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PROBLEMS AND PRACTICES OF AFRICAN COUNTRIES IN THE  
COMPILATION OF INPUT-OUTPUT TABLES

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Introduction:

1. This paper is intended to provide a bird's-eye-view of input-output tables and analysis carried out in countries of the region during the fifties and the sixties. Reference should be made to a discussion on methodological and conceptual problems on the subject in the paper entitled "The objectives, concepts and methods of input-output analysis" (E/CN.14/NAC/?), prepared by the United Nations Statistical Office. The emphasis in this paper will be on the data sources, methods of compilation used, problems encountered and uses made of input-output analysis in African countries insofar as they are available.
2. The paper is neither intended as exhaustive nor completely up-to-date. It has been prepared from published material, official or private, that is available in the ECA Library or otherwise made available to us. The text and contents of the paper will be amended and updated in the light of fuller information that may become available later.
3. Although Part B of an ECA questionnaire on Production Accounts, Commodity Balances and Input-output Analysis at both Current and Constant Prices deals with input-output analysis (See Annex II to this paper for Part B of the questionnaire) and was despatched to the countries, very few of them have actually made replies in view of the fact that the compilation of input-output tables is still a relatively new statistical exercise for most countries of the region; the lack of sufficient inter-dependence among the various sectors of the economy found in them appears to be frequently the case; and the technical coefficients, once obtained, may be highly unstable for use in projections. It is mainly on account of the difficulties involved in collecting the data needed for the compilation of input-output tables that the present SNA has accorded a rather low priority of compilation for the developing countries.
4. The above, however, is not meant to detract from input-output analysis its relevance, desirability and usefulness in evaluating the structure of the African economies or in planning their development. In fact, as is indicated in a later section of this paper, varied uses ranging from statistical ones (e.g., the checking of internal consistency of national accounts calculations, the planning of data collection programmes, etc.) to those for planning and projections have been made of input-output analysis in a number of countries of the region.

General review of input-output analysis in Africa:

5. Table 1 shows that input-output tables have so far been compiled for a total of 19 African countries at one time or another. Recent

tables compiled or currently under compilation include those for several countries only, namely, the United Arab Republic (Egypt) (1966/67) and Morocco (planned for 1969/70 ?) from North Africa, Kenya (1967) and Zambia (1966) from East Africa, and Ivory Coast (annual since 1960) and the People's Republic of Congo (1967) from West and Central Africa. As is clear from column (7) of Table 1, a good number of the tables compiled for these countries were done either by national statistical or planning bodies with external assistance or by foreign agencies or individuals direct. An increasing number of countries in the region appear to have taken interest in the compilation of input-output tables as part of their regular national accounting work. Examples are Algeria, Ivory Coast, Madagascar, Morocco and Tunisia from the French group, and Kenya, Southern Rhodesia, Tanzania, the United Arab Republic and Zambia from the English group. By and large, the countries appear to have been concentrating on the collection of basic data, the improvement of quality of the existing data series and the filling of gaps in their data collection programme. For the French group, the compilation of input-output tables appear to have been the logical extension of their work on the construction of the uses and resources tables by commodity group, a usual feature for countries following the French system of national accounting. As for the English-speaking group, their relatively more developed statistics on industry, external trade, public finance, household consumption and distribution in selected countries have enabled them to enter this field as well.

6. The various features of the input-output tables compiled for countries of the region, bearing on such items as the statistical unit used, industrial classification, valuation of transactions, treatment of imports, final demand sectors and primary inputs, etc., will be dealt with in a later section of the paper, while some brief general remarks on the tables compiled for selected African countries will be given below:

- (a) Algeria: Prior to independence, an input-output table of the order of 98 x 25 was compiled for the year 1957, with transactions valued at purchasers' prices. After independence a table of the order of 12 x 13 was constructed, again with transactions valued at purchasers' prices. For both tables, commerce (i.e. wholesale and retail trade) is distinguished as a separate sector in the columns, but not in the rows. A matrix on trade margins by type of demand categories and industrial sector, is compiled for 1963. The table for 1964 represents an updating of that for 1963, by making use of volume changes for the various production sectors and applicable price indices.
- (b) Congo (Brazzaville): The input-output table for 1967 was prepared by SEDES (Paris) and consists of 19 product groups in the rows (excluding commerce) and 20 production sectors (including commerce) in the columns. The general features of the table resemble those for countries of the French group.

- (c) Ghana: Input-output tables for Ghana have not been officially released. The one for 1960 was prepared under the sponsorship of the Ghana Academy of Sciences. The 10 x 10 transactions table was inverted and the import requirements (both predicted and actual) compared for 1955-61. In addition to the 1960 table, tables for 1966 and 1968 were constructed by the Central Bureau of Statistics for the use of the Planning Commission. The tables are of the order of 14 x 14 and represent no more than preliminary rough estimates. A particular feature for the 1966 and 1968 tables lies in the treatment accorded to imports, which are sub-divided into complementary and competitive imports. The former category of imports is allocated in a single row to the consuming sectors, while the latter category is allocated along the rows for the corresponding domestic production sectors, with the totals entered as a negative column of final demand.
- (d) Kenya: Kenya has been working on its first input-output table during the past two years. The analysis is for 1967. The matrix is at the level of 3-digit sub-group classification for industrial sectors of production. For the other sectors of the economy, industrial classification is based at a slightly higher level of aggregation with monetary agriculture treated as a single sector of production. The initial attempt was to classify the monetary sector of the economy into 83 sub-groups, with 17 sub-groups for agriculture and 39 for manufacturing. However, the 17 sub-group classification for agriculture has been abandoned due to unsatisfactory state of data at this level of aggregation. The work on the 1967 table is expected to be completed in the course of 1971.
- (e) Ivory Coast: The first input-output table for Ivory Coast was established for 1958. Since 1960 annual tables have been compiled largely on account of the annual Survey of Enterprises carried out by the National Accounts Service. It is not, however, clear whether the tables established annually after 1960 represent an updating of the table for that year. The tables are established for 26 production sectors, with one additional sector "commerce" in the columns. An inverse matrix was calculated for the terminal year of the current Five-Year Plan (1971-75). The input-output tables for 1960 and 1965-69 have been established at constant 1965 prices. The study is not at present distributed, pending a review of the methods of calculation used.
- (f) Madagascar: The 1966 input-output table for Madagascar is of the order of 36 x 33 and is the first officially published table for that country, earlier tables of the order of 28 x 29 for 1960 and of 12 x 13 for 1962 not having been

released. The presentation of the 1966 table follows that for France except that distribution (trade margins) is distinguished also as a separate sector in the rows. Separate matrices for imports, trade margins, and transport have been compiled in the exercise for 1966. Although the production sectors distinguished in the table total 33, the inverse matrix calculated refers to a much condensed version only, namely, of the order of 6 x 6, distinguishing agriculture, industries, construction, transport, commerce, and other services.

- (g) Mali: The 1959 table of 9 x 12 sectors follows the commodity classification of the French (Courcier) system. The 12 sectors distinguished in the columns include the usual 9 commodity groups of the system plus 3 additional sectors, viz., commerce, transport and financial institutions.
- (f) Morocco: The 1958 input-output table covered 190 branches, but was published in the order of 30 x 31. The table for 1960 represents an updating of that for 1958. With the manifold statistical programmes of national coverage in the stage of implementation (i.e., a population and housing census in 1971; an agricultural census for 1970/71; a national consumption and expenditure survey, which started in April 1970; and an industrial survey, which covers mining and manufacturing establishments of all sizes, 1970/71), the country plans to compile an input-output table for 1969/70 in the near future.
- (g) Southern Rhodesia: The first input-output table for Southern Rhodesia refers to 1964, and the national accounts estimates for that year was obtained by working within the framework of the matrix. The table for 1964 is rather sketchy in that for intermediate transactions the table is of the order of 45 x 1 only, although the table contains much detailed information on final demand sectors, imports and the components of value added. For the compilation of the table, domestic industry is sub-divided into 58 industries, which are in accordance with the ISIC except for the introduction the industry "rural household services". A separate matrix for private consumption by type of consumption and source of supply (excluding rural household consumption from own production) is also compiled.
- (j) South Africa: The first inquiry into input-output relation in South Africa was carried out in 1956, relating to the year 1951/52. The study covered 14 industrial sectors, and the value of the first application "should be sought in the statistical shortcomings which it revealed". The table for the year 1956/57 distinguishes 48 industrial sectors and

took about 9 months to complete. The table covers the South African economy excluding South West Africa and the three then British protectorates (i.e. Lesotho, Botswana and Swaziland). For the 1956/57 exercise, two transactions tables were prepared, one being valued at purchasers' prices and the other at producers' prices. The published versions of the transactions table are in the order of 24 x 24 and 16 x 16 respectively. Analysis of the data (e.g., inverse matrix, direct and indirect requirements, etc.) was carried out based on the 16 x 16 table.

- (k) Tunisia: The table for 1957 appears to be more coherently done than the later tables (i.e., for 1960, 1962 and 1964). The 1957 table distinguishes 22 production sectors, with transactions all valued at producers' prices, and imports distributed in a single row to the consuming industries (for both intermediate and final consumption). The tables for 1960 and later years resemble much similar tables compiled for France, namely, with intermediate consumption valued at producers' prices and final deliveries at purchasers' prices. For the 1960 table, a total of 17 production sectors are distinguished, with commerce distinguished as one sector in the columns, but not in the rows; imports are allocated in a single row to similar domestic sectors of production.
- (l) United Arab Republic: The 1954 table is of the order of 83 x 83. Other versions of it are of the order of 33 x 33 and 7 x 7. The 1959 table is only of the order of 33 x 33. Value added is shown in a single row, with no breakdown into its various components. Producers' prices were used throughout; flows of domestic production are separated from imports. Compilation of input-output table for the year 1966/67 has been in progress during the past two years; the table will be of the order of 44 x 44.
- (m) Zambia: The first input-output table for Zambia covered the year 1961, prepared by the UN/ECA/FAO Economic Mission to the country in 1963. A similar table was prepared in 1965 for the year 1964. In both these tables the input of goods and services is not grouped according to sectors of production or origin, but on three commodity groups and three service groups. In a supplementary table for 1964 the inputs of goods and services of domestic origin are, however, grouped by 11 producing and using sectors. The input-output table for 1965 is a square matrix of 40 x 40 production sectors and for 1966, 38 x 38, with 7 groups of primary inputs. The final demand is grouped on 25 accounts (1 for export, 12 for fixed capital formation, 10 for private consumption, 1 each for government consumption and changes in stocks). The imports are classified according to sectors

of origin and allocated to sectors of destination in the same way as domestic production. The input-output tables for 1965 and 1966 are fully integrated with the national accounts for these years and the basic classifications are the same.

#### Data Sources:

7. As the input-output table deals with the flows in goods and services, it is necessarily compiled based on the production approach. For the countries in the region for which these tables have been or are being compiled, the sources of data usually consist of the following:

- (a) An industrial census or survey for the benchmark year, which provides data on the gross output and cost structure of the industrial sectors, e.g. mining, manufacturing and electricity. The census or survey would normally be confined to larger-sized establishments employing 10 or more persons.
- (b) Good external trade statistics with imports valued c.i.f. and exports f.o.b., classified in accordance with the SITC or the BTN, to enable imports and exports to be classified by industry of origin and the classification of imports by end-use.
- (c) Accounts for at least the central government, with respect to its current expenditure so as to enable the tracing of the purchases of government by industry of origin, and for assessing the level of indirect taxes net of subsidies by industry of incidence.
- (d) Surveys of household consumption and expenditure, covering both urban and rural areas. These surveys serve for checking purposes, as in most cases private consumption expenditure by industrial origin is derived from the commodity flow approach and obtained as difference or residue.
- (e) Data on agricultural production and prices. The availability of commodity balances in both physical and value terms for principal agricultural commodities, such as the food balance sheets, would go a long way towards estimating the disposal or use of agricultural outputs by industry of destination for intermediate consumption and by type of demand for the final demand categories. The cost structure would normally have to be based on limited scale farm surveys, supplemented by data from imports and local production (e.g. insecticides, fertilizers, etc.).
- (f) Data on building and construction, including information on gross output and cost structure based on a sample of builders and contractors.



- (g) Information on trade and transport margins by commodity, preferably a survey of distribution held for a particular year.
- (h) Data on transport (road, rail, air, maritime), indicating its gross outputs and cost structure.
- (i) Data on prices and price indices (wholesale, retail, imports, exports, etc.).
- (j) Data on small-scale industries, in particular, handicraft. Estimates on this score can be built up through area sample surveys, coupled with information from population censuses on the number of handicraftsmen engaged and wages and earnings data obtained from periodic employment and earnings surveys.

8. The above represent roughly the paraphernalia of statistical data usually available in building up a rudimentary input-output table for a developing country. Often painstaking work will be involved in reconciling the data from different sources and in obtaining the necessary breakdowns and cross-classifications of data required. Ad hoc surveys are often needed to fill the gaps in information.

9. A few case studies will illustrate this point:

- (a) Ghana (table for 1960): The main sources of information consisted, amongst others, of material obtained from the Industrial Section of the Central Bureau of Statistics, the Household Expenditure Survey of 1961/62, the Public Accounts Section, the worksheets of the National Accounts Section and the 1960 Census Advance Report.
- (b) Kenya (table for 1967): The main sources of data consist of: (i) the annual Census of Large Farms and the 1968/69 Survey of Small Farms; (ii) the Census of Industrial Production for 1967, which covered firms with 50 or more employees; (iii) Surveys of Services and Distribution, both undertaken in 1966; and (iv) end-use analysis of imports into intermediate consumption (classified by using industries), capital formation and household and government consumption - a routine annual exercise since 1963.
- (c) Ivory Coast: The main sources of data included: (i) periodic external trade statistics, (ii) agricultural statistics, (iii) annual Survey of Enterprises, in which the output, intermediate inputs and all other operating expenses and investment, etc., are obtained, and (iv) regional surveys of 1963-64 and of 1964-65, which provided a sufficiently good overall picture of the economy of the country, in

particular, in the fields of the production of foodgrains, subsistence production and handicraft.

- (d) Madagascar (table for 1966): The main data sources used include the industrial surveys, import statistics by enterprises, the turnover (or sales) statistics of enterprises, taxation records, and household budget surveys.
- (e) Morocco (table for 1960): The main data sources include, amongst others, (i) periodic (annual ?) surveys of industry, energy and mining and quarrying, which covers a sample of 1,500 enterprises in the industrial sector employing more than 10 persons and is designed to obtain the main components of the production, operating, appropriation and capital accounts of the enterprises concerned, (ii) household consumption surveys (1959/60), and (iii) trade margins derived from the Survey of Distribution carried out in 1963.
- (f) Nigeria (table for 1959/60): The most important single source used in the input-output study of Nigeria for 1959/60 appears to be the returns of industrial production questionnaire of the Department of Statistics, covering 700 establishments and sent annually coinciding with the government fiscal year (April - March). The returns covered 6 categories of information, viz., employment, inputs, outputs, inventories, capital expenditure and future capital plans. Under outputs were products in quantity and value both at sales and production cost. Inputs were broken down into local and imported production inputs, fuel and electricity, repairs, administration, rents, insurance, contractors, interest and other inputs.
- (g) Zambia (table for 1966): The main sources of data for compiling the 1966 table included: (i) the annual National Accounts Inquiry, which, provides, inter alia, data on gross fixed capital formation and changes in stocks, operating income and operating expenses of the enterprises covered, (ii) Censuses of mining, manufacturing and construction, (iii) processing of external trade statistics, and (iv) government accounts.

#### Methods of Estimation and Problems:

10. The methods used in compiling input-output tables for the region follow roughly either or both of the output and input approaches. The output approach consists in first establishing the totals of output for each of the production sectors distinguished, and then allocating the total output to the using industries and the final demand categories, while the input approach consists in building up the cost structure of the industrial sectors distinguished, sector by sector. Control

totals are imposed on the total output and therefore the total input of each production sector, including sectoral totals of intermediate consumption and value added. Totals obtained through the two approaches are then collated, differences investigated, adjustments introduced and balances and equilibrium finally achieved through a process of iteration and trial and error.

11. The input (or cost structure) approach is the easier of the two approaches so far as the developing economies are concerned. Where, however, the output approach alone is used, as appears to be the case of Algeria in compiling the table for 1963, or where mainly the input approach is used as was the case in the construction of the 1959/60 input-output table for Nigeria and that of 1960 for Ghana, the task would be much easier as no reconciliation of data would be needed, but the advantages of being able to compare the figures obtained through different approaches, would be lost.

12. A number of countries in the region appear to have made use of both approaches and attempted reconciliation of the data obtained from both approaches. A description of their experiences would be of interest.

13. In compiling the input-output tables for the UAR (Egypt), the tables were first built up row by row, and then, as an independent exercise, column by column. For the distribution of the output of a sector among the different production sectors and the sectors of final demand, commodity balances were established for both material commodities and services and transportation. In order to obtain data for filling in the cost structure, column by column, special surveys of enterprises were conducted for the purpose.

14. Tunisia mainly used the output approach and the input-output table is established essentially as a result of the compilation of the resources and uses table. For products which constitute the intermediate consumption of one production sector only, no problem would arise; where they are, however, put to varied uses or consumed by more than one production sector, these products would have to be distributed to the various using sectors. The allocation to the using sectors of the output of mechanical and electrical products and chemicals proved, in the case of Tunisia, very difficult. The input approach was also used in the compilation of Tunisia's input-output tables. The method used consists in determining input coefficients (based on accounting data, sample, technical data provided by experts, etc.) and in applying them to values of production of the production sectors. Comparison of the two tables obtained from the output and input approaches would reveal numerous divergences. Where the differences were relatively important, the sources of data would be looked into and the causes found (e.g., differences in the definitions used of the product or commodity group, valuation procedure, omission or simply gross error). Numerous successive adjustments to data were necessary to reduce the size of unallocated outputs.

15. Both Nigeria and Sudan used the sector economic accounts (detailing both debits and credits) as a vehicle for establishing their input-output tables. For Nigeria, the emphasis was placed on inputs rather than outputs, as the accounts from which the data was gathered were oriented towards costs rather than customers. In compiling the table for 1959/60 for Nigeria, varied techniques had been applied to raw data in order to obtain consistent and passable estimates. These techniques include: (i) "time projections", that is, changing of data for one period to fit another period based on only one or a few pieces of information about the desired period; (ii) "time series projections", which differs from the time interpolations in that there is no data about the needed time period or about subsequent periods; (iii) borrowed ratios from input-output studies for other countries; (iv) the use of imputed prices; (v) the determination of ratios of inputs on a physical unit basis; (vi) blowing up of input-output data for partial coverage; (vii) the method of "residuals", that is, to fill in the blank cells in the table as difference once the remaining parts of the table were completed; and (viii) guesstimates. The very fact that these techniques were resorted to in the process of compiling the tables was a sure manifestation that there was a vast lacunae in the basic statistical series needed. And this was by no means peculiar to the country concerned, i.e., Nigeria, alone.

16. Algeria is illustrative of the way in which trade margins are calculated in the Franco-phone countries of the region. A matrix for trade margins by type of use (both intermediate and final demand categories) and industry of use, is available for 1963. Trade margins in Algeria consisted of two components, viz., the trade margins proper (i.e. crude margins on goods traded) and indirect taxes. The latter included duties and taxes on imports and exports and certain taxes on local trade, taxes on local production being already included in the producers' prices of local products. To arrive at trade margins, calculations were done product by product, based on quantities used where information was available. For agricultural products, detailed calculations were done in this fashion. For the other products, either a weighted average rate of margin or the rate corresponding to the most important commodity in the group, was used for the calculation. The rates of trade margins provided by the traders were used for the calculations.

17. The method of estimating the output and input of small-scale industries and handicraft by Nigeria for its 1959/60 table is interesting in some ways. It provides an example to what can be done in similar situations. For the Nigerian exercise, the only data available then were the results of a survey of small-scale industry held in the former Eastern Region (with unpublished cost data). The survey covered 11,000 establishments distributed to 35 industries in 14 towns. The method of projection used consists of: (i) obtaining the ratio of the urban to total population for the former Eastern Region and the ratio of the population covered by the survey to the total urban

population of the region, it being assumed that industrial activity took place only in urban areas; (ii) the computation of the ratio of the urban to total populations for the other regions and the calculation of the ratio of craftsmen/urban population to each regional ratio, using the "craftsmen" figures contained in the 1952 census; and (iii) the use of wage rates computed from the data in Okigbo <sup>1/</sup> for assessing the relative productivities of small firms, as compared between regions. Once the output data for small-scale industries were arrived at, unpublished cost data obtained in the survey were used to obtain estimates of inputs.

18. As for the breakdown by industrial origin of data on primary inputs and final demand categories, the methods used were more or less the same, depending on the valuation of transactions (i.e., whether at producers' or purchasers' prices). An illustration of this can be seen in the case of Zambia. In constructing the table for 1966, (i) imports valued c.i.f. were grouped on 3-digit commodity groups, by sector of origin and sector of destination by means of a special coding system prepared. As the imports were recorded at f.o.b. prices point of despatch, the transport costs, etc., to the Zambian border were estimated and added; (ii) the other primary inputs such as depreciation and wages and salaries, were obtained from the annual national accounts survey, census of industrial production, and other sources; customs duties, indirect taxes, royalties and subsidies, from relevant public authorities' accounts, with operating surplus obtained as a residue; (iii) exports were grouped by commodity groups and sector of origin according to the same coding system as for imports; (iv) little information on the commodity composition of government expenditure was available. It became necessary to obtain a breakdown of the consumption of goods for each Ministry according to information available or sometimes estimated. Naturally proper coding of government expenditure can be used for tabulating data on the functional and economic classification of government expenditure as well as for obtaining data on the sector of origin of government consumption; (v) Data on expenditures on gross fixed capital formation and on changes in stocks were collected through the annual National Accounts Survey; and (vi) private consumption by sector of origin was arrived at as a residue.

19. The nature of the problems encountered for the construction of input-output tables is much the same as for the compilation of production accounts and commodity balances, except that for the former exercise data requirements would be much more demanding and exacting than for the latter. For most African countries lack of statistical data has put a serious constraint on the feasibility of input-output table construction. The data requirements would become acute once the number of production sectors distinguished in the table were increased beyond a certain size. Suffice it to say that the problems encountered by most African countries engaged in the construction of input-output tables are manifold, but mainly lie in the lack of reliable basic statistical data in the following fields:

<sup>1/</sup> P.N.C. Okigbo; Nigerian National Accounts, 1950-57, Federal Ministry of Economic Development, Lagos.

- (a) Agriculture: Lack of reliable data on acreages under different crops; data on yields; production; household consumption of own production (subsistence); disposition of agricultural products to intermediate and final uses; producers' prices; data on labour and other inputs.
- (b) Industries: Incomplete (i.e. partial) coverage of industrial censuses and surveys conducted; inadequate collection of data on consumption of intermediate inputs; lack of data on small-scale industries and handicraft; reliability and consistency of data supplied by industrial establishments or enterprises; etc.
- (c) Services: These cover distribution, transport, banking, insurance, real estate (including ownership of dwellings), public administration and defence, educational, health, recreational, personal and other services. Most African countries have experienced great difficulty in assessing the inputs (cost structure) as well as the outputs, of some of the services industries and to allocate their outputs to the using industries and final demand sectors. This is necessarily so because of the relatively undeveloped nature of statistics in these countries concerning services and the unavailability of reliable and comprehensive licensing and taxation records.

Methods used in compilation and presentation:

20. Under this section the methods used in compiling input-output tables for the African countries concerned will be dealt with under the following headings:

- (a) The statistical unit.
- (b) Industrial classification.
- (c) Valuation of transactions.
- (d) Net or gross sector output.
- (e) Secondary products and joint products.
- (f) The treatment of imports.
- (g) The treatment of primary inputs (other than imports).
- (h) The treatment of final demand sectors.
- (i) Estimates at constant prices.

21. Before proceeding with the features of input-output tables, item by item, as suggested in the foregoing paragraph, a brief description of the special features of the input-output tables compiled for countries following the French system of national accounting will be in

order. These tables resemble those for France and are characterized, with some exceptions, by the following features: (i) The diagonal elements in the table are not empty, that is, the gross sector output concept is used instead of the concept of a net sector output; (ii) Imports are counted as resources which add to the local production of each domestic producing sector, and are not distributed in a single row or otherwise to the consuming sectors. This results in the inconvenience of the impossibility of distinguishing local inputs from imported inputs and consequently limit the usefulness of the input-output table; (iii) The valuation procedure is normally producers' prices for intermediate inputs and purchasers' prices for final deliveries. There are exceptions to this. For instance, for a number of countries' tables, transport is separated out as a sector in both the rows and the columns, while distribution is only distinguished as a sector in the columns. In other words, intermediate purchases were valued at producers' prices plus trade margins but excluding transport costs on them. (iv) For some tables, trade margins on the final demand sectors (i.e., consumption, capital formation, exports) are given in one row of the table, distributed by product group but not to the consuming industries. The margins that appear under each industry do not represent the margins paid by the industry on its purchases, but rather represent margins on the products of that industry. The inclusion of trade margins on final demand sectors in a single row of the table is in accordance with the practice of valuing final deliveries at purchasers' prices for these countries.

22. We can now go on with a brief examination of the practice of countries in compiling the input-output table, item by item, as follows:

- (a) The Statistical unit: The statistical units used for recording transactions can be one of the following: (i) a commodity group, (ii) an establishment such as a farm, a mine or a factory, (iii) an activity such as transport or construction, or (iv) an institution organizing a branch of economy such as an enterprise or government agency. So far as countries in the region are concerned, for the compilation of their input-output table, varied statistical units are known to have been used. For agricultural production, the available statistics are compiled on a commodity basis; for mining, manufacturing and electricity, the statistical units used include both the establishment and the enterprise. For activities such as transport, trade and construction, the statistics are mostly available on an activity basis (e.g., number of houses built, number of ton-miles carried, etc.). Although the Franco-phone countries usually used enterprises as the statistical unit for data collection, they correspond in most instances to establishments. In both Ivory Coast and Tunisia for which such information is available, it was remarked that very few enterprises carried on multiple activities. In Tunisia, if an enterprises was found to produce

commodities that fall under more than one industrial sector, the enterprises's activities would be sub-divided into its constituent parts, that is, establishments. In the case of Madagascar, for its exercise in compiling the table for 1966, "branches" were used instead of the "sector", that is, the secondary activities of enterprises would have to be transferred from the industry where they are secondary to the industry where they are primary.

- (b) Industrial classification: The ISIC (International Standard Industrial Classification of All Economic Activities) <sup>1/</sup> has not been used in all African countries. However, some correspondence between the industrial classifications used in the Franco-phone countries in the region and the ISIC can be established. Table 2 indicates the correspondence between national sector classifications used for the compilation of the input-output table by African countries and the ISIC. It can be seen from the table that of the 18 countries included in Table 2, most of them have distinguished the main sectors in their input-output tables, such as agriculture, hunting, forestry and fishing; mining and quarrying; electricity, gas and water; construction; transport and communications; real estate. Under manufacturing, a number of industries are popular and distinguished as separate production sectors in the table, such as food manufacturing; textiles, wearing apparel and leather; wood and wood products; paper and printing; chemicals; non-metallic mineral products, excluding petroleum and coal; basic metals industries; and manufactures of fabricated metal products, machinery and equipment. Naturally, in a number of countries' tables, additional sectors of national importance were distinguished.
- (c) Valuation of transactions: Column (3) of Table 1 details the prices at which the transactions (both intermediate and final) were valued in the African countries' input-output tables. The following 4 types of valuation appear to have been used:
- (i) Producers' values: 9 countries, viz., Ghana, Kenya, Nigeria, Southern Rhodesia, South Africa, Sudan, Tanzania (Tanganyika), United Arab Republic (Egypt), and Zambia;
  - (ii) Purchasers' values: 2 countries, namely, Mali and Togo;

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<sup>1/</sup> International Standard Industrial Classification of All Economic Activities (Series M, No.4, Rev.2), 1968.



- (iii) Approximate purchasers' values (including trade margins, but excluding transport charges): 4 countries, viz. Algeria, Cameroon, Congo (Brazzaville) and Ivory Coast;
  - (iv) Producers' values for intermediate transactions and purchasers' values for final deliveries: 4 countries, viz., Madagascar (table for 1966), Morocco, Senegal and Tunisia.
- (d) Net or gross sector output: For the 19 African countries for which input-output tables have been compiled for one year or more, the majority used the gross sector output approach, that is, intra-industry transactions are included in the table and consequently the elements in the principal diagonal of the table are not empty. Only in two cases, namely, the tables for Ghana (1960) and Sudan (1961/62 & 1962/63), the net sector output approach was used. In fact, the preliminary input-output tables for Ghana for 1966 and 1968 also adopted the gross sector output approach.
- (e) Secondary products and joint products: Two procedures that do not involve mathematical techniques are usually used in effecting transfers of secondary and joint products. The first is "artificial transfers", which consists in adding artificial entries to the original table as a device to transfer secondary products from the sectors in which they are actually produced to those sectors in which they are primary. A second procedure is termed "redefinition", which involves the separation of the inputs used in the production of secondary products from the inputs used in the establishment's primary products, and the rearrangement in one sector of all products of a given type, regardless of where they may have been produced.

Little is known about the actual country practices in the treatment of secondary and joint products for the region. Limited information is, however, available for two countries, namely, Kenya and Madagascar. In both cases, the transfers were effected through redefinition, that is, both outputs and corresponding inputs were transferred. Examples are:

- (i) In the case of Kenya: The transfer of the manufacturing activity of the East African Railway Corporation from the sub-group on Rail Transport to the appropriate sub-group in Manufacturing sector; the transfer of the repairs activity of car distribution firms employing more than 50 persons from their distribution activity to an appropriate sub-group in manufacturing.

- (ii) In the case of Madagascar: the transfer of own-account construction together with costs to the building and construction sector.
- (f) The treatment of imports: Imports may be treated in one of the following ways:
  - A. All imports are allocated in a single row to the consuming sectors. In this case, all intermediate flows are of domestic product only;
  - B. All imports are distributed along the row of a similar domestic sector. In this case, all intermediate flows contain imported and domestically produced elements without distinction;
  - C. Imports are classified into competitive and non-competitive. Non-competitive imports are distributed in a single row to the consuming sectors, while competing imports are distributed along the rows of the corresponding domestic sector. In this case, all intermediate flows consist of domestic product plus competing imports, and the total of the latter are entered as a negative column in the final demand category;
  - D. All imported goods are classified both by industry of origin and industry of destination, and this will involve the preparation of two tables - one for domestic flows and one for imported products.

Table 3 shows that procedures A and B were each followed by 6 countries of the region. Procedure A was mainly followed in the English-speaking group of countries, while procedure B in the French-speaking group. Procedure C was followed in one case only, namely Ghana (preliminary tables for 1966 and 1968); while 4 countries followed procedure D.

- (g) Treatment of primary inputs: Table 4 lists the components of primary inputs that were distinguished in 16 African countries' input-output tables. It can be seen from Table 4 that, apart from imports, which appear as a primary input item in 13 of the 16 countries' tables, wages and salaries appear as a primary input item in 9 countries' tables; social security benefits and social assistance grants in 4 cases; depreciation in 5 cases; indirect taxes less subsidies in 12 cases (when the information in Table 4 is condensed). The balancing item shown in Table 4 varies in connotation from one country to another. It corresponds sometimes to gross operating surplus, sometimes to net operating surplus, and in two cases, to gross value added at factor cost.

- (h) The treatment of final demand sectors: The treatment of final demand sectors in the African countries' input-output tables is summarized in Table 5. It can be seen from the table that in most cases, the final demand sectors distinguished comprise private consumption, government consumption, fixed capital formation, changes in stocks, and exports. However, in the tables for Congo (Brazzaville) (1967) and Ivory Coast (1958 & 1960), a breakdown of household consumption expenditure into marketed and non-marketed (subsistence) was made. In the 1959 table for Senegal, household consumption was divided into two sub-sectors, namely, for African households and expatriate households. On the other hand, on account of lack of data, at least in 4 countries' tables, namely, Ivory Coast (1962 & 1964), Mali (1959), Nigeria (1959/60) and Tunisia (1957, 1962, 1964), private and government consumption was combined together and shown as one sector. With respect to capital formation, the 1954 table for the UAR (Egypt) distinguished government capital formation from that by the private sector. In the 1958 table for Ivory Coast, four sub-sectors were given for gross domestic fixed capital formation, namely, by administrations, households, non-financial enterprises and financial institutions.
- (i) Estimates at constant prices: Ivory Coast appears to be the only country in the region that has compiled input-output tables at constant prices. The tables refer to the years 1960 and 1965-69 at constant 1965 prices. Neither the tables nor the methodology used in their compilation have yet been released.

Uses made of input-output tables compiled:

23. Information on the actual uses made of the input-output tables compiled for countries of the region remains scanty. In at least 7 cases they represent no more than a one-time exercise, namely, Cameroon, Congo (Brazzaville), Ghana, Mali, Nigeria, Senegal and Togo. Some of these exercises are of academic interest only and were mainly meant to reveal statistical deficiencies. For a few others the number of production sectors distinguished is too small to be of much analytical use. Nonetheless, it is known that about a dozen or so countries in the region have made use of the tables compiled for one use or another. The uses made of input-output analysis can be summarized under the following headings:

- (a) Statistical uses: Included under this heading may be listed such uses as the checking of the consistency of national accounts estimates, the development and improvement of basic statistical series as well as the development of an integrated national statistical system, preliminary short-term national accounts estimates, the provision of "weights" for price

indices and indices of production, consumption, etc. As Table 7 will show, 11 countries appear to have made use of input-output tables in this way. Thus, in Ivory Coast, the annual tables since 1960 were used for the construction of tables on resources and uses of goods and services (N.B.: Final consumption was obtained as difference in Ivory Coast after intermediate consumption, capital formation and exports were determined, on account of lack of firm data from household consumption surveys in recent years); they were used for establishing provisional national accounts estimates and, as from 1970, the forecasting of these estimates; and were used for estimating "gross domestic production" at constant prices. In Southern Rhodesia and Zambia, the tables were used as a means for improving the accuracy and internal consistency of their national accounts estimates; the exercise also served to ensure the use of a uniform industrial classification in such fields as production, external trade, consumption, capital formation, etc.

- (b) Uses for economic planning and forecasting: Covered under this heading are such exercises as the projection of final demand, the estimation of direct and indirect requirements of imports and import substitution, the estimation of the requirements of labour, capital, foreign exchange, etc.

A number of African countries are known to have made use of input-output tables compiled, however simplified and rudimentary they may be, for economic planning and projections purposes. However, actual information on the way in which they are used is scarce and unavailable. The experiences of the UAR (Egypt) in this field can, however, serve as an illustration. The uses made of input-output analysis in that country include the following:

- (i) Calculation of foreign currency requirements for development projects: To obtain the requirements for foreign currencies the calculation distinguished two phases for each project, the construction phase and the production phase. For the first phase, the investment was broken down into its input components, which represent a column of final demand. Having taken into consideration the various stages of completion of the project, the direct and indirect requirements for imports for the set of final demands which represents the investment project under consideration, could be calculated. For the second (production) phase, a similar procedure was followed and the total import requirements needed for the new production calculated. The latter would create a demand for the products of other sectors, and those in turn have import requirements. The Egyptian experience showed

that "these types of calculations are most useful in estimating the real need for foreign funds and their proper allocation".

- (ii) The testing of the effects of an import substitution policy: The amount of imports to be replaced by domestic production should be shown as part of final demand. The direct and indirect requirements for imports necessitated by this final demand, could be calculated. By subtracting these requirements from the value of imports to be replaced by domestic production, the net effect of the process of import substitution could be obtained. The Egyptian experience showed that better estimates of the net savings in foreign exchange could be arrived at through such calculations.
- (iii) Choice of investments: For each investment programme, its foreign currency requirements, the employment to be created and the incomes generated, by it would be of interest. This is tantamount to the calculation of the total (direct and indirect) requirements from imports, labour and incomes created from the various categories of investments. The type of calculation has proved to be valuable in Egypt as it put before the analyst as well as the policy-maker a valuable set of information which would facilitate the choice of investments.
- (iv) National budgeting: The 1954 table was utilized in the preparation of a national budget for Egypt for the year 1960-61. For the preparation of such a budget, a projection of the changes in the final demand elements which would take place during the period 1959/60 and 1960/61, was made. Then the sets of coefficients which show the direct and indirect requirements of imports, value added and household income created as percentages of a variety of final demands for the year 1960/61, were calculated. A national budget showing the repercussions on imports and incomes which would result from the projected final demand, was then obtained.
- (v) Calculating the requirements of a certain investment programme: The use of the input-output analysis for the calculation of the requirements of a certain investment programme was done repeatedly in Egypt. The total investment was divided into two components, the investment for horizontal expansion and that for vertical expansion. The first step was to break down

the two types of investment into their input components or direct requirements. The second step was to calculate the production required from each sector to meet this investment programme. "Having calculated these production targets, the available capacities in every sector which could be directed to this production was reviewed. In some sectors it appeared that to avoid bottlenecks new capacities should be installed, which, of course, would require investment in these sectors. Another round of calculation should be made in such cases in order to calculate the requirements of these new investments".

- (c) Uses for analysis of economic structure, etc.: Covered under this heading are studies on the economic structure of the economies concerned. This may involve the finding, amongst other things, of the degree of dependence of individual industries on others and the weight of the different sectors in the rest of economy, etc. Analysis to this effect has been carried out with respect to the economies of South Africa (1956/57) and the UAR (Egypt) (1954 and 1959). The compilation of input coefficients after "triangulation" was also carried out for the tables for Ivory Coast (1960), Mali (1959) and Tanzania (Tanganyika) (1954).

Concluding remarks:

24. Having described at length the practices and problems of African countries in the compilation of input-output tables, it should be emphasized that for some time to come, for most countries of the region priority would be given to the compilation of production accounts and commodity balances and such other accounts and tables as suggested in the present SNA <sup>1/</sup>, including the accounts and tables which represent an adaptation of the Full System of the present SNA to developing countries. Their efforts would largely be concentrated on the continual improvement in quality and reliability of the data series and the filling of important gaps in information, using the present SNA as the framework within which a coherent and integrated national data collection programme could be established. In the meantime, some countries of the region will undoubtedly continue to compile input-output tables while others will keep the data requirements for their eventual compilation in view.

<sup>1/</sup> A System of National Accounts (Series F, No.2, Rev.3) 1968.

TABLE 1

Summary of Input-output Tables Compiled in Africa

Country	Years to which the tables refer	Number of production sectors	Kind of prices used	Number of tables compiled	Table showing primary inputs to production	Table showing primary inputs to final demand	Agency, institution or individual that compiled the tables
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Algeria .....	1957	98 x 25	Purchasers' values <u>a/</u>	1	Yes	No	National Statistical Office
	1963	12 x 13	Purchasers' values <u>a/</u>	1	Yes	No	
	1964	11 x 12	Purchasers' values <u>a/</u>	1	Yes	No	
2. Cameroun.....	1959	23 x 23	Purchasers' values <u>a/</u>	1	No	No	National Statistical Office
3. Congo ..... (Brazzaville)	1967	19 x 20	Purchasers' values <u>a/</u>	1	Yes	No	S.E.D.E.S.
4. Ghana.....	1960	10 x 10	Producers' values	6	Yes	Yes	R. Szereszewski
5. Kenya .....	1967 (Compila- tion of table still in progress)	83 sub- groups for the mone- tary sec- tor only	Producers' values	...	...	...	Ministry of Economic Planning & Development
Ivory Coast	1958	21 x 22	Purchasers' values <u>a/</u>	2	Yes	No	National Statistical Office
	1960	21 x 22	Purchasers' values <u>a/</u>	5	Yes	No	
	1962	26 x 27	Purchasers' values <u>a/</u>	1	No	No	
	1963	26 x 27	Purchasers' values <u>a/</u>	1	No	No	

TABLE 1 (Cont'd.)  
Summary of Input-output Tables Compiled in Africa (Cont'd.)

Country	Years to which the tables refer	Number of production sectors	Kind of prices used	Number of tables compiled	Table showing primary inputs to production	Table showing primary inputs to final demand	Agency, institution or individual that compiled the tables
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
7. Madagascar	1960	28 x 29	Purchasers' values <u>a/</u>	1	No	No	National Statistical Office
	1962	12 x 13	Purchasers' values <u>a/</u>	1	Yes	No	
	1966	36 x 33	Producers values for intermediate demand and purchasers' values for final demand	5	Yes	Yes	
8. Mali	1959	9 x 12	Purchasers' values	3	Yes	No	National Statistical Office
9. Morocco	1958	30 x 31 30 x 31	Producers' values for intermediate demand; purchasers' values for final demand	1	Yes	No	Division de la Co-ordination Economique et du Plan
10. Nigeria	1959/60	20 x 20	Producers' values	3	Yes	No	N.G. Carter
11. Senegal	1959	18 x 18	Producers' values for intermediate demand; purchasers' values for final demand	2	Yes	No	Gabriel Marc, INSEE
12. Southern Rhodesia	1964	45 x 1	Producers' values	2	Yes	No	Central Statistical Office



TABLE 1 (Cont'd.)  
Summary of Input-output Tables Compiled in Africa (Cont'd.)

Country	Years to which the tables refer	Number of production sectors	Kind of prices used	Number of tables compiled	Table showing primary inputs to production	Table showing primary inputs to final demand	Agency, institution or individual that compiled the tables
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
13. South Africa	1956/57	48 x 48; 24 x 24; 16 x 16	Producers' values	4	Yes	No	Office of the Economic Adviser to the Prime Minister
14. Sudan	1955/56	14 x 14	Producers' values	3	Yes	Yes	National Statistical Office
	1961/62	14 x 14	Producers' values	1	Yes	Yes	
	1962/63	14 x 14	Producers' values	1	Yes	Yes	
15. Tanzania (Tanganyika)	1954	14 x 14	Producers' values	2	Yes	No	Peacock & Dosser
	1961	17 x 17	Producers' values	3	Yes	Yes	National Statistical Office
16. Tunisia	1957	22 x 22	Producers' values	1	Yes	Yes	Secretariat d'Etat au Plan et a l'Economie Nationale
	1960	17 x 18	Producers' values for intermediate demand; Purchasers' values for final demand	1	Yes	No	
	1962	15 x 16	Same valuation procedure as for 1960	1	Yes	No	
	1964	16 x 17	Same as for 1960	1	Yes	No	

TABLE 1 (Cont'd.)  
Summary of Input-output Tables Compiled in Africa (Cont'd.)

Country	Years to which the tables refer	Number of production sectors	Kind of prices used	Number of tables compiled	Table showing primary inputs to production	Table showing primary inputs to final demand	Agency, institution or individual that compiled the tables
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
17. United Arab Republic (Egypt)	1954	83 x 83	Producers' values	7	Yes	Yes	National Planning
	1959	33 x 33	Producers' values	4	Yes	n.a.	National Planning Committee
	1966/67	44 x 44	Producers' values	n.a.	Yes	n.a.	National Statistical Office
18. Zambia	1961	13 x 4	Producers' values	1	Yes	No	U.N.ECA/FAO Economic Survey Mission to Zambia
	1964 <sup>b/</sup>	15 x 5	Producers' values	1	Yes	No	Central Statistical Office
	1965	40 x 40 18 x 18	Producers' values	6	Yes	Yes	
	1966	38 x 38	Producers' values	4	Yes	Yes	
19. Togo	1962	9 x 18	Purchasers' values	1	No	No	Government of Togo and European Economic Community

<sup>a/</sup> For intermediate consumption, the entries include trade margins, but exclude transport charges. The latter is shown in a separate row in the table.

<sup>b/</sup> In the interindustry transactions table, mining has 3 sub-sectors and manufacturing 10 sub-sectors.

(Note: An "X" indicates a correspondence exists in the national sector classifications used)

ISIC (revised) major divi- sions, divi- sions and major groups	Countries and year to which the input- output tables refer	Alge- ria (1963)	Came- roun (East- ern) (1959)	Congo (Braz.) (1967)	Ghana (1960)	Ivory Coast (1960)	Mada- gas- car (1962)	Mada- gas- car (1966)	Mali (1959)	Moro- cco (1958 & 1960)	Nige- ria (1959/ 60)	Seneg- gal (1959)	South- ern Rhode- sia (1964)	South Africa (1956/ 57)	Sudan (1961/ 62)	Tan- zania (Tan- gany- ka), (1954)	Tan- zania (Tan- gany- ka), (1961)	Tuni- sia (1957)	Tuni- sia (1960)	UAR (Egypt) 1954	Zam- bia (1966)	Togo (1962)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
10 Agriculture, hunting, forestry.. and fishing	X			X			X		X	X		X	X	X								
11 Agriculture and hunting .....			X		X <sup>6/</sup>	X		X <sup>10/</sup>			X <sup>20/</sup>				X <sup>33/</sup>	X <sup>33/</sup>	X <sup>40/</sup>	X	X	X	X	X
12 Forestry and logging.....			X	X	X	X		X			X <sup>20/</sup>				X	X <sup>38/</sup>	X					
13 Fishing .....			X			X									X	X	X					
20 Mining and quarrying.....	X		X	X	X	X	X	X		X	X <sup>21/</sup>	X	X		X	X	X	X		X	X <sup>21/</sup>	
22 Crude petroleum and natural gas production .....	X		X												X	X						
30 Manufacturing .....					X								X		X	X		X				
31 Manufacture of food, beverages and tobacco .....			X														X <sup>41/</sup>					X
311-312 Food manufacturing...	X			X <sup>2/</sup>		X	X	X	X	X <sup>1/</sup>	X <sup>2/</sup>	X <sup>25/</sup>	X	X			X <sup>41/</sup>	X			X <sup>2/</sup>	
313 Beverage industries				X <sup>2/</sup>				X		X <sup>1/</sup>	X <sup>2/</sup>	X <sup>26/</sup>	X	X			X			X	X <sup>2/</sup>	
314 Tobacco manufactures.				X <sup>2/</sup>						X <sup>1/</sup>	X <sup>2/</sup>	X <sup>26/</sup>	X	X			X			X	X <sup>2/</sup>	
32 Textile, wearing apparel and leather industries.....	X		X	X		X	X	X				X	X					X	X		X	
321 Spinning, weaving and finishing of textiles...								X	X	X	X		X	X				X		X		
33 Manufacture of wood and wood products, including furniture			X <sup>1/</sup>	X		X		X		X	X <sup>22/</sup>	X	X	X				X	X	X	X	
34 Manufacture of paper and paper products; printing & publishing			X <sup>1/</sup>					X		X		X	X	X <sup>29/</sup>				X	X	X	X	
35 Manufacture of chemicals and chemical, petroleum, coal, rubber and plastic products	X		X	X <sup>3/</sup>		X	X			X <sup>16/</sup>	X	X	X	X <sup>16/</sup>	X <sup>31/</sup>			X <sup>43/</sup>	X <sup>47/</sup>	X	X <sup>16/</sup>	
353 Petroleum refineries..														X <sup>16/</sup>	X <sup>31/</sup>			X <sup>43/</sup>	X <sup>44/</sup>	X	X	
36 Manufacture of non-metallic mineral products, except products of petroleum and coal.....			X	X						X	X		X	X				X	X <sup>48/</sup>		X <sup>15/</sup>	
37 Basic metal industries .....			X				X			X		X	X					X	X	X	X	
38 Manufacture of fabricated metal products, machinery & equipment .....	X		X			X			X <sup>12/</sup>	X	X <sup>23/</sup>		X					X	X	X <sup>51/</sup>	X <sup>30/</sup>	
40 Electricity, gas and water.....	X		X	X <sup>4/</sup>	X	X	X <sup>8/</sup>	X	X	X <sup>17/</sup>	X	X	X	X	X <sup>34/</sup>		X	X	X	X	X	X <sup>27/</sup>
50 Construction .....	X		X	X	X	X	X <sup>8/</sup>	X	X	X <sup>17/</sup>	X	X	X		X	X	X	X	X	X	X	
60 Wholesale & retail trade and restaurants and hotels.....	X		X	X		X	X	X	X	X <sup>18/</sup>	X	X	X	X	X <sup>35/</sup>	X	X	X <sup>45/</sup>	X	X <sup>52/</sup>	X <sup>54/</sup>	X <sup>58/</sup>
70 Transport, storage and communica- tion.....	X		X	X		X	X	X <sup>11/</sup>	X	X	X	X	X	X	X <sup>35/</sup>	X	X	X	X	X	X <sup>55/</sup>	X <sup>59/</sup>
80 Financing, insurance, real estate and business services.....			X	X											X <sup>36/</sup>				X <sup>36/</sup>	X <sup>36/</sup>	X	
81 Financial institutions.....								X	X						X <sup>36/</sup>					X <sup>36/</sup>	X <sup>36/</sup>	X
82 Insurance .....																						X
83 Real estate & business services						X	X	X		X			X		X	X	X	X	X		X	
831 Real estate.....				X		X	X	X		X			X		X	X	X	X	X		X	
90 Community, social and personal services.....			X																			
91 Public administration & defence													X			X	X				X	
93 Social & related community services.....																					X	
931 Educational services...								X					X							X	X	
933 Medical, dental, other health & veterinary								X														

Footnotes to Table 2:

- 1/ Shown together as one industry, "Wood, paper and printing".
- 2/ Shown together as one industry, "Beverages and tobacco".
- 3/ Excludes petroleum products but includes paper.
- 4/ Includes petroleum products.
- 5/ Apart from the sectors shown in column (4), there are 4 additional sectors, viz., cocoa, fuel, public utilities and services. "Fuel" covers coal and petroleum products, including petroleum refining, but excluding fire wood and charcoal. "Public utilities" includes railway and harbours, post and telegraphs, water supplies and government transport and municipal transport. "Services" includes distribution, transport, housing, banking, personal services, etc..
- 6/ Includes fishing
- 7/ Apart from the sector listed in column (5), there are the following additional sectors included in the table, viz., Building materials; Fertilizers; Other chemical products; Oils and fats; Rubber and plastic products; Other manufactured products; Other services; and Other raw materials and semi-finished products.
- 8/ Excludes buildings but includes electric materials. Building is shown as a separate sector.
- 9/ Apart from the industries listed in column (7), the following additional industries are also listed in the table, viz., Agro-industries; Food canning; Oils and fats; Building materials; electric goods; Miscellaneous handicraft; Services rendered to enterprises; Services rendered to households; Garages.
- 10/ Includes fishing. The sector is sub-divided into modern agriculture, traditional agriculture, and livestock, fishing & hunting.
- 11/ The sector is sub-divided into: Goods transport, Passenger transport, and Telecommunications.
- 12/ Refers to mechanical products.
- 13/ In addition, the following industries are shown in the table: Raw materials; Miscellaneous industrial products, and Services.
- 14/ Apart from the industries listed in column (9), the following additional industries are also included in the table, viz., Sugar, coffee; Conserved food, cold; Oils and fats and milk; Milling of grains and flour; Phosphates; Building materials; Vehicles, aircraft, bicycles; Metal products for consumption; Textiles, clothing; Textiles, handicraft; Leather; Footwear; Rubber; and Services.
- 15/ Broken down into two sectors, namely, Bricks & other clay products, and Cement and cement products.
- 16/ Excludes rubber, which is shown as a separate industry.
- 17/ Separated into two sectors, namely, (i) buildings and (ii) other construction (public works).
- 18/ Divided into two sub-sectors, viz., on imports and on local products.
- 19/ Apart from the industries listed in column (10), the following additional industries are also included in the table, viz., Agricultural processing; Apparel (clothing & footwear); Service; Transport equipment; Miscellaneous.
- 20/ Agriculture excludes livestock, while livestock and fishing are included with forestry to form a separate production sector.
- 21/ Separated into two sectors, viz., metal mining and non-metal mining.
- 22/ This branch is entitled "Manufacture of wood, leather, rubber, plastic and paper.
- 23/ Labelled "Utilities" in the table.
- 24/ Apart from the industries listed in column (11), the following additional industries are also included in the table, viz., Oils & fats; Meat and meat canning; Grains and flour; Building materials; Services.
- 25/ Includes sweets and confectionery.
- 26/ Includes matches.
- 27/ Includes a sector entitled "Rural agricultural services".
- 28/ The correspondence between the ISIC and the classification used for the 1956/57 table for South Africa, is based on a publication for the 24 x 24 table. Apart from the industries shown in column (13), the following additional sectors are also included in the table, viz., Gold; Leather and products; Transport equipment; Apparel; Rubber products; Machinery; Iron and steel; Printing & publishing; Other mineral products; Non-ferrous metals; Coal; Services.
- 29/ Excludes printing and publishing, which is shown as a separate production sector.
- 30/ Broken down into 3 sectors, viz., Machinery; Transport equipment and Electrical equipment.
- 31/ Includes coal products.
- 32/ Apart from the industries listed in column (14), the following additional industries are also separately shown in the table, viz., Livestock; Craft industries; Domestic services; Miscellaneous services.
- 33/ Excludes livestock, which is listed as a separate industry.
- 34/ Named "Public Utilities".
- 35/ Transport and distribution are lumped together and shown as are industry in the table.
- 36/ Includes insurance.
- 37/ Apart from the industries listed in column (15), the following additional industries are also included in the table, viz., Livestock; Handicraft; Public services; Miscellaneous services.
- 38/ Includes hunting.
- 39/ Apart from the industries listed in column (16), the following additional industries are also shown separately in the table, viz., Sisal; Sugar; Other crops; Other Manufacturing; Handicrafts; Services.
- 40/ Refers to Livestock only.
- 41/ Food and beverages are combined and shown as one industry.
- 42/ Apart from the industries listed in column (17), the following additional industries are shown separately also in the table, viz., Leather and footwear; Rubber products; Various manufacturing; Miscellaneous services.
- 43/ Excludes petroleum and rubber products, which are shown as separate industries.
- 44/ Includes products of coal.
- 45/ Includes banking and insurance.
- 46/ Apart from the industries listed in column (18), the following additional industries are also shown separately in the table, viz., Fishing, beverages, tobacco agricultural and food processing industries; Rural household products; Other services; Other energy products and water.
- 47/ Excludes petroleum.
- 48/ Includes construction materials.
- 49/ Excludes water, which is included in the industry heading "Other energy products, water".
- 50/ Apart from the industries listed in column (19), the following additional industries are also separately shown in the inter-industry table, viz., Cement; Manufacture and repair of machinery; Other basic industries; Slaughtering and meat products; Dairy products; Grading and processing of grains; Bread and bakery production; Sugar; Oils and fats; Other food products; Ginning and pressing of cotton; Manufacture of ready-made clothes; Fertilizers; Other industries; Suez Canal; Other services.
- 51/ The sector is sub-divided into: Metal products and Manufacture and repair of machinery.
- 52/ Includes financial services.

Footnotes to Table 2 (cont'd.)

- 53/ Apart from the industries listed in column (20), the following additional industrial sectors are also separately shown in the inter-industry table, viz., Slaughtering and meat processing; Dairies; Grain mills; Bakeries; Other food; Rubber products; Other manufacturing; Business services; Recreational and non-business services; Hotels and restaurants; Other personal services; Unspecified.
- 54/ Excludes hotels and restaurants.
- 55/ Broken down into 4 separate sectors, namely, Railway transport; Road transport; Other transport; Posts and telecommunications.
- 56/ The 1962 interindustry table for Togo is for 9 products groups and 18 industrial sectors. Apart from the industries listed in Column (21), the following additional industrial sectors are also included in the table, namely, Other modern industries; Other services of the modern sector; Traditional sector: Production; Traditional sector: Commerce and transport.
- 57/ Broken down into two separate sectors, namely, private construction and construction under State supervision.
- 58/ Broken down into 3 separate sectors, namely, Import-export houses; Other modern commerce; African wholesale trade.
- 59/ Broken down into 5 separate sectors, namely, Road, Rail, Maritime, and Air transport, and Auxiliary transport services.

TABLE 3  
Treatment of Imports

Country	A	B	C	D
Algeria (1963) .....		X		
Congo (Brazzaville)(1967)		X		
Ghana (1960) .....	X			
Ghana (1966) .....			X	
Ivory Coast (1960) .....		X		
Madagascar (1966) .....				X
Mali (1959) .....		X		
Morocco (1960) .....		X		
Nigeria (1959/60) .....	X			
Senegal (1959) .....				X
Southern Rhodesia(1964) .	X			
South Africa (1956/57) ..	X			
Sudan (1962/63) .....	X			
Tanzania (Tanganyika) (1961) .....	X			
Tunisia (1960) .....		X <sup>a/</sup>		
U.A.R.(Egypt)(1954) .....				X
Zambia (1966) .....				X

A = All imports are allocated in a single row to the consuming sectors.

B = All imports are distributed along the row of a similar domestic sector.

C = Imports are separated into competitive and non-competitive. Non-competitive imports are allocated in a single row to the consuming sectors; Competitive imports are distributed along the rows of the corresponding domestic sector.

D = All imported goods are distinguished by industry of origin and industry of destination.

a/ For the 1957 table, imports are allocated in a single row to the consuming sectors (i.e. under A).

TABLE 4  
Primary Inputs Specified in African Input-output Tables

Primary inputs	Algeria (1963)	Congo (Braz.), 1967	Ghana (1960)	Ivory Coast (1960)	Madagas- car (1966)	Mali (1959)	Morocco (1964)	Nigeria (1959/ 60)	Senegal (1959)	Southern Rhodesia (1964)	South Africa (1956/7)	Sudan (1962/ 63)	Tanzania (Tanga.), 1961	Tunisia (1957)	U.A.R (Egypt) 1954	Zambia (1966)	Totals
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
1. Imports.....			X	X	X	X		X	X	X	X	X	X	X	X	X	13
2. Wages and salaries.....	X			X			X						X	X		X	6
3. Wages & salaries to nationals.....		X			X				X								3
4. Wages & salaries to expatriates.....		X			X				X								3
5. Social assistance grants & social security benefits.....	X				X		X						X	X			4
6. Gross operating surplus...				X					X				X				3
7. Depreciation .....		X			X		X							X		X	5
8. Net operating surplus (profits).....		X <sup>a/</sup>				X <sup>a/</sup>	X <sup>a/</sup>			X <sup>a/</sup>			X <sup>a/</sup>	X		X	2
9. Indirect taxes.....	X		X											X			8
10. Subsidies.....	X		X											X		X	4
11. Indirect taxes less sub- sidies.....				X							X	X					3
12. Duties & taxes on imports and/or exports				X					X								2
13. Customs duties.....																X	1
14. Royalties & other indirect taxes.....									X							X	2
15. Gross value added.....			X			X		X		X					X		5
16. Balance (i.e. balancing item).....	X	X			X		X				X	X					6
Number of primary inputs distinguished:	5	5	4	5	6	3	5	2	6	3	3	3 <sup>b/</sup>	4	7	2	7	70

a/ The item appears to stand for "Indirect taxes net of subsidies".

b/ Excluding one item, "Charges and sales of Government", which was distinguished in the table.

TABLE 5  
Treatment of Final Demand Sectors

Abbreviations: Cp = Private consumption;  
Cg = Government consumption;  
Ca = Consumption of administrations;  
I = Fixed capital formation;  
Ia = Fixed capital formation by administrations;  
Ie = Fixed capital formation by enterprises;  
Ih = Fixed capital formation by households;  
E = Exports;  
St = Change in stocks.

Country	Year	Number of sectors shown	Sectors of final demand specified in table
1. Algeria.....	1963	6	Cp; Ca; E; St; Ia; Ie.
2. Cameroun..... (Eastern)	1959	5	Cp; Cg; E; St; I
3. Congo (Braz.)...	1967	7	Household consumption, marketed; Household consumption, non-marketed; Ca; E; St; Ia; Ie.
4. Ghana	1960	5	Cp; Cg; E; I; St.
5. Ivory Coast.....	1958	10	4 final consumption sectors, viz., Ca; Consumption of financial institutions; Household consumption, non-marketed; Household consumption, marketed. 4 fixed capital formation sectors, viz., Ia; Ih; GDFCF by financial institutions; GDFCF by non-financial enterprises. E; St.
	1960	10	Same as for 1958.
	1962	4	I; St; E; Final consumption expenditure.
	1963	4	Same as for 1962.
6. Madagascar.....	1960	5	Cp; Cg; I; St; E.
	1966 <sup>a/</sup>	6	Cp; Ca; I; St; E; Foreign consumption in Madagascar
7. Mali	1959	3	I; E; Consumption of households and administrations.
8. Morocco	1958 <sup>b/</sup>		Ca; Cp; I; St; E.
	1960 <sup>b/</sup>		Ca; Cp; I; St; E.
	1964		Ca; Foreign administration and tourism; Cp; I; E; St.



TABLE 5 (Cont'd.)  
Treatment of Final Demand Sectors (Cont'd.)

Country	Year	Number of sectors shown	Sectors of final demand specified in table
9. Nigeria.....	1959/60	3	I; E; Consumption (government and private).
10. Senegal .....	1959	6	Cp; St; I; E; African households' consumption; European households' consumption.
11. Southern Rhodesia	1964	5	Cp; Cg; I; St; E <sup>c/</sup>
12. South Africa.....	1956/57	5	Cp; Cg; I; St; E.
13. Sudan <sup>a/</sup> .....	1955/56	5	Cp; Cg; E; Capital (including changes in stock); Non-Government education.
	1961/62) & 1962/63)	6	Cp; Cg; E; I; St; Non-Government education.
14. Tanzania .....	1954	4	Cp; Cg; E; Capital formation.
(Tanganyika).....	1961	5	Cp; Cg; E; I; St.
15. Tunisia.....	1957 <sup>d/</sup>	4	I; St; E; Private & public consumption.
	1960 <sup>d/</sup>	5	Cp; Cg; I; St; E.
	1962) 1964)	4	I; St; E; Private & public consumption
16. U.A.R. (Egypt)...	1954	6	Cp; Cg; E; St; Capital formation, private sector; Capital formation, government.
17. Zambia <sup>e/</sup> .....	1961) 1964) 1965) 1966)	5	Cp; Cg; I; St; E.

a/ Each sector is sub-divided into taxed and not subject to tax.

b/ Administration is sub-divided into two sub-sectors, viz., Moroccan Administrations and Foreign Administrations (including tourism). Investment is sub-divided into: private and public enterprises; agriculture; dwelling.

c/ Sub-divided into two columns: goods and services imports.

d/ Private consumption sub-divided into non-marketed and marketed; gross domestic fixed capital formation sub-divided into: enterprises, households and administrations.

e/ For 1961, the final demand sector "Private Consumption" is sub-divided into Non-African and African consumption.

TABLE 6  
Special Input-output Tables Compiled

Country	Year	Input-output coefficients matrix	Input-output coefficients matrix after triangulation	Inverse coefficients matrix	Imports matrix	Investment (or capital formation) matrix	Private consumption matrices	Tables for certain product or industry groups in value	Tables in constant prices
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Algeria	1963							Trade margins	
2. Ghana <sup>a/</sup>	1960	X		X					
3. Ivory Coast	1958	X							
	1960	X	X	X				Trade margins & indirect taxes	1960 at 1963 prices, and 1960 & 1965-69 at 1965 prices.
4. Madagascar	1966	X <sup>d/</sup>		X <sup>d/</sup>	X			Matrices separately for trade margins and transport	
5. Mali	1959	X	X	X					
6. Nigeria	1959/60	X		X					
7. Senegal	1959	X			X				
8. Southern Rhodesia	1964						X		
9. South Africa	1956/57	X	X	X <sup>e/</sup>					
10. Sudan	1955/56	X							
11. Tanzania (Tanganyika)	1954	X							
	1961	X		X					
12. U.A.R. (Egypt) <sup>b/</sup>	1954	X		X	X				
13. Zambia	1965	X <sup>c/</sup>			X	X	X		
	1966				X	X	X		

Footnotes to Table 6

- a/ Additional tables compiled include: Direct input coefficients of final demand; Primary inputs coefficients of final demand.
- b/ Additional tables compiled include: Ranking of the productive sectors according to their deliveries to intermediate and final demand (without imports); Ranking of the productive sectors according to their deliveries to intermediate and final demand (with imports); Ranking of the productive sectors according to their weight in the rest of the economy; Direct and indirect requirements of imports per unit of final demand from each of the productive sectors.
- c/ For 1965, the input-output coefficients matrix has been worked out for the 18 x 18 production sectors table. Separate matrices were worked out for domestic production and imports respectively.
- d/ The input-output coefficients and inverse matrices worked out are for a much condensed table, namely, 6 x 6 production sectors.
- e/ Additional tables compiled include: Direct and indirect requirements for imports per unit of final demand; Total, direct and indirect requirements for each sector's products per unit of final demand by type of demand; Ultimate percentage disposition of gross output to final demand categories by sector; Ultimate disposition of gross agricultural, forestry and fishing output to final demand categories.

TABLE 7

Uses Made of Input-output Tables Compiled

	For statistical uses	For planning & forecasting	For analysis of economic structure etc..
1. Algeria .....	X	X	
2. Congo (Brazzaville)	X		
3. Ghana.....		X	
4. Kenya .....	X	X	X
5. Ivory Coast .....	X	X	X
6. Madagascar.....	X		
7. Morocco .....	X	X	
8. S. Rhodesia.....	X		
9. South Africa.....	X		X
10. Tunisia.....	X	X	
11. U.A.R.....	X	X	X
12. Zambia.....	X	X	
	11	8	4

ANNEX I

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## ANNEX II

Questionnaire on Production Accounts, Commodity Balances,  
and Input-Output Analysis at both Current and Constant Prices

Note: The questionnaire is divided into Parts A and B. Countries which have not so far compiled, and are not currently compiling, input-output tables are not requested to make replies to Part B of the questionnaire.

Part A. PRODUCTION ACCOUNTS AND COMMODITY BALANCES: Omitted.

Part B. INPUT-OUTPUT ANALYSIS:

Replies to this part of the questionnaire should not be attempted by countries which have not yet compiled, or are not compiling, input-output tables.

B.1. General on the compilation of input-output tables:

- (a) Historical review of the compilation of input-output tables in your country, including the list of tables compiled, years to which the data refer, organizations or individuals responsible for their compilation. If some of the tables listed represent an "up-dated" version of an earlier table, please say so and indicate briefly the methods used in up-dating the tables.
- (b) Plans, if any, in the compilation of input-output tables for the future in particular, in the construction of standard tables 2 and 3 of the revised SNA.

B.2. Detailed practices in the compilation of input-output tables:

- (a) Size of table: The number of production sectors distinguished in the table. Please also attach list of production sectors (or industries) used, and the latest input-output tables compiled.
- (b) Industrial classification used: State if the ISIC was followed in your classification of industries for the compilation of input-output tables. If national classifications are used for the purpose, please attach copy of national industrial classification.
- (c) Statistical Units used: Please state if the establishment or the enterprise has been used as the reporting unit for purposes of aggregation of data. If other units are used for the purpose, please specify.

- (d) Adjustments to basic data collected: The adjustments consist mainly of the transfer of secondary activities or products from the industry where they are subsidiary to the industry where they are primary.

If these adjustments were carried out in your tables please:

- (i) State which of the following possible ways of adjustment has been used:
- Adjusted by transferring output without the associated input;
  - Adjusted by transferring both output and input;
  - Adjusted by recording secondary output as negative input.
- (ii) Give practical examples as to for which products of what industries these adjustments were made, and how this was done.

- (e) Treatment of internal transactions (between establishments of the sector): Please indicate which of the following treatments was used:

- These transactions are shown in the main diagonal;
- They are shown in the main diagonal in brackets and deducted from the input and output of each industry;
- They are not shown at all.

- (f) Treatment of unallocated inputs and outputs: If unallocated inputs and outputs are distributed between the different industries in order to obtain a "clean" table, please indicate how this is achieved.

- (g) Inverse matrices: State if inverse matrices have been compiled. If the answer is "yes", please:

- (i) Indicate whether the inverse matrices have been published, and indicate publication in which they were issued;
- (ii) Describe the procedures adopted to resolve the problems created:
- by the existence of joint products and by-products;



- by the fact that exports are usually differentially taxed from production of the same products for the home market.

- (h) Input-output tables at constant prices: Have you compiled input-output tables at constant prices? If so, kindly:
  - (i) Describe the methods followed in the compilation of the tables.
  - (ii) State the years for which these tables in constant prices were compiled, and the publication in which they appeared (if published).
- (i) Special ad hoc sample surveys: State if for the compilation of input-output tables, you have been obliged to undertake special sample surveys to collect missing data. If the answer is "yes", describe briefly the types of special surveys undertaken for the purpose.
- (j) Length of time required in compilation and publication:
  - (i) State the time required (in years and months) for the compilation of your input-output tables;
  - (ii) State whether all or only parts of the tables compiled have been published.

B.3. Uses of input-output tables compiled:

Input-output tables compiled may be put to any or a number of the following uses:

- (a) As a framework for estimating the needs for extensions and improvements in basic statistics for integrating and checking the whole internal statistical system;
- (b) for checking the consistency of national accounts estimates;
- (c) as a basis for short-term preliminary national accounts estimates;
- (d) for supplying weights for index numbers of price, volume of production, consumption, etc.;
- (e) analysis of internal structure of the economy, e.g. estimation of direct and indirect requirements for production in the various industries, labour, capital, etc., associated with specific sectors in final demand, e.g. private consumption.

- (f) analysis of cost-and-price relationships;
- (g) analysis of foreign trade;
- (h) uses for building general and partial models of the economy;
- (i) uses in connexion with economic forecasting and planning (please describe and elaborate on this part).

Please indicate specifically for which of the above possible uses the input-output tables compiled by your country have in fact been used, and describe in more detail the experiences of your country in the use of input-output tables.