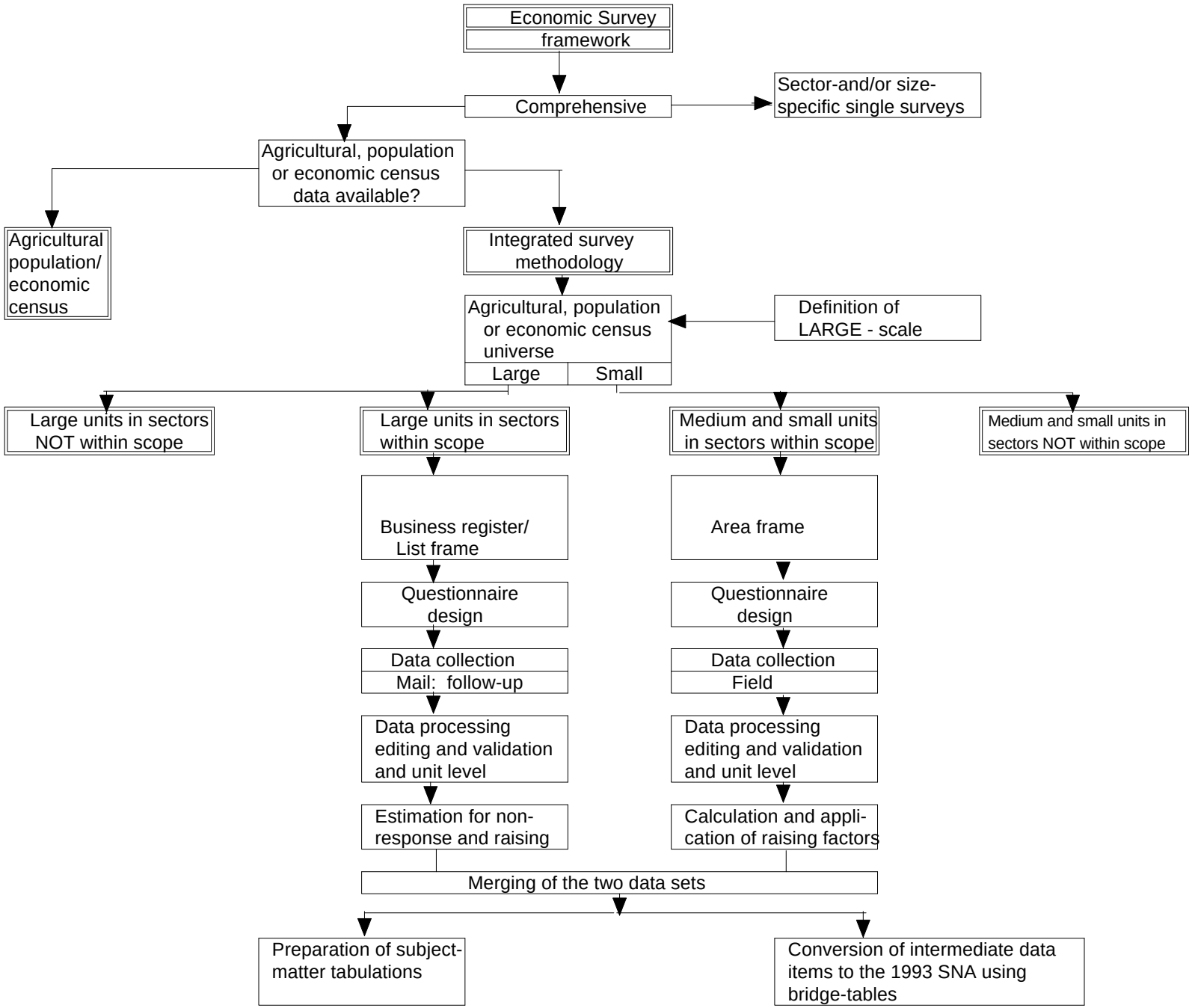


Table III.5 Schematic presentation of data collection framework for economic statistics

Inquiry	Population census	Agricultural census	Establishment/ Population census				
Frame	Area frame	Area frame	Area frame	List frames	List frames		
Universe	All households	Agricultural enterprises	Non-agricultural enterprises	Agricultural and non-agricultural enterprises	Government Finance Statistics	BOP Stat	
Unit	Households	Enterprises	Enterprises	Enterprises	Government		

	ISIC		ISIC			ISIC				
Supply Table CPC	1	2	4	5	6	7	8			
Use Table CPC	1	2	4	5	6	7	8			
	Household sector			**Financial and non-financial corporate sector**				**General Government**	**Rest of the world**	

Opening stock	1	2	3			6	7	8		
Production account	1	2		4	5	6	7	8		
Other account	1	2	3			6	7	8		
Closing stock	1	2	3			6	7	8		

ANNEX I

PRACTICAL EXPERIENCES WITH THE COMPILATION FRAMEWORK IN COUNTRIES

1. The process of developing the framework described in the report, has been markedly influenced by the practical experiences that UNSD has gained in its close cooperation with a number of countries, covering a wide geographical range and characterized by a varying degree of economic and statistical development. Certain elements of the approach have been implemented as early as 1987. For instance, the first extensive microcomputer programme distinguishing 23 institutional sectors was created for a benchmark study in Mexico in 1989. As the SNA revision process was approaching its final stages, the accounting frameworks of the countries increasingly made use of the concepts and the terminology defined in the 1993 SNA.

2. Rather than listing individual country cases, this annex adopts a topics perspective, describing the practical experiences in the implementation of the approach, with regard to (a) sectorization, (b) integration between industry and sector accounts, (c) basic data sources, (d) scope of the system and special studies and (e) reconciliation. These constitute the main elements through which the flexibility of the compilation approach is exercised.

A. Sectorization

3. In the earlier pilot studies, the number of sectors in the original project design was over 20, in an attempt to introduce break-downs such as "urban" and "rural" for the household sector, and "central", "regional" and "municipal" for the general government sector. In the case of Mexico, attempts were also made to subsectorize the external sector, by singling out the external relationships of a key sector, in this case the oil sector. Even though these are interesting analytical distinctions, they could in many cases not be sustained at the transaction level that was suggested, unless special studies were available.

4. The main sectoring suggested in the 1993 SNA is usually the starting point for the sectorization discussion. The non-financial corporate sector is generally broken down at least by public and private, whereby - e.g. in Vietnam - a further distinction between "central state industry", "local state industry" and "cooperatives" was made. In China, a sector grouping "joint venture enterprises" was suggested. It is generally recommended to separate out key sectors: "oil" in Mexico, Iran and Angola, "wood" in Equatorial Guinea, etc.

5. The financial sector lends itself most easily to further breakdown, as detailed information is often compiled by the monetary authorities. The 7-subsector breakdown chosen by the Dominican Republic is rather typical:

Monetary Institutions:	- Central Bank
	- Other public monetary institutions
	- Private monetary institutions
Other Financial Intermediaries:	- Other public financial intermediaries
	- Other private financial intermediaries
Insurance Companies:	- Public insurance companies

- Private insurance companies

The subsectoring of the government sector, if at all done, follows the hierarchical government structure (central, regional, etc.). The household sector and the external sector are generally not subdivided further. With regard to NPISHs, the databases of many countries at this point in time do not permit to single them out as a separate sector.

6. A special sector, which lies outside the basic SNA sector classification is "International Technical Cooperation Projects". This key sector was distinguished in the Equatorial Guinea system because of its relative importance for the Guinean economy; in it, all the transactions of several international cooperation projects, for which ample data were available, were grouped together.

B. Integration between industry and sector accounts

7. A special feature of the compilation approach described in the report, is the explicit integration of industry accounts contained in the SUT and of sector accounts in the IEA. In the early designs of the compilation framework[40] it was suggested to introduce the institutional sector dimension fully into the SUT, i.e. compiling complete sectoral "supply and use tables" for every institutional sector. This design of the compilation framework was only implemented in the Mexico project, where, however, the SUT was simplified, insofar as it did not include product detail. For projects which included SUT matrices with product detail, the attempt to compile fully elaborated sectoral SUTs had to be abandoned, as, in practice, it was not considered feasible or cost effective.

8. The alternative of having only a weak link between the two data sub-systems, via the totals for the national economy, was considered to be unsatisfactory: Frequently asked questions such as "How is the output of the government services column in the SUT related to the output of the general government sector in the IEA?", indicated the need for intensifying this link. The first steps were to establish the linkage for selected sectors (government, external sector, financial sector) which are related directly to a small number of well identified economic activities. However, the objective to establish a more systematic link led finally to the development of comprehensive cross-classification tables, which since then have been used in more recent projects (e.g. Iran, Dominican Republic).

9. In order to compile the cross-classification table, in practice, the SUT is generally taken as the point of departure: Given the production vector of a certain economic activity (comprising output, intermediate consumption and value added components), an effort is made to estimate its allocation to the different institutional sectors. For example, in the case of Pakistan valuable a priori information was available, as the detailed SUT (approximately 100 industries) distinguished for many economic activities between "large scale" and "small scale" (see also para. 14 below). This distinction was used then to allocate the large scale activities to the enterprise sector, whereas the small scale activities were assumed to belong to the household sector. In other countries, ad hoc estimates on how to allocate the total production vector of an industry to the sectors had to be made based on prior knowledge. Thereby, the components of

the production vector were analysed individually, in order to reflect different technologies used by different institutional sectors.

10. The intensity of the link between SUT and IEA is measured by the number of items that are cross-classified and by the industry-sector dimension of the cross-classification tables: In the case of the Dominican Republic, seven cross-classification tables have been introduced for output, intermediate consumption, value added, compensation of employees, taxes on production, subsidies on production and operating surplus[41]. As the system distinguishes 16 industries and 13 domestic institutional sectors, in theory the cross-classification could have been a 16 industries x 13 sectors table. However, this would have implied, for instance, the allocation of the SUT vector of "financial services" to the very fine sub-sectoring of the financial institutions sector (7 subsectors). For practical reasons, thus, the cross-classification table was reduced to the dimension of 16 industries x 5 sectors, focussing on the main sector categories only.

11. As the availability and the formats of SUTs varied considerably between the country projects - no SUT in the Thailand and Malaysia projects, no product detail in Mexico's, no industry detail in Equatorial Guinea's, 16 industries in the Dominican Republic's, 100 industries in Pakistan's - the design of the linkage between industry and sector data had to be discussed and resolved individually for every country. In the future, it is hoped that additional questions included in industry surveys on the institutional nature of an establishment will allow a direct compilation of the cross-classification table from the basic data sources.

C. Basic data sources

12. The compilation of the SUT was usually derived from the data base of an existing input-output table. The availability of a recent I-O table frequently determined the choice of a benchmark year, for which the country pilot study was then executed. For the compilation of the institutional sector accounts, a variety of sources was explored: BOP data for the external sector; government finance statistics, budget and tax data and other administrative records for the government sectors; money and banking statistics and other information collected from the monetary authority in its supervisory function for the financial sector; etc.

13. The two difficult sectors are the non-financial corporations and the household sectors. For key sector corporations, public enterprises and large private enterprises, usually complete business accounts in the form of profit and loss statements and balance sheets are available, so that the problem of the intermediate data compilation is reduced to solving the methodological difficulties of the conversion process. However, for smaller scale businesses and for households often only very incomplete survey information is available for selected years, upon which estimations for the institutional sector accounts have to be based.

14. The most comprehensive effort to integrate basic data development with national accounts development was made in the Pakistan project, where a survey methodology called FIRST (Fully Integrated Rational Survey Technique)[42] has been developed and applied. FIRST aims at maximizing survey efficiency by designing a national strategy for capturing reliable and timely data on industrial activity. One of the features of the FIRST methodology is the distinction between "large-scale" and "small-scale" enterprises. The "large" sub-universe

comprises (a) public limited enterprises, (b) private limited enterprises, (c) government-sponsored enterprises, and (d) all other establishments employing 250 persons or more. The "large" sub-universe is directly and completely enumerated, with the help of a comprehensive questionnaire.

15. On the other hand the "small" sub-universe, which consists of all the other enterprises/establishments[43], is covered through sampling. For instance, economic activities that take place within a fixed structure can be estimated using an area frame provided by an economic census. It is suggested that the design of the questionnaire take care of the diversity of activities by providing specific modules on particular income distribution transactions. If deemed desirable, the questionnaire could also differentiate between establishments that maintain accounts and those that do not.

16. Basic data for the household sector in Pakistan are obtained from a Household Integrated Economic Survey, which has also been designed in such a manner as to facilitate construction of SNA sector accounts: e.g. the classification of the consumption block in the survey is linked to the product classification in the SUT, and at the same time permits a sensible reporting of consumption of food items in quantities that facilitates poverty analysis (measures of calory and protein intake). Furthermore, agricultural and non-agricultural worksheets on the production process have been added, to be completed by household members who are owners/operators of establishments engaging less than 10 persons. These worksheets provide a check for the primary income reported by household members with own-account employment status.

17. A PC-based data management and compilation software (based on PARADOX software) called Integrated Accounts System (IAS), processes the different standardized vectors of basic data (survey results, annual reports, etc.) and, with the help of computerized bridge tables, generates so called initial national accounts estimates. To the extent possible, pre-editing checks are built into the programme, so that the internal consistency of unit data can be verified already at the data entry level.

18. In the context of basic data management, the institutional and organizational aspect of national accounts compilation needs to be addressed also. From the above it is clear that the role of national accountants is one of coordinators of various types of economic statistics: They draw on a pre-specified set of basic information and transform it into a coherent national accounts framework. Consequently, in order to take advantage of specialization, in may be advisable to divide the compilation work along sectoral lines, having one person/group taking care of the financial sector, others of the household sector, etc.

D. Scope of the compilation framework and special studies

19. Concerning the scope of the compilation framework, the differences between countries regarding the format of the SUT (and consequently the cross-classification table) and the sectorization have already been mentioned in the report. The following discussion, thus, focuses on the differences in the horizontal dimension of the IEA table.

20. In the Mexico study, one of the first carried out by UNSD, an attempt was made to compile complete accounts, including balance sheets for all sectors, with the exception of the general government and the households. Most of the subsequent studies followed a phased approach, by which the first objective was to introduce the sectoring up to the "use of income" and the "capital account", in order to arrive at sectoral estimates for saving and investment. The inclusion of the financial account and the balance sheet, was left to further stages of project implementation, depending on the results of special studies. As mentioned above, the financial account and the balance sheets provide national accountants with the opportunity of important vertical consistency checks.

21. With regard to the classification of transactions, countries took the first digit level detail of the 1993 SNA classification[44] as a starting point. Depending on the analytical relevance, further detail was included. For instance, in the Malaysia framework great detail was included to describe social transfers, because one of the declared objectives of the early implementation phases of the 1993 SNA for Malaysia was to make the income distribution streams more explicit. In the case of the Dominican Republic, remittances from workers abroad were singled out under miscellaneous current transfers because of their relevance in determining disposable income.

22. The inclusion of additional items in the transaction classification generally represents a commitment to compile this information for all institutional sectors distinguished in the system. However, it was generally agreed, that reconciliation is made easier at a more disaggregated level: For instance, it is easier to balance detailed transactions such as "interest", "dividends", "land rent", etc. between sectors, rather than having to reconcile an overall flow called "property income".

23. Even though most of the country projects focussed on the implementation of the basic features of the 1993 SNA, in some cases "windows were opened" for further special analysis. As one example the Iran project could be cited, in which detailed data on asset stocks were included in the SUT, following a design similar to the one suggested in table II.3 of the report: Opening and closing stocks for produced and for some important non-produced assets, such as oil, have been placed at the right hand side of the SUT. A line for oil depletion was added to explain the changes in the stocks during the accounting period. Furthermore, an effort was made to identify separately losses through war damages.

E. Reconciliation

24. At the conclusion of the first compilation cycle, in many countries the system showed substantial imbalances, in particular between the SUT and the IEA and vertically for some sectors, where information had been drawn from a variety of sources, or where data were based on rough estimates (e.g. household sector). The challenge was to derive from the initial global

analysis of discrepancies a reconciliation strategy which would make optimal use of the existing information. In country practice the reconciliation process was often composed of several "modules", where a group of discrepancies, such as the vertical or the horizontal discrepancies were addressed together.

25. The SUT, in almost all cases, was already internally balanced as a result of the application of the commodity flow method. In the case of the Dominican Republic, where no input-output table was available, a preliminary balance between supply and use of product categories had been established, leaving, however, an imbalance for intermediate consumption as a total of economic activities, as opposed to the total of intermediate consumption by products.

26. Another module in the reconciliation process was the vertical balancing of institutional sectors: For large non-financial corporations, public enterprises, financial corporations, the government and the external sector internal imbalances could often be resolved by clarifying methodological issues, such as treatment of taxes on production, valuation of transactions in foreign currency, etc. Discrepancies for the small private corporations sector and for the household sector usually could not be removed easily, as the information for both sectors was incomplete. However, the discrepancies observed were often similar in magnitude, though of opposite signs, reflecting the fact that, once all other sectors were balanced, these two sectors taken together needed to be balanced, unless there was still a major discrepancy for the total economy.

27. Balancing the common items between the SUT and the IEA, was done with help of the cross-classification table. This led often in actual fact to an allocation of production information of the SUT - which was considered more reliable - to the institutional sector accounts, in particular to the household sector. The data already contained in the household sector (labour and transfer incomes, investment) served as important signals in this process: In Equatorial Guinea, as well as in the Dominican Republic, the preliminary allocation of production income (value added) to the household sector had to be revised upward, as the disposable income of the households did not suffice to finance household consumption and investment. In other words, the net lending of the household sector was negative.

28. An important module in the reconciliation process was concerned with the horizontal balances of transactions in the IEA. These balances were established analysing each transaction, whereby the largest imbalances were usually addressed first. Some transactions were obviously related and needed to be analysed together, as they were frequent candidates for misclassifications (e.g. current and capital transfers). In all country projects the transaction matrices (see chap. I, sect. B.4.a) were considered to be a useful tool in the process of horizontal reconciliation. Even though the system attempts to avoid the concept of residual sectors, it is obvious that, in the horizontal reconciliation, the two weak institutional sectors (private enterprises and households) were prime candidates for adjustments. However, the analysis of vertical sector consistency sets certain limits to the adjustments, that could be reasonably made in the sector context.

29. It is important to reiterate that, by nature of the approach described here, the reconciliation process is an overall process. That implies, that any balance achieved locally in some part of the system, should be considered as preliminary, leaving the possibility open that, in

the light of strong evidence, adjustments to the pre-reconciled data may be necessary. This is particularly true for the data of the SUT; treating them as "untouchable" implies a significant reduction of the degrees of freedom for the reconciliation process.

30. Through its close cooperation with countries in their reconciliation exercises, UNSD is presently accumulating experience in observing certain repetitive patterns of statistical discrepancies, which point in the direction of specific and frequently occurring data deficiencies. As mentioned before, the recognition of a data problem, from an overall pattern of statistical discrepancies is one of the key features of this compilation approach. It is hoped that further insight in this area will ultimately lead to the formulation of recommendations for effective reconciliation strategies.

ANNEX II

ILLUSTRATIVE EXAMPLES OF THE RECONCILIATION OF NATIONAL ACCOUNTS DATA AND THE ROLE OF STATISTICAL DISCREPANCIES THEREIN

1. The reconciliation process has been described in general terms in the report (see chap. I, sect., C.3). The reconciliation of data, obtained from a variety of independent sources, is the most important element of the national accounts compilation procedure. It takes place after the micro data have been edited and aggregated to intermediate data and after their conversion to the national accounts format has been completed. The various types of statistical discrepancies illustrated in the tables of chapter I (tables I.1 to I.9) guide the process of reconciliation. From the analysis of a specific pattern of statistical discrepancies, deficiencies in the intermediate information are detected and corrections are made to the data.

2. Section A of this annex presents a concrete numerical example of data deficiencies, which are analysed using the tools of the compilation framework; section B lists further typical examples of data problems and their effects on the pattern of statistical discrepancies; and section C, finally, discusses the interference of statistical discrepancies and the consequences for formulating an effective reconciliation strategy.

3. In reviewing the examples, the reader should be aware of the following terminology that is used to describe the reconciliation procedures. The term "reconciliation steps" is used to refer to single adaptations of separate items in a worksheet. Several conceptually related reconciliation steps may be needed to make one "reconciliation adjustment". Each reconciliation adjustment - or, for short, called "adjustment" - is represented by one adjustment column in one worksheet or by several related adjustment columns spread over the worksheets of several sectors. All reconciliation adjustments together, which lead to the final balancing of the national accounts data, are called the "reconciliation process" or "procedure". The reconciliation process consists usually of a number of iterations, in which one reconciliation adjustment is made at a time, and the next adjustment is made only after studying the data effects of the previous adjustment. A "reconciliation strategy" is a planned reconciliation process which aims at removing all statistical discrepancies in the most effective manner.

A. A numerical example of reconciliation adjustments

4. As mentioned above, the numbers included in the tables of chapter I are based on the data example of the 1993 SNA publication. However, in order to show how the compilation framework works, certain data items have been modified, simulating underlying data deficiencies. Tables I.5 to I.7 include, therefore, concrete examples of rather typical statistical discrepancies.

5. In order to arrive at a consistent database, a two-step approach is suggested and worked out below on the basis of these illustrative data. In a first step, general conclusions are drawn as to what are the main causes of the statistical discrepancies, in which part of the data set are they located, and what type of data adjustments are needed in order to arrive at a consistent data set.

In a second step, the data base is reviewed in more detail and specific data deficiencies are identified, and, as a consequence, specific adjustments are defined. Ideally, these adjustments would eliminate the statistical discrepancies entirely, but in practice, of course, several iterations may be needed.

6. When reviewing the sets of statistical discrepancies made explicit in tables I.5 to I.7 some general conclusions can be drawn as to the underlying causes. There are no statistical discrepancies between supply and use in the SUT, and also there are no statistical discrepancies between the SUT and the CCIS. Thus, there are no internal inconsistencies within and between the industry accounts, or between the product detail of supply and use items in the industry and sector worksheets. However, there are "horizontal" (or "between sectors") statistical discrepancies in the IEA and also "vertical" (or "within sectors") statistical discrepancies for the column of the non-financial corporate (NFC) sector. Accordingly, the data of the latter are internally inconsistent and this causes also discrepancies between the sectors. The data deficiencies in the NFC data are further confirmed by the statistical discrepancies between the CCIS and the IEA in table I.7 with regard to NFCs. However, in the latter table, discrepancies are not restricted to the NFC sector only; also for the household sector there are statistical discrepancies between the CCIS and the IEA. Furthermore, the latter are more or less equal in magnitude, but opposite in sign between the household and NFC sectors.

7. The conclusions drawn from this first step of the reconciliation assessment may be summarized as follows:

(a) NFC sector data should be further reviewed in connection with their internal consistency which causes vertical statistical discrepancies in the IEA; furthermore, the level of some of the data which may be the cause of the horizontal statistical discrepancies in the IEA should be examined;

(b) The distribution of output, intermediate consumption and value added data on industries between the household and NFC sectors should be reviewed, as a possible cause of the opposite signs of the CCIS-IEA statistical discrepancies for the two sectors in the CCIS.

8. In practice, the above would be based on the experiences of the national accountants. They may be aware, for instance, that NFC source data were converted to SNA format without applying any adjustments. This would of course lead to deficiencies, which still need to be addressed. Also, with regard to the distribution of industries by sectors in the CCIS, it should be observed that whole industries have been allocated to sectors, and this allocation may be particularly deficient when it comes to the allocation of industries between the NFC and household sectors.

9. These considerations should be kept in mind when reviewing the NFC and CCIS data in detail, and entering the second step of the reconciliation. This part of the reconciliation is worked out in two tables - tables A.1 and A.2 - of this annex, which present the statistical discrepancies and the adjustments made. Both tables present data that are extracted from the worksheets and the central framework tables of the compilation framework.

10. Table A.1 is a presentation of adjustments made to NFC sector data, after they were converted to SNA format. Each of the adjustments are reflected in a column that is to be included in the NFC sector worksheet as presented in table I.3 of the report. The adjustments are made to individual SNA items of the NFC sector, but when included in the same column, represent a group of reconciliation steps that are related to one another. The adjustments and effects on each SNA item are presented on the left hand side of table A.1, and the total of adjustments and statistical discrepancies extracted from different tables of the central framework are shown on the right hand side. When adding together the adjustments to each item of the IEA, their total is very close to the discrepancies to which they are supposed to respond.

11. The underlying reasoning behind the adjustments presented in each of the columns of table A.1 is the following:

(a) Inter-establishment deliveries within the same enterprise may not be reflected in NFC data, but are included in the industry data of the SUT, which are based on establishment information. To arrive at compatibility between the SUT and the IEA, therefore, such deliveries are additionally included in output and intermediate consumption of the NFC sector;

(b) Production for own final use in consumption of agricultural goods and for own account of capital goods may not be reflected in a deconsolidated manner in the accounts of large agricultural and other enterprises; only the cost may be reflected. This deficiency of the intermediate data of NFCs may be corrected by including an adjustment based on deconsolidated data of output, intermediate consumption, compensation of employees, as well as capital formation and final consumption;

(c) The balance sheets of NFCs are generally used in the initial conversion to estimate capital formation (in produced assets) and acquisition less disposal of non-produced assets. However, as the difference between balance sheets may include also revaluations and other volume changes, adjustments are made to account for this incorrect estimation of gross fixed capital formation and acquisition less disposal of non-produced assets;

(d) Intangible produced assets may often not be included in the balance sheets of NFCs and, therefore, are omitted from the estimate of capital formation that is obtained as the difference between balance sheet items; corrections made increase capital formation. In other instances, corrections are made because intangible assets are not separately identified from tangible produced and non-produced assets (e.g. cost of ownership transfer of produced and non-produced assets; improvements to land); in these instances corrections do not change the total of capital formation and acquisition less disposal of non-produced assets;

(e) A final correction is included to take into account imputed interest on actuarial reserves of insurance schemes in the calculation of insurance service charges. This affects intermediate consumption of the NFC sector, which purchases such services.

12. The second group of adjustments, illustrated in table A.2, are made to the distribution of production accounts data of industries between the household and NFC sectors. This is usually the most difficult part of compiling the CCIS, as allocating industries to the sectors of government, financial corporations, and also, in some instances to public and large private NFCs, may be less difficult. The reallocation is applied to all three industries contained in this simplified version of the CCIS. In the case of agriculture, etc., initially all production was allocated to the household sector. This is now refined by re-allocating a part, associated with plantations and collective farms, to the non-financial corporate sector. In the case of manufacturing, etc., all data were initially allocated to the NFC sector. This was obviously a gross oversimplification, and it is corrected through a more detailed review of the establishments data, which results in the re-allocation of some of the smaller activities of repair shops, own account and small scale construction activities to the household sector. With regard to services, initially all services, except financial services, government services and the services of owner-occupied dwellings, were allocated to the NFC sector. This has been also corrected in table A.2, where some of the smaller services establishments dealing with retail trade (stores) and transport services as well as personal services such as barber shops and beauty parlours, have been re-allocated to the household sector. The re-allocation in all three instances has been indicated in the table in the columns of changes corresponding to each of the three industries; the changes are derived as the difference between the initial allocation and revised allocation of industries between the NFC and household sectors, both of which are indicated in separate columns of the table.

13. Tables A.1 and A.2 show that the totals of changes and statistical discrepancies are close. What is not shown in the tables, but which is apparent from a more detailed review of the adjustments in the NFC worksheets and the CCIS table, is that all statistical discrepancies disappear, once both sets of adjustments are incorporated into the data set.

B. Typical patterns of statistical discrepancies

14. The following examples intend to illustrate, how certain frequently occurring patterns of statistical discrepancies point in the direction of specific data deficiencies, such as incorrect classification of transactions, time mistakes in the recording of transactions or under-reporting of specific transactions by the economic agents in one sector.

15. Each example is introduced briefly by a diagnosis, i.e. a general description of what data problems are usually encountered, given a certain method of compilation used and the assumptions made therein. This diagnosis is the explicit expression of the compilation aspects that affect the quality of the national accounts data and that any national accountant takes into consideration - often implicitly - when reconciling conflicting estimates. Thereafter, an analysis of the pattern of statistical discrepancies is presented. Finally, for each of the scenarios, suggestions are made to amend the data through concrete reconciliation steps.

1. Classification of outlays in the government records that are incompatible with classifications used in other sectors

16. Government records frequently classify expenditure items differently from counterpart sectors that are the recipients of certain payments. Of course, when converting government records to the national accounts format, corrections should be made for this. However, the description of the government records or the detail in which the data are available may lead the national accountant initially to record the government transactions incorrectly. Also, specialists from the government and other sectors might use different classification criteria in their separate compilations. Only at the final reconciliation stage, when confronting the government expenditure data in national accounts format with the receipts recorded in the counterpart sectors, it is possible to detect the incompatibilities between the manner in which flows and stocks are recorded in different sectors. The incorrect classifications lead to specific statistical discrepancies, which are analysed below.

17. If the mistakes in the government recording were the only data problem, in an otherwise clean data set, this would lead to the following situation:

(a) There would be no statistical discrepancies between the SUT and the CCIS, nor between the CCIS and the IEA, which would indicate that the information flow from the SUT through the CCIS to the IEA is internally consistent;

(b) There would be no vertical statistical discrepancies within the sectors (net lending, changes in net worth), which implies that all institutional sector accounts are vertically balanced and that all sector information has been recorded in an internally consistent manner;

(c) However, horizontal statistical discrepancies could be observed, indicating that certain transactions, such as compensation of employees, other current transfers, capital transfers and elements of the financial account are still unbalanced;

(d) There may also appear a discrepancy in the SUT for certain product lines.

18. The two striking facts of this example are, that (a) no sector is vertically unbalanced, and (b) certain transaction discrepancies have different signs and are of similar magnitude. This indicates, that all sectors have consistently recorded their information, but certain flows have not been classified the same way by the paying and the receiving sector. Misclassifications between transaction categories generate statistical discrepancies of the same magnitude but with opposite signs.

19. A typical misclassification is between current and capital transfers: The government may record a payment of a capital transfer, whereas the counterpart (e.g. households and the rest of the world) receipts are treated as a current transfer. Another example for a pair of discrepancies are capital transfers, and shares and other equities. In the government accounts a payment of a capital transfer was recorded, while the counterpart sector (e.g. a public enterprise) recorded an increase in liabilities in the form of government shares. The national accountant needs to decide what is the correct classification in terms of SNA standards and reflect this in an identical classification of the transaction by both the government and the corporate sector.

20. A discrepancy in compensation of employees would have a matching partner in size in one of the products of the SUT (e.g. in medical services) if the following type of misclassification had occurred: The government may provide free medical services to a selected group of citizens, which may be done in the form of directly paying a doctor's bill from a hospital. This remuneration of a doctor which will appear in the government account, may then be mistakenly recorded by the government as "compensation of employees" instead of being recorded as the purchase of medical services for government consumption. Assuming that the provider of the medical service correctly records a "sale of a service", then the following pattern of statistical discrepancies would appear: An excess of supply in the product category "medical services" and an excess of "compensation of employees, paid", as the doctor does not treat the payment received as remuneration.

21. It should be noted that from the pattern of discrepancies alone it cannot be determined which sector is the "culprit" sector. Reclassifying for instance the transfer paid by the government from capital to current would have the same effect on the overall statistical discrepancies as reclassifying the transactions in the counterpart sector in the opposite direction. The existence of statistical discrepancies with opposite signs should, however, alert the national accountant, to the fact that there may be inconsistent classifications in different sectors. To identify those, the national accountant may use the tool of the transactions matrices to analyse in detail the data links between the sectors with regard to all transactions for which statistical discrepancies are detected (see chap. I, sect. B.4.a). He may also need to inquire further with the sectors involved, in order to understand better the character of the transactions and/or to obtain more transaction detail if necessary.

22. The number of incorrect classifications by one or more sectors may increase when the transaction detail is further refined: If, for instance, the financial instrument "loans" is further broken down to distinguish between "short-term loans" and "long-term loans", a situation can be easily imagined in which the overall category of "loans" will be balanced between sectors; however, there may be still a discrepancy in the sub-categories, as debtors and creditors do not use exactly the same criterion to differentiate between short and long term[45]. In general, if it is hardly possible to allocate discrepancies to sub-categories in a meaningful way and, depending on the analytical circumstances, one may thus be satisfied with balancing the transactions at a higher level of aggregation. However, if such a situation occurs, the level of detail included in the central framework should be reconsidered for future compilations: As mentioned before, adopting the classification detail of the framework implies, in principle, that reconciliation is to take place at this level.

2. Errors caused by "cash" recording of government transactions

23. Differences in the timing of recording transactions between the government and other sectors occur frequently. Government records used in the national accounts are generally on a cash basis and there may exist a considerable difference for some transactions between the moment of, for example, the receipt of a capital good (accrual recording) and the moment that the actual payment takes place (cash recording). Another example is the time discrepancy between the moment a certain tax payment becomes due (accrual) and the moment the payment

is actually made (cash). This creates a problem, as enterprise accounting is generally on an accrual basis.

24. Accrual recording of transactions is the general principle adopted in the SNA for the recording of transactions and other flows[46]. Consequently, for those sectors - such as the government sector - for which intermediate data are available on a cash recording basis, adjustments need to be made in the conversion of those intermediate data to the national accounts format.

25. If these adjustments, however, have been incorrect or insufficient, this would typically cause the following type of statistical discrepancies:

(a) Statistical discrepancies may appear between supply and use, for instance in the line of manufacturing goods;

(b) There are usually no statistical discrepancies between the SUT and the CCIS, nor are there discrepancies for individual sectors between the IEA and the CCIS, which indicates that the information contained in the IEA for individual sectors is consistent with the CCIS and the SUT;

(c) None of the institutional sectors would be vertically unbalanced, which means that all the sector information was introduced in an internally consistent manner;

(d) Horizontal statistical discrepancies are likely to appear across sectors for the following transactions: taxes on production and imports, current taxes on income, wealth, etc., as well as other accounts receivable/payable. The reason for these discrepancies is that the total taxes recorded as paid by other sectors do not coincide with the taxes recorded as received in the government sector. Furthermore, discrepancies in the line "other accounts receivable/payable" indicate that at least one sector has recorded a claim or a liability, the counterpart of which does not appear in the government accounts. This data problem would also be reflected in the closing balance sheets.

26. In order to analyse the problem in the transaction lines, the transaction matrix (see chap. I, sect. B.4.a) may be used. The transaction matrix should be filled in using the marginal totals and additional data and information that may help to compute the cells of the table. In doing so, the problematic inter-sectoral flows will become apparent and, if necessary, estimates for missing data or corrections for weak data will have to be made. After a thorough analysis and subsequent adjustment of the inter-sectoral flows in the transaction matrix, recalculation of the margins of the matrix yields the adjusted data for the institutional sector accounts, which are then balanced for the transaction.

27. Filling in the interior of the matrix with the marginal totals seems difficult to achieve. However, very often many of the boxes in the interior can be deleted from the beginning, as the corresponding inter-sectoral flow for the transaction at hand is conceptually impossible. The tax example given above is very illustrative in this connection: As the government sector and the rest

of the world are the only two sectors that can receive taxes, many boxes will be empty by definition. If, in addition, the information given by the balance of payments for the external sector is considered to be reliable, the only part left to be filled in is the column representing the tax payments by the resident sectors to the government.

28. In general, business accounts record tax payments on an accrual basis. This also implies that the corporate accounts include a tax liability, which has no counterpart yet in the government sector. If this explanation is accepted, not only the government's tax receipts are underestimated but also its financial claims, and, therefore, with every adjustment of the tax transactions a matching adjustment in the financial accounts would have to be made. This explains why neither sector shows a vertical statistical discrepancy, as all sectors record their taxes and the corresponding changes in the financial assets in an internally consistent manner.

29. So far, this example focused mainly on tax payments, in order to illustrate what pattern of statistical discrepancies arises if there is a difference in the recording practices of the corporate sector, on the one hand, and the government sector, on the other (accrual versus cash). If, however, in a real world situation such a recording discrepancy is detected, more transactions by the government (such as intermediate consumption, capital formation, current and capital transfers, etc.) are, of course likely to be affected in a similar way.

30. If for instance the purchase of intermediate consumption items for the production of government services had not been recorded because they had not been paid yet by the end of the accounting period, the following sequence of reconciliation steps would be necessary to correct this error:

(a) Increase intermediate consumption of a certain product category (e.g. equipment) in the SUT in the column of "other non-market production - public administration";

(b) Increase by the same amount the production of public administration services (in the same column), which will leave the value added and its components for this economic activity unaltered;

(c) Increase the government final consumption in the SUT as the government is the user of its own additional output. Note that the overall effect on the balances between supply and use of the adjustments made so far is that in the line of "manufacturing products" the use has been increased.

31. As the SUT is now out of line with the CCIS and the IEA, the same adjustments (output, intermediate consumption and collective final consumption expenditure) need to be carried through the entire system. By introducing an additional expenditure into the IEA, however, a corresponding correction to the financial position of the government needs to be made, in order to preserve the vertical sector balance. Increasing the liability side of the financial instrument "other accounts receivable/payable" will reestablish the balance in the government accounts.

32. A similar sequence of adjustments would be necessary, if, for instance, a purchase of equipment for the purpose of capital formation had not been registered in the government sector:

Increase of gross fixed capital formation in the line of "manufacturing goods" in the SUT; a corresponding increase of capital formation in the government sector worksheet and an increase of financial liabilities of the government. If capital formation appears as one of the items in the CCIS, the adequate adjustment would also have to be made there.

33. It should be underlined again, that this type of comprehensive adjustment preserves not only the balances between the SUT and IEA, but also vertically within the government sector. This is rather typical and unique for the government sector, as all the information related to the government (production, income flows and financial position) usually stem from the same administrative records. The same is not true for the other institutional sectors.

34. This example shows how the recording practices of the government can lead to certain patterns of statistical discrepancies in the system. To the extent that it is known that the government records are based on cash accounting, it may be possible to make certain adjustments to the government sector prior to the reconciliation process, converting intermediate information to the correct accrual accounting prescribed by the SNA. However, these "a priori adjustments" may be insufficient, and it is likely that it will not be possible to "fine-tune" these adjustments until the government information is confronted with that of the other sectors.

3. Under-coverage of receipts and payments by households in household survey data

35. The use of household survey information in the national accounts gives sometimes rise to a number of data deficiencies. Thus, households may not be able to record all use and resource items that are attributed to them in the household sector accounts of the SNA, because they lack information on these items. Household survey data, for instance, do not include payments by employers of social security contributions, which the SNA records as part of compensation of employees, or government expenses on education, health and so on, which the SNA treats as transfers in kind to households and as part of actual household consumption. Also, in their responses to household survey questionnaires, households may under-report, for tax reasons, revenue from property income and entrepreneurial income, and, for other personal reasons, may also under-report certain outlays such as on alcoholic beverages, tobacco, etc. The counterpart information on these transactions is generally available in the records of enterprises and government and, thus, would be reflected in the SUT and the IEA data of the corporate and government sectors after conversion to SNA format. This leads, of course, to inconsistencies in the data, once the data of different sectors are brought together in the central framework, and results in the various types of statistical discrepancies that are analysed below.

36. The type of data problems mentioned above would lead to the following statistical discrepancies:

(a) Statistical discrepancy in the SUT between supply and use in the row of "manufacturing" products;

(b) There are no statistical discrepancies between the SUT and the CCIS, nor statistical discrepancies between the IEA and CCIS for the household sector or for any other sectors. Thus SUT, CCIS and IEA data are consistent with each other;

(c) There are statistical discrepancies with regard to net lending of the household sector in the IEA, i.e. net lending obtained from the capital account is different from net lending resulting from the financial account of the household sector;

(d) Other statistical discrepancies observed are those across sectors in the IEA between total income flows paid and received. The imbalances refer to the transactions involving employers' social contributions (actual and imputed) and the corresponding entries under social contributions, to property income and to social transfers in kind.

37. These statistical discrepancies could all result from data deficiencies in household survey information. However, conceptually speaking they can be grouped together in three separate specific data problems, which may be resolved through three reconciliation adjustments that would be recorded in different columns of the worksheet of the household sector.

38. A first adjustment is needed to address the vertical statistical discrepancy with regard to net lending of the household sector. This discrepancy implies an inconsistency between revenues and outlays that households record in their responses to household surveys and information on net lending of sectors, including the household sector, that is obtained as a result of detailed flow-of-funds analyses. One part of the inconsistency with regard to outlays may be related to observable statistical discrepancies between supply and use of "manufacturing" products. For instance, the total uses of "manufacturing" products may be lower than the total supply and, when analysing this in more product detail, it may become clear that this is caused by under-reporting of final consumption expenditures on alcoholic and tobacco products. Increasing the final consumption expenditure reduces the net lending in the capital account.

39. A second adjustment to be included in a separate column of the household worksheet would address the statistical discrepancy for compensation of employees in the "generation of income account". This discrepancy may indicate that households have not recorded receipts of employers' social contributions, while the paying counterpart sectors do record this information either as part of labour cost or as other types of expenses that have been re-classified as compensation of employees, when converting the data to the SNA format. If, for instance, the employers of a given economy pay their contributions directly to a social security scheme, the households would not be able to include this transaction in their accounts, as they may not even know the exact amount of the payment. Consequently, an imputation will have to be made, by which the households record the receipt of an increased compensation of employees and make an equivalent payment to the social security scheme, recorded in the secondary distribution of income account.

40. Making this type of adjustments in the household sector for both actual and imputed employers' social contributions, would resolve simultaneously problems of the statistical discrepancies in the "generation of income account" and in the "secondary distribution of income account". As a receipt and a payment of the same amount are recorded, disposable income of the households (and thus the total economy) will not change; however, the balance of primary income will increase by the amount of the adjustment.

41. A third adjustment relates to similar data problems that may be responsible for discrepancies in the "social transfers in kind". These transfers originate in the government and/or the non-profit institutions serving the household sector and are received exclusively by the households. The latter, however, are in general unable to quantify these received transfers. This is, for instance, the case for free education or health services. Consequently, the households do not record any transfer receipts at all when responding to household surveys, nor do they record the actual consumption of these "in kind receipts".

42. An imputation in the household sector of the amount of the statistical discrepancy will resolve this problem. Consequently, the adjusted disposable income (not the disposable income) will increase, but as the actual individual final consumption of households (and consequently of the total economy) will have to be increased by the same amount as the transfer receipts, the saving of the household sector (and thus of the total economy) will be unaffected. Equally, as all adjustments are made exclusively in the "real" part of the accounts and in a balanced manner, the vertical statistical discrepancies (net lending, changes in net worth) will not be affected by these adjustments.

43. The statistical discrepancies described in this example are different from the example presented in subsection 2 above, in so far as they could not be avoided in the data collection phase, even with improved collection methods. The household sector data do not include the necessary information to estimate these flows; it is only when the information from different sectors is confronted in the reconciliation phase that the household sector will be able to make the necessary adjustments, based on the information provided by its transaction partners. The statistical discrepancies in this example are, thus, a tool to comply with the accounting principles of the system.

C. Elements of a reconciliation strategy

44. To isolate one or a few particular data deficiencies, as was done in the previous section, is of course a strong simplification, justified only by the ease of explanation. In actual national accounts compilation, simultaneously occurring data problems will lead to an interference of several patterns of statistical discrepancies which, in the extreme case, may lead to a situation where particular discrepancies disappear, not because the corresponding sector or transaction is correctly balanced, but because there are two (or more) data errors, which cancel each other out. The signals conveyed by these discrepancies, thus, get particularly blurred if the individual data deficiencies lead to statistical discrepancies with different signs, and/or when the different statistical discrepancies are of different quantitative magnitudes. It is also easily conceivable that, in the reconciliation process, while removing one particular statistical discrepancy in a certain reconciliation step, others could actually increased temporarily.

45. It is important, therefore, to develop a reconciliation strategy. The reconciliation consists in general of several iterations. In a first iteration, adjustments would be made for those data deficiencies that had been clearly identified. This would improve the conditions for the next iteration. In practice it may not always be possible to arrive at a uniquely defined data set; because of the mixed messages given by the statistical discrepancies, there is a danger of misinterpreting the discrepancies. This may lead to incorrect adjustments, which makes it of course more difficult to diagnose correctly the data deficiencies in any further iteration.

46. The key to a successful reconciliation strategy is the reading of certain patterns of statistical discrepancies in terms of recognizing the data problem behind it. Experiences obtained with the use of the compilation approach show that intensive discussions among national accountants with practical compilation experience can considerably advance the development of a reconciliation strategy.

47. In subsequent paragraphs a number of practical recommendations are made, that national accountants may follow when working with the compilation approach developed in this report. These practical recommendations are meant to ensure the optimal conditions needed to arrive as closely as possible to the uniquely defined data set from which all data deficiencies have been removed; they could be summarized as follows:

(a) All independent data should be separately processed, and no reconciliation of data should take place before all available information has been incorporated into the compilation framework;

(b) A thorough review of the statistical discrepancies and the underlying data deficiencies should take place prior to any reconciliation;

(c) Any mistakes or gross omissions of data identified in the review should be corrected prior to the reconciliation;

(d) An explicit reconciliation strategy should be defined after the analysis.

48. The first recommendation guarantees that a maximum number of discrepancies between independent data sources is made explicit in the compilation framework prior to the reconciliation. Thus, reconciliation in the approach developed in this report, is a much more comprehensive activity than what it is in the traditional national accounts compilation.

49. The thorough review of the statistical discrepancies suggested as the second recommendation aims at getting as close as possible to a correct diagnosis of data deficiencies prior to the actual reconciliation of data. The review should determine what are strong data that cannot be adjusted much during the reconciliation, and what are weak data that may be subject to large adjustments. This determines the "degrees of freedom" for the reconciliation process. Traditionally, the information for the financial, the public enterprises and the government sectors as well as for the external sector are considered more reliable than the data for the non-financial private sector or the household sector. The quality of the data for the former sectors is superior, because the data are generally based on specialized and internally consistent statistics and these sectors comprise usually a smaller number of economic agents.

50. Analysis of all statistical discrepancies together is feasible in the present approach, as the proposed compilation framework internalizes the interrelationships between all economic transactions, and thus is able to make explicit all statistical discrepancies at the same time. Simultaneous analysis of all statistical discrepancies prior to reconciliation is essential as one data deficiency is often reflected in different statistical discrepancies and it would be, consequently, of little use to try to tackle a specific statistical discrepancy in an isolated manner. The overall analysis of the statistical discrepancies should be done by a team of experts responsible for the different statistical sub-systems of the framework and familiar with the analysis of the data.

51. The third recommendation, that any mistakes or gross omissions of data should be eliminated prior to the reconciliation, is based on the experience that large statistical discrepancies at the beginning of the reconciliation process stem usually from missing data entries or gross undercoverage in certain sectors. The initial effort should thus be directed to filling in data gaps or removing serious undercoverage of one or several sectors. If no further information is available, preliminary estimates, which will be refined later, should fill the data gaps. If these deficiencies are not removed from the start, interpretation of the remaining deficiencies is made much harder. This initial removal of mistakes and gross omissions may be considered as a pre-reconciliation stage.

52. It would be useful for any national accountant to develop a check list of gross mistakes or omissions, based on experiences in past national accounts compilations. Such check list might include the following items:

(a) Global adjustments for import duties, VAT and other product taxes less subsidies are often omitted in the compilation of the SUT, and thus cause statistical discrepancies between the SUT, the CCIS and the IEA, as the government records those taxes as part of its resources;

(b) Imputations for output of FISIM (financial intermediation services indirectly measured) may have been made in the relevant industry accounts of the SUT, but

omitted from the sector accounts of financial corporations, and/or no global adjustment may have been incorporated when FISIM is not allocated to uses;

(c) Trade and transport margins may have been treated correctly in the supply, but adjustments for trade and transport margins between the supply and use of products may have been incorrectly recorded in the SUT, and/or the margins may have been fully omitted from the accounts of non-financial corporations or households in the IEA;

(d) Production of government services may have been correctly recorded as output in the SUT, but its distribution in particular to general government, may not have been recorded properly, mainly because government consumption may include some purchases that are not recorded as government output;

(e) Cash accounting or other deviations in accounting practices in some sectors - particularly government - may not have been identified correctly.

53. The definition of an explicit reconciliation strategy, suggested as the fourth recommendation, will depend on the following typical considerations: If the data of the government, public enterprises, financial corporations and external sectors are considered to be strong data, reconciliation between these sectors may be carried out as a separate iteration. Similarly, if the data of the balanced SUT are considered to be more reliable than the sector data of the IEA, it is best to remove first the overall statistical discrepancies between all three tables, i.e. the SUT, the CCIS and the IEA (primarily the elements of the production account), and then, in a next iteration, to remove horizontal statistical discrepancies across the sectors in the IEA. They may be eliminated in several steps, starting with the discrepancies that appear at the top of the IEA, i.e. starting with the income and use of income accounts or, alternatively, from the biggest statistical discrepancy to the smallest. Once all the horizontal discrepancies have been eliminated up to "net lending", it is very likely that the remaining group of vertical discrepancies is considerably reduced also.

54. To conclude this annex, it should be mentioned that specifying the objective of the reconciliation process is also part of defining a reconciliation strategy: The obvious objective of reducing all discrepancies to zero may well be too ambitious to achieve, especially when balance sheets are included in the compilation framework. A modified objective could be that certain transactions or asset types need only to be reconciled on a higher aggregate level. Equally, certain sectors taken together may be balanced in a satisfactory manner, even though discrepancies remain in the individual sub-sectors. In general, it will be difficult to formulate these modified objectives at the beginning of the reconciliation process. However, the possibility of modifying objectives in the described manner should be taken into consideration, from the beginning of the process, especially if it is already known that certain sub-sectors may be difficult to separate.

Table A.1 Statistical discrepancies and adjustments to SNA data of non-financial corporations

		ADJUSTMENTS: inter-establishment deliveries within the same enterprise added to output and intermed.iateconsumption	ADJUSTMENTS: production for own final use in agriculture and construction, separately identified in output, inputs (interm. cons. and comp. of employees) and final use (cap. formation)	ADJUSTMENTS: other changes in volume of assets and revaluations separated from total changes in assets and liabilities	ADJUSTMENTS: separate identification of intangible produced and non-produced assets in capital formation and acquisition less disposal of assets	ADJUSTMENTS: attributed interest on insurance policies increases the imputed service charge included in intermediate consumption
Production account	**output**	13	31			
	intermediate consumption	13	16			5
	consumption of fixed capital					
	VALUE ADDED, NET	0	15	0	0	-5
Income generation account	**compensation of employees, payable**		10			
	other taxes less subsidies on production					
	operating surplus/ mixed income, net	0	5	0	0	-5
Distribution of income accounts	**property income, receivable less payable**					5
	current transfers, receivable less payable (incl. current taxes on income and social transfers, and also taxes less subsidies on production and imports receivable by government)					
	DISPOSABLE INCOME, NET	0	5	0	0	0
Use of income account	**Adjustment for the change in net equity of households in pension funds**					
	SAVINGS, NET	0	5	0	0	0
Capital account	**gross capital formation**		5	-61	21	
	of which: additions to the value of non-produced assets					
	less: consumption of fixed capital					
	acquisition less disposal of non-produced assets, net			-95		
	capital transfers, receivable less payable					
	NET LENDING	0	0	156	-21	
	CHANGES IN NET WORTH DUE TO SAVINGS AND CAPITAL TRANSFERS	0	5	0	0	0
Financial account	**acquisition of financial assets**			10		
	incurrence of liabilities			14		
	NET LENDING	0	0	4	0	0
Other changes in assets accounts	**produced assets**			61		
	non-produced non-financial assets			95		
	financial assets			10		
	liabilities			15		
	CHANGES IN NET WORTH DUE TO OTHER VOLUME CHANGES AND HOLDING GAINS AND LOSSES	0	0	151	0	0
Opening balance sheet	**produced assets**					
	non-produced non-financial assets					
	financial assets					
	liabilities					0
	NET WORTH	0	0	0	0	
Closing balance sheet	**produced assets**		5		21	
	non-produced non-financial assets					
	financial assets					
	liabilities			1		
	NET WORTH	0	5	-1	21	0

Table A.1 (continued)

		TOTAL ADJUST-MENTS	STATISTICAL DISCRE-PANCIES: between sectors	STATISTICAL DISCRE-PANCIES: CCIS-IEA	STATISTICAL DISCRE-PANCIES: IEA - SUT	STATISTICAL DISCRE-PANCIES: within sectors, real - financial net lending / NFC
Production account	output	44		-44		
	intermediate consumption	34		-34		
	consumption of fixed capital			0		
	VALUE ADDED, NET	10		-10		
Income generation account	compensation of employees, payable	10	-10			
	other taxes less subsidies on production					
	operating surplus/ mixed income, net	0				
Distribution of income accounts	property income, receivable less payable	5	-5			
	current transfers, receivable less payable (incl. current taxes on income and social transfers, and also taxes less subsidies on production and imports receivable by government)		0			
	DISPOSABLE INCOME, NET	5				
Use of income account	Adjustment for the change in net equity of households in pension funds		0			
	SAVINGS, NET	5				
Capital account	gross capital formation	-35			35	
	of which: additions to the value of non-produced assets					
	less: consumption of fixed capital					
	acquisition less disposal of non-produced assets, net	-95	95			
	capital transfers, receivable less payable		0			
	NET LENDING	135				131
	CHANGES IN NET WORTH DUE TO SAVINGS AND CAPITAL TRANSFERS	5				
Financial account	acquisition of financial assets	10	-4			
	incurrence of liabilities	14				
	NET LENDING	4				
Other changes in assets accounts	produced assets	61				
	non-produced non-financial assets	95				
	financial assets	10				
	liabilities	15				
	CHANGES IN NET WORTH DUE TO OTHER VOLUME CHANGES AND HOLDING GAINS AND LOSSES	151				
Opening balance sheet	produced assets					
	non-produced non-financial assets					
	financial assets					
	liabilities					
	NET WORTH	0				
Closing balance sheet	produced assets	26				
	non-produced non-financial assets					
	financial assets					
	liabilities	1				
	NET WORTH	25				

Table A.2 Statistical discrepancies in the CCIS and adjustments based on a redistribution of production data by sectors

		Agriculture, hunting, forestry and fishing			Mining, manufacturing, electricity, gas, water, construction			Services industries			Total changes	Statistical discre-pancies before adjustment
		Data before adjustment	Data after adjustment	Changes	Data before adjustment	Data after adjustment	Changes	Data before adjustment	Data after adjustment	Changes		
Non-financial corporations	Output	0	28	28	2123	1304	-819	710	421	-289	-1080	-1124
	Intermediate consumption	0	7	7	1258	726	-532	268	166	-102	-627	-661
	Consumption of fixed capital	0	6	6	92	80	-12	56	51	-5	-11	-11
	Value added, net	0	15	15	773	498	-275	386	204	-182	-442	-452
				0			0			0		
House-holds	Output	89	61	-28	0	819	819	100	389	289	1080	1080
	Intermediate consumption	47	40	-7	0	532	532	20	122	102	627	627
	Consumption of fixed capital	11	5	-6	0	12	12	20	25	5	11	11
	Value added, net	31	16	-15	0	275	275	60	242	182	442	442

NOTES

1. System of National Accounts 1993, Inter-Secretariat Working Group on National Accounts: Commission of the European Communities-Eurostat, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, World Bank. Brussels/Luxembourg, New York, Paris, Washington, D.C., 1993 (United Nations publication sales No. E.94.XVII.4).

2. The comprehensive data approach was developed by Prof. Richard Stone and elaborated in many of his publications. In particular, mention should be made of "Definition and measurement of the national income and related totals", Appendix to a Report of the Sub-Committee on National Income Statistics of the League of Nations Committee of Statistical Experts (United Nations: Geneva 1947); also R. Stone, D.G. Champernowne, J.E. Meade, "The precision of national income account estimates", Review of Economic Studies, 9 (2), pp. 111-125, 1942.

3. On the micro-macro links of data, see 1993 SNA, chap. I, paras. 1.64-1.67; see also "Micro-Macro(-Micro) Data Links for Use of Household Sector Accounting", Harry H. Postner, in UNSD Handbook on National Accounting: "Household Sector Accounting" [see note 5(e) below].

4. The term "economic agents" is not used in the 1993 SNA. "Institutional sectors" and "establishments" are defined in SNA chaps. IV and V respectively.

5. The following Handbooks have been issued, are pending publication or are in preparation at UNSD:
   (a) "Accounting for Production: Sources and Methods", Studies in Methods, Series F, No.39, New York, 1986 (Sales No. E.86.XVII.11);
   (b) "Integrated Economic and Environmental Accounting", Studies in Methods, Series F, No.61, New York, 1993 (Sales No. E.93.XVII.12);
   (c) "Use of the SNA in economies in transition", Studies in Methods, Series F, No.66, New York, 1996 (Sales No. E.96.XVII.11);
   (d) "Input-Output Table Compilation and Analysis", Studies in Methods, Series F, No.74, New York, 1999 [pending publication];
   (e) "Household Sector Accounting", Studies in Methods, Series F, No.75, New York, 1999 [pending publication];
   (f) "Links between Business and National Accounting", Studies in Methods, Series F, No.76, New York, 1999 [pending publication];
   (g) "Uses of National accounts" [in preparation];
   (h) "Non-profit Institutions" [in preparation].

6. For the details of the integrated economic accounts, refer to Table 2.8 and to para. 2.92-2.95 of the 1993 SNA. The schematic presentation here differs from SNA Table 2.8 insofar, as the columns have been rearranged: For the purposes of compilation it is convenient to present the sectors in a compact manner, i.e. to move the resources and uses

columns for every sector together.

7. For a detailed description of the sequence of accounts that define the IEA, the reader is referred to chaps. VI-XIII of the 1993 SNA. Also, note that not all accounts are represented in the diagram of table I.1, in order not to overburden its presentation. In particular the breakdown of the Allocation of Primary Income Account into two sub-accounts - i.e. the Entrepreneurial Income Account and the Allocation of Other Primary Income Account - is omitted. Furthermore, an alternative sequence of accounts included in parallel with the Secondary Distribution of Income Account and the Use of Disposable Income Account - i.e. the Redistribution of Income in Kind Account and the Use of Adjusted Disposable Income Account, has been left out here.

8. In comparison with the cross-classification presented in the 1993 SNA (Table 15.3), the cross-classification here is a transposed presentation, i.e. shows the institutional sectors in the columns and the economic activities in the rows. Furthermore, this cross-classification represents in actual fact a sequence of matrices, as a separate cross-classification matrix can be generated for each common element between SUT and IEA (e.g. output, intermediate consumption, compensation of employees, etc.).

9. The only comprehensive information on country practices available at this time but not updated to the present, is contained in "National Accounting Practices in Seventy Countries", United Nations Statistical Office, Studies in Methods, Series F No.26, New York 1979 (Sales No. E.79.XVII.19, Vols. I-III).

10. See also 1993 SNA, chap. II, paras. 2.171-2.174.

11. In an extensive study, UNSD has calculated a country-by-country milestone assessment based on data available for the period 1990-1995. This document was presented to the Statistical Commission at its 1997 session as background document to E/CN.3/1997/12.

12. In accordance with the definitions of the 1993 SNA, non-profit institutions serving households will be treated as a separate sector when the compilation framework is introduced. However, as of now only few practical experiences exist with the compilation of data for this sector. Consequently, in some text examples or in the country experiences presented at the end of this report, NPIs still continue to be integrated with the household sector.

13. Manual on Monetary and Financial Statistics, IMF, Washington, D.C., 1998;
Balance of Payment Manual, Fifth edition, IMF, Washington, D.C., 1995;
Government Finance Statistics, IMF, Washington, D.C. 1988 [this publication is currently being revised; the new edition is expected for 2000].

14. For more detailed descriptions of ERE-TES and IAS, refer to the bi-annual newsletter of the Inter-Secretariat Working Group on National Accounts "SNA News and Notes" issues 5 and 6 (January and July 1997), respectively.

15. See, in particular, the chapter written by Magda Ascues and Jan W. van Tongeren on

Compilation of Sector Accounts of Non-Financial Corporations, Latin American Practices, in "Links between Business Accounting and National Accounting" [see note5(f) above].

16. The terminology primary, secondary and tertiary sector is not used in the 1993 SNA. The denomination "sector" in this context is unfortunate, as the 1993 SNA suggests that the term "sector" be strictly reserved for groupings of institutional units, not groupings of establishments.

17. Strictly speaking, the external sector is not an "institutional sector", in the sense that it does not reflect the behaviour of a homogenous group of economic agents. The 1993 SNA rather adds the accounts of the rest of the world in order to "close" the system. However, for the sake of simplicity in the presentation, the external sector will be dealt with here as an institutional sector.

18. An important exception are SDRs and monetary gold, which are only recorded as assets and have no liability counterpart when they are created, transacted or kept in stock.

19. In those cases in which the receipts and payments (assets and liabilities) for one transaction are not recorded in the same line, the statistical discrepancies actually refer to two lines of the IEA. For instance, domestic payment of compensation of employees is recorded in the generation of income account, whereas the receipts are recorded in the primary distribution of income account. The same is true for taxes less subsidies on production. In the financial account, acquisition of financial assets and incurrence of liabilities are recorded on separate lines.

20. It may be noted that these are the only statistical discrepancies that can already be calculated at the level of the individual sector worksheet.

21. The principle of a transaction matrix has been described in detail in Michel Séruzier, "*Construire les comptes de la nation*", chap. 14.3.a, p. 365, Paris 1988. In this publication transaction matrices are called "*matrices qui a qui*".

22. More elaborate compilations of product balances in which important product detail of intermediate consumption is included, are discussed in Michel Séruzier, "*Construire les comptes de la nation, selon le SCN 1993*", chap. 12, Economica, Paris 1996 . In this approach, important backward and forward product links between industries are established within so-called "*filières*" or production chains, which are taken into account in the compilation of intermediate product data.

23. In this context, see 1993 SNA, chaps. XVIII-XXI, which deal with "Functional classifications", "Application of the integrated framework to various circumstances and needs", "Social accounting matrices" and "Satellite analysis and accounts", respectively.

24. For the classification of transactions, balancing items and assets refer to 1993 SNA, Annex V, Part I.B-I.D; for the classification of institutional sectors refer to Annex V, Part I.A.

25. Chapter XXI of the 1993 SNA, when dealing with functional satellite accounting, provides a different orientation. It suggests to elaborate part of the System for special analyses, dealing in detail, for instance, with education, health, environmental protection, etc.

26. Refer also to 1993 SNA, Annex II: "Relationship of the rest of the world account to the balance of payments accounts and the international investment position".

27. See UNSD handbooks on "Household Sector Accounting" and on "Links between business and national accounts" [see note 5(e) and (f) above].

28. Having reached at least milestone 4 is also the requirement to be able to respond in a comprehensive manner to the international data questionnaire on national accounts, which will be distributed by UNSD to all non-OECD member countries.

29. See also note 16 above on the terminology of "key sectors".

30. See Vu Quang Viet, "Measurement of Fixed Capital Stock and Consumption of Fixed Capital", to be published as chapter VI in the forthcoming Handbook on National Accounting: "Links between Business and National Accounting" [see note 5(f) above].

31. See the System of integrated Economic Environmental Accounts (SEEA), United Nations, 1993. The SEEA only includes environmental impacts caused, and limits the stocks to those assets that are depleted in volume terms; quality characteristics of the stocks of natural assets and changes therein are not dealt with in the SEEA [see also note 5(b) above].

32. See also Marcello Caiola, "A Manual for Country Economists", IMF Institute and Research Department, Washington, D.C., 1995.

33. For information on the objectives and the substantive content of HRAs, the reader is referred to a paper by Jan van Tongeren entitled "Human Resource Accounting for Socio-Economic Analysis: an Accounting Framework for Analysis", to be published in the forthcoming UNSD handbook on "Household Sector Accounting" [see note 59(f) above].

34. The term "enterprise" is used in this chapter in a survey context. It generally includes public and private, non-financial and financial corporations and quasi-corporations as well as unincorporated enterprises. In general, the term, as it is used in this chapter, does not refer to non-profit institutions.

35. In Pakistan, a variant of the present compilation methodology was implemented. It should be noted that, for easy reference of an enlarged number of users of this Technical Report, the Pakistan fiscal year cycle has been replaced by a calendar year cycle.

36. See "Strategies for Measuring Industrial Structure and Growth", Studies in Methods, Series F, No. 65, United Nations Statistical Division, New York, 1994 (Sales No. *E*.94.XVII.11).

37. In the paragraphs that follow, the terms "establishments" and "enterprises" are generally used as the units that are covered in surveys and/or through which information is obtained; these terms are not statistical units in the SNA sense. See also discussion in chap. I, sect. A.1.

38. Refer to ISIC Rev. 3.

39. Technical papers produced and discussed at the first 10 meetings of the round table are available on a CD-ROM produced by Statistics Canada. Current papers may be consulted at the following Web site: <<www.stat.go.jp/roundtable/rndtab.htm>>.

40. Jan van Tongeren and Cristina Hannig, "Compilation of Integrated National Accounts and the Use of Micro Computer", (unpublished paper, available), United Nations Statistical Office, New York, 1989.

41. In actuality, there are only five "independent" cross-classification tables, as "value added" and "operating surplus" are determined by the other elements.

42. See also "Strategies for Measuring Industrial Structure and Growth", Studies in Methods, Series F, No. 65, United Nations Statistical Division, New York, 1994 (Sales No. E.94.XVII.11).

43. It is argued that for the "small" sub-universe and for developing countries the distinction between enterprises and establishments is of limited relevance, because most "enterprises" in the sample consist of single location establishments.

44. See 1993 SNA, Annex V, Part I.B, "Classification of transactions and other flows", p. 586 ff.

45. In the case of financial assets and liabilities, more detailed information on the sectoral origin/destination of flows is available in general. Thus, the transaction matrix may be a particularly helpful instrument, in order to identify the problematic creditor-debtor relationship.

46. For further details, see 1993 SNA, chap. II, paras. 2.64-65, and chap. III, paras. 3.91-96.