E-TRAINING ON COMPILATION OF SUT IN AFRICA

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Session 5: Classifications and Data sources for SUTs
Outline of presentation

• Classifications
• Data Sources for supply Table
  – Agriculture, livestock, forestry and fisheries:
  – Mining, manufacturing, construction, services:
  – Taxes and subsidies on products
  – Imports
• Data sources for final use matrix:
  – Final consumption expenditure
  – Gross capital formation
  – Exports
• Concluding remarks
Classifications
Introduction (1/3)

• The size of SUT refers the number of Products and Industries included in the supply/use tables.

• National circumstances generally guide the size of SUTs. However, international recommendations and data requirements also may need to be considered:
  - For the ICP, guiding factors for determining the size and classifications (especially for products) for SUTs is (i) they should be at a reasonable classification level; and (ii) they should match with ICP basic heading classification, at least at some aggregation levels.
  - The AFRISTAT recommendation for size of SUT is of 44X44 dimension.
Introduction (2/3)

- In most countries, primary data available from different sources (such as surveys or administrative data) use the following classifications:
  - Central Product classification (CPC) for products
  - International Standard Industrial Classification (ISIC) for industries
  - Standard International Trade Classification (SITC) & Harmonized Commodity description and coding system (HS) for foreign trade
  - COICOP, COFOG, COPNI for final consumption expenditure of households, government and NPISHs, respectively
  - SNA recommends for GFCF data to be shown by seven types of assets, but some countries may show the data under more categories
  - The BoP presents imports and exports of services according to 12 standard components of services, but some countries may show the data under more services
Introduction (3/3)

- In the SUTs, use of these data is achieved through the establishment of concordance tables between these classifications and a standard product classification.
  - Such concordance tables between international classifications are available from the international agencies.
  - If the national classifications are based on these international classifications, concordances between the national classifications can be easily built up on the basis of the concordances between international classifications.
  - Otherwise, the countries need to go through the entire process of matching item by item for establishing concordances between their national classifications.
  - However, it should be understood that concordances between classifications may not be easy and needs to be done carefully.
Classification of Industries for SUTs (1/2)

- SNA recommends ISIC for the classification of Industries in SUTs. The latest version of ISIC rev 4 contains 21 sections, 88 divisions, 238 groups & 419 classes, and theoretically one can include all 4-digit ISIC industries in SUTs, but in practice this is neither feasible nor needed, because
  - industry surveys may classify establishments only under few industry groups (1/2/3 digit level)
  - Data collected at the establishment level may be coded or processed or tabulated at 1/2/3 digit level
  - Administrative agencies may use their own classifications, due to which or otherwise, data may be available at more aggregated levels.
  - Different source agencies may provide data at different levels of industries. For example, Census or LFS data on employment may only be available at 2/3 digit level, while establishment surveys may provide data at 4-digit level
  - Data provided by source agencies at 4-digit level may not be reliable, as respondents at that level may be very small.
  - Resources available for compiling SUTs in statistical offices may be limited
Classification of Industries for SUTs (2/2)

• Choice of industry classification for SUTs, therefore, depends on number of factors
  – For benchmarking national accounts: most developing countries compile SUTs for the years for which most source data (censuses, surveys, for example) becomes available, with the objective of benchmarking GDP estimates. In this case, the SUTs could have as many industries as the source data permits (in terms of details and quality)
  – For updates or annual or constant price SUTs, classification could be more aggregated, as data on production or prices may not be available at the level of industries included in benchmark SUTs.
  – Other considerations could be
    • importance of industries to the economy
    • detailed level of industries at which production approach GDP data is compiled as part of annual national accounts
Classification of Products for SUTs (1/2)

• Product classification is important in SUTs, as
  – product balance is key feature of SUTs and
  – sources of data for different components of SUTs come with different product classifications

• Considerations for selecting product classification for SUTs
  – SNA recommends the use of CPC (latest version is CPC 2.1) for classifying products. This version is 5-digited with 10 Sections, 71 Divisions, 329 Groups, 1299 classes and 2887 Sub-classes
  – Generally, the number of products included in the SUTs is more than the number of industries.

• Some developed countries compile SUTs for few thousand products, but this is difficult for developing countries.
Classification of Products for SUT (2/2)

- Some countries choose the characteristic products of industries (included in the SUTs) as the product classification (which makes the SUTs as square tables), thereby the number of products become equal to the number of industries in the SUTs
  - This classification helps in identification of main products (shown in diagonal cells) and secondary products (shown in off-diagonal cells) of industries
  - It also helps in easy transformation of SUTs to IO tables, as IO tables are symmetric and square

- If the objectives of compiling SUTs also include in supplying GDP expenditures data for ICP, then the product classification should be aligned with the ICP basic headings (155 in number) at some level

- Therefore, choice of product classification in SUTs depends on their importance to the economy, availability of detailed source data at product level, objectives of compiling SUTs, and resources available with the statistical office
Final Consumption Expenditure Vectors

- The final consumption expenditure vectors in the use matrix refer to households, NPISHs and government. These are compiled according to COICOP, COPNI and COFOG respectively in the source data.
  - The main issues here, therefore, relate to the development and use of concordance tables between the classifications used for estimating final consumption expenditures and the product classification of the SUTs.
- COICOP is structured into 14 divisions (2-digit), which are further disaggregated into groups and classes. Divisions 01-12 refer to individual consumption expenditure of households, Divisions 13 and 14 refer to individual consumption expenditure of NPISHs and general government, respectively.
- The structure of COPNI and COFOG are also similar to the COICOP.
  - COPNI includes at 2-digit level, the final expenditures of housing, health, recreation, education, social protection, religion, political parties, environmental protection and services, n.e.c.
  - COFOG includes under collective expenditure, general public services, defence, public order and safety, economic affairs, environmental protection and housing and community amenities; and under individual consumption expenditure, housing, health, recreation and culture, education and social protection.
Imports & Exports Vectors

Goods

• The international classifications for recording imports and exports are the Standard International Trade Classification (SITC) and the Harmonized Commodity Description and Coding System (HS).
  – SITC (Rev 4) is structured under Sections (1-digit), Divisions (2-digit), Groups (3-digit), Sub-groups (4-digit) and basic headings (5-digit)
  – HS is organized into 21 sections and 96 chapters followed at 4-digit level by headings and at 6-digit level by divisions.
  – Further digits are added to meet specific national requirements.
• Concordance tables available between SITC/HS and CPC can be used for SUTs. Alternatively, the source data available with codes and description of items, can be used to directly classify them against SUTs product codes

Services

• BoP presents data on imports and exports of services according to 12 categories. These can be easily identified with products included in SUTs
Data sources
Construction of SUT requires information on the following components with product details:

- **Supply**
  - Domestic output by industries (further by institutional sectors)
  - Imports (Goods, Services, C.i.f.-f.o.b. adjustment, Purchases of residents abroad)
  - Trade margins, Transport costs, Taxes and subsidies on products

- **Use**
  - Intermediate consumption by industries (further by institutional sectors)
  - Exports (Goods, Services, Purchases of non-residents in the domestic economy)
  - Household final consumption expenditure (with adjustment items for Resident purchases abroad and Purchases of non-residents in the domestic economy)
  - Final Consumption expenditure of NPISHs
  - Government final consumption expenditure
  - Gross fixed capital formation, Change in inventories, acquisition less disposal of valuables

- **Value Added components (by institutional sectors)**
  - Compensation of employees
  - Other taxes and other subsidies on production
  - Consumption of fixed capital
  - Net operating surplus/mixed income
Introduction (2/2)

• However, in reality, economic data that is available in developing countries is much less than the data required for compiling SUTs
  – Therefore, all available information from different sources, namely, censuses, surveys, administrative data, sample surveys, etc. conducted in the reference year or close to the reference year of SUTs, need to be examined and used judiciously while compiling SUTs
  – These need to be supplemented with small sample surveys, focused input-output surveys, research studies, expert consultations, application of commodity flow methods and even borrowing ratios from neighboring countries or similar economies, where needed
Main sources of data for production, intermediate consumption and value added (1/3)

• Agriculture, livestock, forestry and fishing
  – Agricultural surveys and censuses; Area, yield and prices of crops
  – Livestock censuses for data on livestock population and annual yield surveys
  – Administrative statistics on agriculture, livestock, forestry and fishing
  – Administrative data maintained by local/regional authorities and commodity boards
  – Land utilization statistics/surveys
  – Household income-expenditure surveys (for estimating production from expenditure data)

• Mining, manufacturing, utilities and construction
  – Administrative data on mining (output of minerals) and utilities from regulatory bodies
  – Economic censuses and manufacturing/economic/enterprise surveys
  – Construction and investment surveys; administrative data on building materials
  – Government budget documents
  – Accounts of companies – government owned and private
  – Labour force surveys and population censuses (to estimate informal sector through labour input methods)
  – Reports of industry associations
  – Tax data disaggregated by products
  – Data on production of industrial goods
Main sources of data for production, intermediate consumption and value added (2/3)

- Services
  - Economic censuses
  - Enterprise surveys covering all non-agricultural economic activities
  - Wholesale and retail trade surveys
  - Accounts of companies/corporations – government owned and private
  - Financial statistics from central bank/regulatory agencies
  - Regulatory agencies of insurance companies
  - Government budget documents/government finance statistics
  - Administrative data for services (such as telecom, transport, airlines, etc.)
  - Reports of industry associations
  - Tax data, disaggregated by products
  - Reports of research organizations
  - Labour force surveys and population censuses (for estimating informal sector)
  - Data on volume indicators of output of services, such as freight tonne kilometres, passenger kilometres, number of vehicles on road, number of passengers, cargo handled in ports, etc.
Main sources of data for production, intermediate consumption and value added (3/3)

• In some countries, data may only be available on total output and total intermediate consumption by industry, but not product-wise. This could be the case for the activities of general government and NPISHs.

• In such situations, outputs could be assigned to the characteristic products of industries, though this is a crude procedure and should be adopted only as a last resort.

• However, intermediate consumption broken down by products, is an essential requirement in the construction of SUTs. In such cases, the fall back options are:
  – focused input-output surveys covering a few establishments in each industry,
  – expert opinion of engineers and concerned entrepreneurs,
  – standard input structures of different industries (for example, in the construction activity), and
  – borrowing intermediate consumption coefficients from countries with similar economic structure.
Imports and exports

• The two main data sources for product level information are: (a) Merchandise trade statistics from customs authorities for goods at c.i.f values and (b) Balance of payments statistics for services

• SNA recommends valuation of total imports and exports on f.o.b. basis, but valuation of goods on c.i.f. basis.

• Source of data for c.i.f. to f.o.b. adjustment is the balance of payments (imports of freight and insurance services) or surveys conducted on few importers
Taxes and subsidies on products and other taxes and other subsidies on production

- Data on taxes and subsidies on products is required with product break-down. Data on other taxes on production is only needed industry-wise.
- The required data is generally available in the budget documents or with the tax authorities.
- Sometimes, data on product taxes or subsidies may be available only at aggregate level, not product-wise
  - In such cases, estimates could be compiled using average tax rates and production at product level. The data may then be adjusted to control figures obtained from government accounts, on pro-rate basis.
- If detailed information on other taxes and subsidies on production is not available in the government accounts, the control figures given in these accounts could be distributed to industries on the basis of information on these items collected in the establishment surveys or business accounts of companies.
Trade and transport margins

• The data on trade and transport margins by products is mostly estimated through indirect methods. It is difficult to collect direct data on trade and transport margins.
• The trade and transport margin ratios for different products can be estimated on the basis of small surveys of wholesalers and retailers and transporters.
• A more detailed procedure of estimating these margins was covered in the previous presentations.
Household Consumption Expenditure

- The main data sources for household consumption expenditures are the household income expenditure surveys, retail trade surveys, agricultural production surveys and other administrative data.
- In some countries, household income-expenditure surveys are carried out only periodically. In such cases, benchmark HFCE estimates are prepared using survey results and annual estimates based on retail trade surveys and other indicators.
- Some countries also use a combination of various sources for estimating different items of household consumption expenditure (for example, consumption of alcohol from the excise authorities, purchase of motor vehicles from the motor vehicle registrations or sales, electricity consumption from supply by electricity distributors, consumer durables from retail sales, etc.).
- There are also other expenditures of households (such as, imputed rents of owner occupied dwellings, FISIM, insurance service charges) that need to be accounted for in the household consumption expenditure, which are not collected directly from surveys.
- Commodity flow approaches are widely used by statistical offices to estimate the household consumption expenditure.
Government Consumption Expenditure

- GFCE is estimated as output of government minus receipts from sales plus social transfers in kind. The government output is estimated on cost basis as sum of intermediate consumption, compensation of employees, other taxes less subsidies on production, if any, and consumption of fixed capital.
- Government output is presented according to activities (such as public administration, education, health, etc.) and GFCE presented according to COFOG.
- The main data sources for estimating output and GFCE are government accounts.
- Generally, these accounts do not provide product level details of expenditures, which are necessary for estimating intermediate consumption columns in SUTs. Small surveys may need to be conducted by selecting few government departments.
- Similarly, for estimating GFCE according to COFOG, details on government expenditures by purposes are required. This is possible if government accounts are available separately for all departments and levels of government and within that expenditures under broad functions.
- Once estimates of GFCE are available by COFOG, concordance tables could be applied to classify them according to products of SUTs.
Consumption Expenditure of NPISHs

- Estimating output and final consumption expenditure of NPISHs is similar to that of general government.
- The main data sources are surveys on NPISHs are the annual accounts of NPISHs.
- Alternative data sources could be economic censuses or annual enterprise survey in which a separate code for NPISHs could be given to identify the NPISHs units.
- In countries which do not have the above sources,
  - estimates could be compiled on the basis of labour force surveys, if it is possible to identify the number of employees in NPISHs from these surveys.
  - Generally, NPISHs are exempt from paying taxes, but tax agencies collect and maintain accounts of NPISHs. This could be a source for data on NPISHs.
Gross Fixed Capital Formation

• SNA recommends presenting GFCF estimates under
  (i) Dwellings
  (ii) Other buildings and structures
  (iii) Machinery and equipment
  (iv) Weapons systems
  (v) Cultivated biological resources
  (vi) Costs of ownership transfer on non-produced assets
  (vii) Intellectual property products

• The main data sources are construction surveys, building permits, annual enterprise survey, accounts of government budget documents, foreign trade statistics and the household surveys.

• Commodity flow methods which are based on from domestic production and imports of capital goods are used in some countries.
Change in inventories

• The source of data for the change in inventories are surveys on inventories, company accounts, annual enterprise survey, agricultural surveys, food balance sheets, government budget documents and government strategic stocks of food, oil, etc.

• Countries that do not regularly compile estimates of change in inventories should focus on estimating inventories at least for government and corporations from their annual accounts; government food stocks; and data available in the business/establishment surveys.
Acquisition less disposals of Valuables

• Main sources of data are the accounts of government and corporations; business/establishment surveys; and household surveys. Appropriate questions need to be included in the establishment surveys and household surveys to collect such information from producers and consumers.

• Alternatively, if commodity flow methods are used to estimate this item, main sources of data are the imports and exports statistics and domestic production of valuables.
  – Imports and exports data is available from customs records. Domestic production can be estimated by identifying the establishments/enterprises associated with the production of valuables in the establishment surveys or accounts of companies.
Compensation of Employees

• Data on compensation of employees is normally compiled in a cross-classification of industries and institutional sectors, just as in the case of production and intermediate consumption.

• The most common data sources for estimating compensation of employees by industry are:
  - The annual enterprises survey;
  - Business accounts;
  - Government budget documents;
  - Administrative data;
  - Labor force survey.

• Information on compensation of employees can also be indirectly compiled from the social security records, since social security contributions are usually made as a fixed percentage of salaries and wages.
Consumption of Fixed Capital

• The recommended method of compiling CFC estimates by industry is by compiling capital stock estimates, which in turn are based on the perpetual inventory method (PIM).

• The PIM requires long term data on gross fixed capital formation by type of assets cross classified by industry / institutional sectors and the life cycle of the assets.

• A short-cut method for estimating capital stocks and consumption of fixed capital is suggested in the ECA handbook on supply and use tables (draft).

• Some developing countries use either depreciation rates provided in the business accounts or fixed ratios of output. If countries are using depreciation rates given in the business accounts, SNA recommends that these be adjusted for “historic costs to current prices”.

Net Operating Surplus

• This item is derived as residual, as the difference between industry output and the sum of intermediate consumption, compensation of employees, other taxes less subsidies on production and consumption of fixed capital.

• If countries do not compile CFC estimates, then the residual is the gross operating surplus /mixed income.
  — However, lack of CFC estimates can lead to under-estimation of output of non-market activities, which are estimated on cost basis
Data sources for valuation matrices and constant price SUTs

• Please see the previous presentation on the compilation of these matrices, where data sources are also covered
Concluding remarks

• Source agencies providing data for compilation of different tables of SUTs use different classifications. Therefore establishing concordances between these and the product classification used for SUTs, is important.

• The data sources for compiling SUTs should aim to collect as much coherent and consistent business data as possible using surveys sampled from high quality business register.

• An important basic requirements for high quality economic statistics is the availability of a comprehensive and up-to-date business register that covers all production units; and comprehensive surveys using the business register as frame for sampling units.

• Other important sources could be government and company accounts, tax records, foreign trade statistics, balance of payments, establishment surveys and censuses, household expenditure surveys and structural surveys for product details.
Concluding remarks on the four presentations on SUTs

• The four presentations on SUTs help in making the participants familiar with the structure of SUTs; the classifications to be used; concordances to be developed between the classifications used by sources and in SUTs, product balance, compilation methods, SUTs at purchasers’ prices, at basic prices and at constant prices; balancing the two tables and compiling GDP from three approaches, goods and services account, production account and generation of income account.

• The SUTs are compiled following the column-row-column approach, in which columns of two tables are filled with the data from sources in the first instance, then rows in the two tables are examined for ensuring product balance (total supply = total uses, for each product), and columns are examined to ensure total output = total inputs (for each industry)

• The commodity flow method, which is based on product balance, is used to estimate missing data either on supply side or use side.

• SUTs should be compiled as an integral part of national accounts, especially for the benchmarks or base years, as they provide coherence and consistency to the data. The practice of compiling SUTs using national accounts already available (mainly for IO tables) should be avoided.
Suggested reading material

• Handbook on SUT: Compilation, Application, and Practices Relevant to Africa (Draft), UNECA, Chapters 4, 5 and 6
  – Chapters 2 to 9
THANK YOU