1. The ACC Sub-Committee on Statistical Activities at its nineteenth session reviewed the work done in the international statistical organizations on preparing, using and publishing estimates on the basis of a report assembled by the Statistical Office of the United Nations Secretariat from inputs received from members of the Sub-Committee (SA/1985/9). The Sub-Committee noted that estimates of the same statistical series were sometimes prepared by several organizations and it was agreed that an effort should be made to avoid issuing conflicting estimates. The fields of trade, capital flows, production, balance of payments, population, national accounts and employment were particular areas in which an exchange of experience and information was considered to be a valuable step towards improving and/or reconciling estimates. The Sub-Committee also noted that one way to provide an indication of the reliability or nature of the estimates would be to supply a description of methodologies used for the estimates. It was agreed that future Sub-Committee meetings should be used as a periodic opportunity for a more formal and general exchange of detailed information and experience in that area. This report, in response to the request of the Sub-Committee, has been compiled from information provided by Sub-Committee members (ACC/1985/15, paras. 17, 18 and 70 (f)).

2. Inputs received from the United Nations Statistical Office, ECE, ECLAC, ECA, ILO, IMF, UNIDO and GATT concerning the methodologies in use in their organizations for making estimates in the fields of trade, capital flows, balance-of-payments, industrial production, population, national accounts and employment are presented in the annex.

3. The Sub-Committee may wish to consider:

(a) Whether there is a need to better co-ordinate the work of international agencies on producing and disseminating estimates in the above fields;

(b) Whether further steps need to be taken with the aim of identifying and avoiding any conflicting estimates; and

(c) Any new initiatives which might be taken for the exchange of experience and information on estimation methodologies.
ANNEX
(to SA/1986/9 dated 5 May 1986)

A. UNITED NATIONS STATISTICAL OFFICE

Methodologies used by the United Nations Statistical Office in preparing estimates in several fields of statistics are as follows:

1. National Accounts

1. Estimates are prepared for the following series: (a) gross domestic product at market prices and net material product expressed in U.S. dollars (current prices) for non-reporting countries; (b) national income at market prices expressed in U.S. dollars (current prices) for non-reporting countries; and (c) gross domestic product at market prices expressed in constant 1975 dollars broken down into components of expenditure and kind of industrial activity and net material product by kind of activity of the material sphere.

2. Where estimates of national product aggregate are derived from other related national product aggregates (gross domestic product from gross national product, etc.), the method used is (a) to estimate the relevant components, e.g., depreciation, indirect taxes, subsidies or net factor income from abroad, either from absolute amounts contained in publications of other international organizations, such as the World Bank and the International Monetary Fund (IMF) and make the necessary adjustments, or (b) use the proportions or percentages established by prior relationships between these components and the main economic aggregates. In cases where data for one or more years have to be calculated to complete a time series, growth rates implicit in estimates of basic economic and financial statistics prepared from a number of sources, such as national publications, regional economic surveys prepared by the regional commissions and reports of statistical experts provided under the technical co-operation programme, are utilized to extrapolate from available information to arrive at estimates for the missing years.

3. Where estimates of national product aggregates are not available but sectoral shares of each of the primary, secondary and tertiary sectors of the economy can be established for any one year with sufficient reliability, these sectoral estimates are weighted and extrapolated by relevant production indicators. For example, national indexes of the quantum of production are employed for agriculture, total industrial activity, manufacturing and, in some cases, construction. Where such national indexes are not available for agriculture, indexes compiled by the Food and Agriculture Organization of the United Nations (FAO) are utilized. In the absence of official series for total industrial activity or manufacturing, use is made of indicators officially provided and utilized in compiling the world index of industrial production of the United Nations Statistical Office. If estimates at current market prices are desired, this is done by adjusting both agricultural and industry sectoral growth performances with the use of suitable price indexes. For the utilities and services sector, extrapolations are generally made by using current government expenditures in the production of government services. By adding up the resulting sectoral estimates, the total gross domestic product (GDP) is obtained, which is then further adjusted where necessary, using the method described in paragraph 2 above.
4. For MPS countries, where net material product data need to be converted to national income, the value of the "non-material" services is estimated by the difference between (a) the sum of the incomes arising in the activities classified in the non-material sphere of production, which is comprised of wages and salaries, profits, interest and taxes, and (b) the amount of non-material services used in the material sphere, such as expenditure on social and cultural services furnished by enterprises to their employees, purchases of non-material services, allowances for travel expenditures and imputed gross output of financial institutions. For a few MPS countries which have never provided this difference or the basic data necessary to estimate the quantities involved, the Statistical Office has calculated these estimates from basic information contained in national publications and in reports of international organizations, such as the Council for Mutual Economic Assistance (CMEA).

2. Industrial Statistics

5. In the work on industrial statistics, estimates are currently utilized in two areas: (a) in the calculation of weighting coefficients for the compilation of index numbers of world industrial production and employment; and (b) in the computation of the world and regional aggregates for commodity production statistics. Following is a brief description of the methods used in each area.

(a) Index numbers of world industrial production and employment

6. The weighting coefficients for the compilation of world and regional index numbers of industrial production and employment are estimates of value added (in factor values) and the number of persons engaged, respectively, classified at the 3-digit (major group) level of ISIC, for mining, manufacturing, electricity, gas and water. Data for more than 150 countries or areas must be prepared every five years; the latest were for 1980.

7. For many countries, these data were directly available from national publications or were provided by national statistical offices, on request. However, for some (mainly developing) countries, adjustments or estimations have been required to attain full coverage and international comparability. The most common problems encountered, and the estimation methods that were used to address them, are listed below:

(a) The available data for 1980 did not cover all establishments:

If data based on full establishment coverage and on incomplete coverage were available at the 3-digit (major group) level of ISIC from previous censuses, then the ratios between the two data sets for each major group were applied to the 1980 data, to obtain full coverage.

If 1980 data based on full establishment coverage were available at the 1-digit (major division) or 2-digit (division) levels of ISIC, these were broken down to the 3-digit level of ISIC using percentage distributions of the 3-digit data for 1980 that were based on incomplete establishment coverage.
(b) The available data for 1980 did not cover all major groups:

Estimates for each of the missing major groups were based on the corresponding shares in the most recent year for which complete data, i.e. including the missing major groups, were available. (In a few cases, this required the use of shares derived from the weighting coefficients for 1975).

(c) Value added was reported at a valuation other than factor values:

This adjustment was very difficult when national data on indirect taxes and subsidies were not available at the 3-digit level of ISIC, because the patterns of taxation as well as of subsidies differ greatly from country to country. Usually, only a total for indirect taxes - or indirect taxes net of subsidies - in manufacturing was available. In most such cases, 90 per cent of the total was allocated equally to ISIC major groups 313, 314 and 353, and the remaining 10 per cent was proportionally distributed among the remaining major groups.

(d) Value added data were available only at the 1-digit (major division) level of ISIC:

Percentage distributions of available data for other variables (gross value of production, wages and salaries, etc.) were applied to the totals for value added.

8. It should be noted that these weighting coefficients are for internal use only, and are not shown separately in any of our publications.

(b) Commodity production statistics

9. These data are compiled for publication in the Industrial Statistics Yearbook, Volume II. Commodity Production Statistics. Most of the tables in the publication contain aggregate figures described as total. The aggregates of data are shown for commodities for which a satisfactory degree of comparability exists in the series for the different countries. They represent the summation of the country data shown in the tables and include estimates of the missing country data.

10. In providing the estimates of the missing data for a given country and commodity, the following methods have been utilized:

(a) When the available data are limited to a single year, this figure is repeated for the remaining years;

(b) When data are available for less than five years of the period shown, the average of the years is used for the missing data;

(c) When data are available for five or more years of the period shown, estimates for the missing data are derived from a regression straight line, using the least squares method, applied to the reported data.

11. When some data in a given table are shown in units of measurement other than the unit indicated for that table and conversion of such data to the standard unit is not possible, aggregate figures are not published.
12. The country estimates calculated for the compilation of world and regional aggregates are for that specific purpose only and are, therefore, not separately printed in the tables. Commodity production statistics with aggregates are also published on a selective basis in the U.N. Statistical Yearbook.

3. Population

13. The Statistical Office does not prepare population estimates but official estimates* prepared by national statistical authorities and estimates prepared by the United Nations Population Division are routinely included in Statistical Office publications.

14. The series of estimates presented are: (a) total population by urban/rural residence; (b) population in cities of 100,000 or more; (c) population by age, sex and urban/rural residence; (d) population by age, sex and marital status; and (e) crude birth rates, crude death rates, infant mortality rates and life expectancy.


17. In addition to the series given above, estimates prepared by ILO and UNESCO are included in the compilations on women and youth published in 1985 and in ongoing work on special population groups and the new edition of the Compendium of Social Statistics.

18. General co-ordination of work within the United Nations System on population estimates and projections has been promoted through the mechanism of the ACC Ad Hoc Interagency Working Group on Demographic Estimates and Projections. Agencies participating in the last meeting of Ad Hoc Working Group, which was held at United Nations Headquarters, 15-17 October 1984, were the United Nations (Population Division, Center for Social Development and Humanitarian Affairs and the Statistical Office), ECLAC, ECA, UNICEF, UNFPA, ILO, FAO, UNESCO, WHO, the World Bank and UNIDO, with the Population Division of the United Nations serving as secretariat. The focus of the Working Group is the co-ordination of work on population projections rather than population estimates per se. Thus, inter-agency variations in population estimates are primarily considered by the Working Group in terms of their impact on population projections.

19. There are many sources of variation in national population estimates, some of which are inherent in the uses and timing of these estimates, whether they are made either by the country itself or by an inter-governmental

* Estimates here refer to official national non-census figures prepared by national statistical authorities.
organization. Therefore, it is unlikely that a single set of "correct" population estimates can be established for uniform use by all agencies and for all purposes and efforts directed toward eliminating apparent discrepancies quickly encounter diminishing returns. However, if resources permit, it might be useful for exploratory bilateral studies to be taken between agencies on the sources of variation with a view to eliminating clearly unnecessary variations. At a minimum, we would propose that explanatory technical notes or footnotes should be routinely used to provide users with information on the source of variations in those cases where published population estimates depart from the latest official national population estimates, if any, shown in Population and Vital Statistics Report (Series A).

4. International Trade Statistics

20. Estimates are used in preparing: (a) total imports and exports; (b) value of commodities and direction of trade; (c) indexes of unit value and volume; and (d) International Trade Statistics Yearbook.

(a) Total imports and exports

21. Estimates are calculated either by (a) extrapolating yearly trends, taking account of any details of seasonality observed as well as available accounts of related national or international developments or (b) applying growth factors from inverted data, or (c) by a combination of these methods. Such estimates are made on the basis of national currency and, where required, currency exchange rates are estimated on the basis of current trends.

22. Inverted data refer to the trade of partner countries. Assuming that the imports (exports) of a reporting country are equal to the sum of the relevant exports (imports) of the corresponding partner countries, growth rates are computed, using partner country data, spanning the period for which data is available and that for which an estimate is required, and the resulting rates are applied to the corresponding data of the reporting country.

(b) Value of commodities and direction of trade

23. (a) Matrices are constructed showing statistics of imports into developed countries from developing countries and from countries with centrally planned economies in respect of (i) total imports and (ii) imports of selected commodities;

(b) Estimates are made of exports from the developing countries and from the countries with centrally planned economies to the developed countries, on the basis of observed percentage rates of change between contiguous years in respect of both the total exports and the detailed commodity imports of the developed countries;

(c) For trade in respect of which partner country data are not available, estimates are made on the basis of the proportional distribution as well as trends observed for immediately preceding years.

24. These operations are not always simple and straightforward. Account must be taken of relevant country practices which sometimes vary significantly because of different concepts or methods employed as well as different situations which might have arisen due to the vagaries of commerce.
(c) **Indexes of unit value and volume**

25. As regards indexes of unit value and volume, in cases where such indexes are available in respect of consecutive monthly but not quarterly periods, relevant quarterly indexes are represented by simple averages of the given monthly indexes. Where such monthly indexes are also not available, quarterly indexes are estimated on the basis of extrapolation of trends calculated from existing series.

26. Estimates of unit value indexes (p) so derived for any given country are in terms of (a) the relevant national currency and (b) the base year employed by that country. Therefore, for purposes of standardization, they are converted to US dollar terms and rebased to the year 1980 in accordance with the following procedure:

(i) A conversion rate index (C) is obtained which is the ratio of the relevant current exchange rate (r.1) to the corresponding 1980 trade conversion factor (r.0); thus:

\[ C = \frac{r.1}{r.0} \]

(ii) The product of the conversion rate index and the derived country unit value index results in an estimated unit value index (P) based on 1980, thus:

\[ P = C \cdot p \]

(iii) That estimated unit value index (P) is then divided into the relevant value of imports or exports (V) at current prices in terms of US dollars to arrive at values at base year prices \[ V(d1980) \] thus:

\[ V(d1980) = \frac{V}{p} \]

(iv) Quantum indexes are next computed as follows:

a. For **individual countries** the derived values at base year prices are divided by the corresponding average quarterly values of trade for 1980:

\[ Q = \frac{V(d1980)}{V(c1980)} \]

b. For **country groupings** the derived values at base year prices in respect of relevant countries are added up and divided by the sum of the corresponding average quarterly values for 1980 thus:

\[ Q = \frac{\sum V(d1980)}{\sum V(c1980)} \]

(v) Finally for country groupings unit value indexes \((UV)\) are derived by dividing the relevant values of trade at current prices \((V)\) by the values derived at base year prices, thus:

\[ UV = \frac{\sum V}{\sum V(d1980)} \]
(d) **International Trade Statistics Yearbook**

27. Estimates used in the Commodity and Matrix Tables found in volume II of the *International Trade Statistics Yearbook* are produced by the use of various computer programs in multiple stages of processing.

28. The stages are as follows:

(a) Using Series D and Non-Series D files, partner country data are extracted at the 3-digit level of the SITC. Missing data are substituted by data for a prior year;

(b) The data are inverted so that the reporting country becomes the partner country, the partner becomes the reporter, imports become exports and exports become imports;

(c) Data are aggregated at the 2 and 1 digit levels;

(d) From the Series D and Non-Series D files, data containing the Grand Total and its breakdown by partner country are extracted;

(e) A computer programme then prorates the values of the Grand total and its partner breakdown and applies the derived percentages at the 1, 2 and 3 digit levels. The inverted data values are then adjusted so that the partners add up to the totals at each level;

(f) The output of this process is the creation of the 3 digit estimates;

(g) These 3 digit estimates are then used as the basis for adjusting the 4 and 5 digit estimators (inverted data) to produce the 4 and 5-digit estimates.

**NOTE:** Series D are the trade data received by the United Nations Statistical Office from countries either on tape or computer print outs. These are converted into standard format at all levels of SITC and by trading partners showing quantities (where reported) and values.

29. Non-Series D are trade data of countries which are obtained from trade reports, national yearbooks and other sources. They are not as complete as the Series D. Most of them do not have trade by Partner Countries and in some cases are at more aggregated levels than Series D. They are shown together with the Series D data in the *International Trade Statistics Yearbook* or as basis for preparing estimates of some countries.
B. ECONOMIC COMMISSION FOR EUROPE

Description of methodologies used in ECE for making estimates:

1. Population statistics

30. The ECE secretariat does not produce its own estimates but relies basically on published and unpublished national official estimates. For those countries for which no data are published or made available to the secretariat, statistics from other international sources are utilized, including especially the estimates prepared by the United Nations Population Division. Exceptionally, population and related estimates are made for the current or recent years, when such data are required for analyses and studies, and would otherwise not be available.

31. The estimates cover the following areas: total population by sex and age, fertility and nuptiality. These estimates are not published but are available in the form of a computerized data bank for the use of the secretariat and collaborating institutions.

2. Labour force and employment statistics

32. The secretariat requires, especially for the annual Economic Survey of Europe, up-to-date series on major labour market indicators. In order to obtain these estimates, the secretariat relies primarily on national statistics and, in cases where not available, on other international sources. Estimates have normally to be prepared for the most recent year as annual national data are usually not yet available at the time the Survey is being prepared (January-early February). The estimated data are replaced by the official statistics once available.

33. As there are a number of sources of national labour force statistics, the secretariat selects those which, in its experience, are most suitable for the analytical purposes of the Survey.

34. Employment statistics from national accounts sources are used, among others, for calculating time series on labour productivity for the total economy and by main economic activities. When filling gaps for the most recent year(s), the secretariat estimates rely heavily on available national or international labour force statistics, which usually are published much earlier than the corresponding national accounts employment statistics.

35. Certain other labour force and employment related estimates are compiled for specific purposes (e.g. data on duration of unemployment, unemployment by sex and age).

3. National accounts statistics

36. National accounts estimates are made by the ECE secretariat for Gross Domestic Product at market prices expressed in constant 1975 U.S. dollars, and for its components of expenditure, such as private consumption, public consumption, gross domestic fixed capital formation, change in stocks, exports and imports. The estimates are used in the annual Economic Survey of Europe, The ECE Economic Bulletin for Europe and the U.N. Timber Bulletin. The data are converted into 1975 U.S. dollars in order to make regional aggregates.

37. The estimates are made for the current year and are based on the growth in volume projected in national budgets or in official forecasts of national Statistical Agencies. Where national forecasts are not available, estimates are made on the basis of partial data available for the current year. In the absence of official forecasts and national data, estimates of other international organizations are used.
4. **Industrial production statistics**

38. Estimates are used for calculating weighting coefficients for the regional aggregates of the total index of industrial production and for similar aggregates of various branch indexes (ISIC major groups). The weights are based on value added at factor cost for market economies and gross industrial output for centrally planned economies, and are derived from UN, CMEA and OECD sources. Missing annual production indexes for the current year are estimated on the basis of the 8 to 11 months of the current year compared to the corresponding period of the previous year, where available.

39. A similar procedure using 8 to 11 months is applied to missing current year estimates of selected items of commodity production. These data are available in the monthly questionnaires received from ECE member countries covering coal, gas, electric energy, steel, engineering products, chemical products, etc., or are estimated on the basis of corresponding monthly commodity production data published in national statistical bulletins, journals or newspapers.

5. **International trade statistics**

40. Analyses of developments in international and east-west trade of the ECE region prepared for the annual trade issue of the Economic Bulletin for Europe and the Economic Survey of Europe are in principle based on national trade returns and derived from national or international statistical sources. In the interest of timeliness and fullness of coverage, estimations are frequently required for the most recent period under review – the last year, or the last quarter. These concern in particular the value of trade flows by main directions in the case of countries where national data are delayed or no sub-annual data are published, and the volume of trade in the latest period for most countries. Value estimates are normally derived from trends in national data for shorter time periods within the given year, appropriately de-seasonalized, or are in the absence of such information built up from trade partner data and other partial information. Volume estimates rely heavily on deflation of value data by national or international trade price and unit value indices. All estimates in ECE publications are indicated by asterisks and replaced by national estimates as soon as these become available.
C. ECONOMIC COMMISSION FOR LATIN AMERICA AND THE CARIBBEAN

41. In general terms, ECLAC prepares estimates on the following areas: main macro-economic variables for the Preliminary Overview of the Latin American Economy of each year; national accounts; income distribution; external trade indexes; and the economically active population by kind of occupation.

42. The Preliminary Overview of the Latin American Economy is prepared for the press conference which is held mid-December each year, during which ECLAC's Executive Secretary reports on the evolution of the economy of the region and gives the views of the Secretariat on the matter. The variables that are estimated deal with the evolution of the product, employment, internal and external prices, external trade; balance of payments, financing and external debt. Towards the end of October this Division sends letters to the countries asking them for information on the above subjects. These requests usually have to be reinforced by telephone calls and cables when additional information is required or when the information is not sent in time. Generally, owing to the short time available, the replies from the countries are partial and have to be complemented with statistics from diverse international organisms, specialized articles published in newspapers or other publications and, lastly, by analysing the structures and tendencies of the economies of the countries. For your better information, I am enclosing a copy of the Preliminary Overview of the Latin American Economy during 1984.
43. The national accounts estimates are mainly oriented to standardize the information to obtain aggregates for Latin America as a whole. This is the case of product by type of expenditure, where not only is the reference base of the data heterogeneous, but a great number of countries lack reliable external trade indexes; thus the estimates used for exports and imports at constant prices are those prepared by ECLAC's Division of Statistics and Quantitative Analysis, accepting the GDP tendency, investment and public consumption. This procedure is followed systematically to obtain regional aggregates, since at country level the information is given in national currency. As regards other estimates of certain components of product according to kind of economic activity, these are concrete cases requiring a particular solution and which occur infrequently.

44. In the field of income distribution of the countries the average income of recipient units (households and individual recipients) is estimated and different hypotheses are formulated to obtain estimates on the income distribution structure, according to spatial, occupational and demographic characteristics and their link with living conditions of the households. This also entails the design of minimum income lines which enables the analysis of the degree of poverty in the different groups. Lastly, the above mentioned estimates are made compatible within an independent group of macro-economic variables.

45. The external trade indexes refer to calculations of the unit value of exports and imports. These indexes have been prepared regularly during more than two decades; however, the last two years are estimates on account of the delay in the receipt of basic information, partial figures or simply a lack of data. The methods of estimation differ according to whether they deal with exports or imports. In the case of imports the evolution of prices and unit values of goods and groups of goods calculated by co-participating trading countries are used as reference variables. In the same way, the movement of the different categories of United States wholesale prices and, in general, the fluctuation of prices in industrialized countries of the principal groups of goods imported by the countries of the region. In this respect, the IMF furnishes very valuable information through its publication "International Financial Statistics"; likewise, national publications of different kinds are used. As regards the unit value indexes of exports, the information from national sources is wider and for estimates it is complemented with data on prices of basic products published by the IMF, UNCTAD and other sources.

46. The estimates on the economically active population (EAP) are undertaken to standardize the information in order to make them comparable between countries and years. Thus, the inferior limits of the EAP are estimated at around 10 years of age and over and, when necessary, the data are extrapolated to certain dates. As in most cases, the International Standard Industrial Classification (SITC Rev. 1) of all the economic activities is used as a framework.
D. ECONOMIC COMMISSION FOR AFRICA

Estimates procedures adopted by the ECA Statistics Division:

1. National Accounts

47. Annual estimates have been carried out in three stages, namely, a preliminary assessment of growth rates by broad production sectors by country in constant prices in February/March each year for the year just ended, more refined estimates showing sectoral breakdown in June, and more definitive estimates in December. The definitive estimates in December incorporate in them the latest country information and national compilations of data on national accounts.

48. The estimation procedures adopted distinguish the following three cases:

(a) Countries which have both current and constant price estimates of GDP: for these countries, the official country data will be used. Where necessary minor adjustments will be made to smooth out difference in data coverage in the historical series. Where the official constant series refer to a base year other than 1970, adjustments to the country data would be to shift them to the 1970 base. To obtain estimates of GDP in constant 1970 U.S. dollars, weighted average exchange rates for converting total value of trade from national currency into the U.S. dollar as published by the UN are being used. However, adjustments to these exchange rates have been made for Ghana and Uganda for some years. This is thought to give a more realistic picture of exchange rates than the official rates.

(b) Countries for which official estimates in current or constant price only are available: the procedure adopted in this case lies in ascertaining sectoral deflators in respect of production sectors as well as expenditure categories. When official estimates are available in current prices only, constant price estimates would result from the application of these assessed sectoral deflators. On the other hand, if official GDP estimates are available in constant prices only, the application of sectoral deflators would result in obtaining GDP estimates in current prices. The conversion of national currencies into U.S. dollars follows the same procedures as in (1) above.

(c) Countries for which official estimates of GDP in neither current nor constant prices are available: this is the case for most countries of the African region. The procedures adopted in this case is as follows:

(i) Ascertaining sectoral growth rates in terms of volume from a base year, ideally the latest year for which official GDP estimates are available.

(ii) Obtaining sectoral price-deflators, for both the production sectors and the expenditure categories.

(iii) The multiplication of sectoral growth rates by their respective sectoral price deflators (or inflators) and then by GDP figures for the base year to arrive at sectoral GDP estimates at current factor (or approximate factor incomes).
(iv) Estimation of indirect taxes net of subsidies by making use of either data from government accounts, or past trends in indirect taxes expressed as a percentage of GDP at factor cost.

(v) Obtaining estimates of GDP at current market prices (or purchasers' values) by using the formula, GDP at factor cost + indirect taxes (net) = GDP at market prices.

(vi) Estimating the components of GDP by type of expenditure, such as exports and imports of goods and services, capital formation, government consumption expenditure, etc., in current prices through the use of relevant indicators and then deriving estimates of private consumption expenditure as a residual item, by deducting from the GDP at current, purchasers' values as obtained in (e) above, the other expenditure components of GDP.

49. Although the working procedures have been established, it has not been possible to apply them in their entirety in all cases. For example, due to lack of data on producers' prices for agricultural products the deflator for agricultural GDP is either (i) unit value index of agricultural exports (with 1970 = 100) or (ii) consumer price index for food: (i) is calculated on the basis of agricultural export data in both quantity and volume from FAO data, while (ii) is taken from the official consumer price indices which in almost all cases relates to the capital city only. The use of (i) as deflator is likely not to cover adequately the bulk of staple crops, which are in wide domestic consumption but not exported to any great extent while cash crops mainly for export are likely to be over represented in the index. The use of (ii) which represent food price movements in the capital city only is likely to exaggerate the price rise in agricultural produce for the country as a whole. Another example is the deflator used for value added in manufacturing. This is perhaps the least satisfactory, in that the unit value of imports is used as deflator. The index is unsatisfactory on two grounds (i) the composition of local manufactures in most African countries differs greatly from imported manufactures with a different cost structure and price movements and (ii) the unit value index of imports is usually calculated on the c.i.f. value of imports which excludes custom duties and other taxes. No estimates are made on capital flows and balance of payments.

2. **International trade statistics**

50. The estimates methods for total trade statistics are based on the following:

   (a) extrapolation or interpolation of trends;
   (b) use of partner country data, mainly of industrial countries;
   (c) analysis and forecasts of monthly or quarterly series.

51. For trade indices, the quantum index is first estimated on the basis of selected commodities using the Laspeyres formula. The quantum index is then adjusted for insufficient coverage, and finally the unit value index is derived by dividing the value index by the adjusted quantum index.

52. Estimates of weighted exchange rates are based on time series analysis of quarterly data of trade conversion factors published in the United Nations Monthly Bulletin of Statistics, otherwise the exchanges rates (mid-point rates) are used as rough estimates.
E. INTERNATIONAL LABOUR ORGANIZATION

53. The methodology to be used in preparing annual employment (and unemployment) estimates will vary from country to country.

F. INTERNATIONAL MONETARY FUND

Methodologies in the Preparation of Estimates

54. For the purposes of the IMF's statistical publications, estimation procedures are applied to the calculation of nonreported data for a single time series, or the derivation of subtotals for a single data, when data exist for some of the components. The data routines of the IMF's primary data base, Economic Information System (EIS), permit the calculation of estimates for a given date by reference—backwards and forwards—to data for the same period of the previous, or subsequent, year. This feature is applied to fill a gap in a time series. When no data for a specific series, on an annual basis, are available in a subsequent year, but are available for subsequent months or quarters in the same year, the gap is filled by "hand estimates."

55. When data are not available for a specified country or countries for a given time series, and are needed to derive regional or world totals, the EIS provides the following methods of estimation:

(a) By carry-forward of data of the previous period—for example, in the calculation of regional and world totals of foreign exchange reserves. This method is primarily used for information based on administrative records such as bank balance sheets.

(b) By the use of a special estimating technique (the "S operator"). Briefly, this feature assumes that the time series for an individual country's time series for which data are not available will behave in the same way as do the totals or averages of the data for the same time series of countries located in the same region for which reported data are available. Area totals and averages for most topics are estimated for current and for earlier periods if country data are known which contribute at least 60 percent of the area total or index aggregate of the latest period for which data of all countries of an area are available. Area totals or averages are estimated by assuming that the rate of change in the unreported country data is the same as the rate of change in the weighted total or average of the reported country data for that area. These estimates are made for the area totals and averages only; these procedures do not involve the estimation of data for individual countries. The "S operator" feature cannot be used for time series that cross zero. Moreover, it may not be applicable to time series that are subject to strong seasonal or cyclical influences, or when it is apparent that the data reported are not fully representative of the universe of reporting countries. This procedure is primarily used for statistics based on sampling methods such as price data and similar statistics.

(c) It should be noted that the Fund does not publish the estimates for individual countries that are used in the calculation of regional or world totals.

56. In trade by partner country statistics published in Direction of Trade Statistics (DOTS), two estimation procedures are used: derivation and extrapolation.

(a) Derivation is used to estimate data for countries which do not publish trade by partner country statistics or report them with delays. In such cases, data derived from the records of partner countries are adjusted for a uniform freight and insurance margin of 10 percent and used to estimate country distribution of exports f.o.b. and imports c.i.f. for a given country.

(b) Extrapolation is used in the estimation of DOTS yearbook data for those periods to which the derivation procedure cannot be applied because neither the exporting nor the importing country has reported data. These nonreported trade flows are estimated by applying the factors calculated from movements in global and area trade to the data (reported or derived as available) for earlier periods.

(c) Derived and extrapolated data are first computed for months, where possible, and annual totals are then obtained by summation.

57. Where the methods described above are considered inappropriate, hand estimates prepared by the country desk economists, in the Fund, based on other sources, may at times be used for purposes of deriving regional or world aggregates.

58. With respect to other publications of the Fund, particularly the World Economic Outlook, projections are prepared for the development short-term and medium-term scenarios, as follows:

(a) Short-term

Country and regional projections for up to two years ahead are compiled through the use of various econometric models, with reference to information prepared by desk economists.

(b) Medium-term

Medium-term scenarios for major regions and countries are prepared by reference to the short-term projections and are made on the basis of the assumption of "better" or "worse" policies for the industrial and developing countries.

59. For internal purposes, including the preparation of confidential reports on economic developments in IMF member countries, the estimation of data by country economists is based on a variety of procedures according to the type of data series concerned, and the availability and quality of related data reported to the IMF by the country or derived from statistics produced by other international organizations.
G. UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Methodology applied in compiling industrial statistics:

60. The UNIDO Data Base (UDB) is designed to incorporate data at a number of distinct and identifiable stages. At each stage the data are subject to various forms of examination and/or adjustment, whereby the results achieved in preceding stages determine which sources should be utilized and which methods of adjustment should be applied. Thus, the structure of the UDB closely reflects the organization of the work of the UNIDO statisticians — both with regard to statistical methods and data sources.

61. At stage I the UDB consists of data supplied to UNIDO by UNSO in machine readable form. This information has been compiled from replies to questionnaires sent by UNSO to national offices. At stage II the data incorporated into the UDB are based on information obtained from national statistical publications (e.g. industrial censuses, surveys, input-output tables) and from statistics compiled through UNIDO field work. At this stage, the coverage of available data is extended and adjustments are carried out to improve the consistency and international comparability of the data. Special attention is given to the following problems:

(a) National differences in coverage by size of establishment;
(b) The use of classifications which do not conform to the ISIC;
(c) Incomplete coverage or total absence of national data relating to certain variables, branches or years; and
(d) Variations in concepts and definitions used by national offices. At stage III information compiled by international and regional organizations is utilized in a similar fashion.

62. Upon completion of the first three stages, adjustments have been made with the help of supplementary information obtained from exogenous sources. At stage IV this work is extended by estimating data for which no such information was available. Information gathered in earlier stages is used as input to a set of computerized procedures. Mainly data not reported in conformity with ISIC (i.e. aggregates referring to two more industries defined at a 3-digit level of ISIC) are disaggregated with the help of "clean" data available for other years or for related variables. At stage V provisional estimates are developed to increase the timeliness of the data. These estimates are all provisional and are eliminated as official statistics become available.

63. A screening package, consisting of a set of computerized procedures, was developed by UNIDO and is used to ensure data consistency and reliability at each stage of the UDB. A series of tests (e.g. relationship between variables, stability of ratios over time and across branches, etc.) are performed and extreme outliers are identified and flagged for inspection and possible correction by statisticians. Estimates derived through computerized procedures (i.e. at stages IV and V) are only incorporated into the UDB after they pass the screening process.

64. For a more detailed description of the methodology applied, see "Industrial Statistics for Research Purposes - Methodology applied in compiling UNIDO's international data on the number of employees, wages and salaries, gross output and value added" (UNIDO/TS.558).
65. There are no described methodologies available for estimates prepared by the GATT secretariat. These estimates are an ad hoc exercise carried out in the framework of the preparation of the GATT Annual Report International Trade.