

Handbook on Supply and Use Table: Compilation, Application, and Good Practices

(Draft)

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SUT can be useful for the computation of Power Purchase Parities (PPPs) in various ways through, for example, cross checking the consistency of GDP calculated from production, income, and expenditure approaches; filling in data gaps from the supply and use sides of products by using different data sources; and tracking the formation of prices from the basic price to the purchasers' price to ensure a uniform valuation of transactions. We trust that the extent and depth of this Handbook will be further perfected by this coming EGM so that it will achieve its purpose of being an effective reference material for strengthening the capacity of African countries.

Economic Statistics and National Accounts Section
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INTRODUCTION

PART 1: How to use SUT and commodity flow approach for ICP?

Chapter 1: Concepts, features and applications of SUT

1. The system of national accounts, 1993¹ (1993 SNA) include compilation of a set sequential accounts which portrays the working of the economy with particular emphasis on how income is generated, distributed, redistributed and used for consumption or the acquisition of assets and when assets are disposed of, or a liability is incurred, to acquire other assets. These sequences of accounts are in the form of flow accounts and balance sheets.
2. Besides these sequences of accounts, the central framework of SNA also provides for compilation of supply and use tables (SUTs) with focus on the processes of production and use of individual goods and services. The SUTs are one of the recommended tables under the "minimum requirement data set," (MRDS)² included under the scope of the compilation of 1993 SNA tables and accounts. Thus their compilation by the countries becomes one of the essential requirements in the implementation of 1993 SNA. Besides, SNA recommends compilation of SUTs as a first step in the preparation of national accounts, due to their several advantages. The most important of these is that they generate consistent estimates of GDP from both the production and expenditure sides. Also, the Global Office of ICP 2011 recommends use of SUTs framework by the countries for compiling and providing values of GDP expenditures for the ICP 2011.

1.1. Concepts of Commodity flow approach and SUTs

1.1.1. *Commodity flow approach*

3. The terms “commodity balances” and “product balances” or “commodity flow approaches/methods” and “product flow methods/approaches” are used interchangeably by the national accountants. The SNA prefers to use the word ‘product’ instead of ‘commodity’ for individual goods and services and therefore, uses the terms, product flow methods and product balances. In this lecture note, we will use the terms, ‘commodity flow approach’ and ‘product balances’, on the grounds of their general usage in this Region.
4. In the commodity flow approach, the detailed flows are compiled for individual products (goods and services) or for a group of products. These flows trace the

¹ prepared and published under the auspices of the Inter-secretariat Working Group on National Accounts (ISWGNA), which is an interagency body set up by the United Nations Statistical Commission (UNSC) on national accounts and consists of European Commission (EU), International Monetary Fund (IMF), Organization for Economic Co-operation and Development (OECD), United Nations (UN) and World Bank.

² Report of the ISWGNA to the thirty-second session of the UNSC, document E/CN.3/2001/8

different sources of supply of products to their subsequent use under various categories.

5. The basic concept behind this approach is that the amount of a product available for use within the economy must have been supplied either by domestic production or by imports. The same amount of the product entering an economy in an accounting period must be used for intermediate consumption, final consumption, capital formation (including changes in inventories) or exports.
6. This gives rise to the equation:

Supply of a product/group of products		Use of the same product/group of products
Domestic production + imports	=	Intermediate consumption + final consumption + capital formation + exports

7. However, the two sides are generally on different valuations, with the supply side being at basic or producers prices and the use side at purchasers' prices. Therefore, for product balancing, it is necessary to adjust both sides to the same valuations. Normally, the valuation basis adopted for this purpose is the purchasers' prices. In order to bring the supply side to purchasers' prices, the trade and transport margins and taxes less subsidies on products are added to the supply side. This is because the goods produced in the units have to go through the trade and transport chain and pay the necessary product taxes before they reach the users/purchasers. Services may not go through the trade and transport chain, as they are supposed to be delivered simultaneously to the users at the time of their production. However, they still attract product taxes before they are delivered to the users. The above equation, therefore, becomes:

Product Balance

Supply of a product/group of products		Use of the same product/group of products
Domestic production + imports + trade and transport margins + taxes less subsidies on products	=	Intermediate consumption + final consumption + capital formation + exports

8. A product balance is a powerful tool for a national accounts compiler, as it can check the consistency of data between availability of a product and its use and provides coherent estimates of the flows of supply and use of the product. This approach is also used to estimate a missing data or identifying a weak data source and replacing the

concerned value. The commodity flow approach is widely used in the preparation of estimates of household consumption expenditure and gross fixed capital formation, which are generally based on weak data sources in the developing countries. Many times, it has been observed that household and enterprise surveys understate household consumption expenditure (especially for services) and gross fixed capital formation and are inconsistent with the supply side information.

1.1.2. Supply and Use Tables

9. Commodity flow provides a description of a product balance whereas a generalization of this for the whole range of products in the economy gives rise to the SUTs. The SUTs build up on the same concept as that of product balances, but in an integrated manner for the whole economy together with individual products (or groups of products). Thus, in the SUTs, the supply is accounted for by the uses for each product as well as for the whole economy. While the commodity flow approaches and product balances are applied at individual product (or group of products) level, the SUTs amalgamate the product balances of all individual products (or group of products) in a matrix framework to present a coherent picture of supply and uses of both the individual products and the whole economy. Thus, the SUTs show the product balances for the economy as a whole and for individual products or groups of products. The level of details for individual products determines the size of the SUTs being compiled.
10. As the name suggests, the SUTs contain a pair of tables, namely, the supply table and the use table. Both the tables are compiled together with a complete set of individual product balances achieved through the commodity flow approach. There are, however, other ways of compiling SUTs without going through the process of achieving individual product balances in the first instance. The most common method is to fill-up data 'column-wise' (columns depicting each of the components mentioned in the above table on product balances and rows indicating products) with the available information from various sources on domestic industries' output, imports, trade and transport margins, product taxes and subsidies, intermediate consumption, final consumption, capital formation and exports. Information in this format is more easily available from the sources rather than on the supply and uses of each commodity across all industries and final uses. This method gives rise to a set of outputs by products in the supply table and possibly a different set of outputs by products in the use table. However, in the SUTs, the product balance identity has to be maintained for each product and the final SUTs must show an integrated set of individual product balances. This simultaneous set of product balances is achieved through the 'balancing' process in the SUTs whereby supply and uses are balanced for each product in respect of output (each row); and output and inputs in respect of individual industries (each column of industries).
11. The SUT framework combines all three approaches³ of estimating GDP by balancing the supply and use of every product (or group of products) and brings together all the requisite data in a single framework, thus leaving no scope for statistical discrepancy.

³ Production (output *minus* intermediate consumption, of industries and taxes less subsidies on products), income (sum of compensation of employees, gross operating surplus and taxes less subsidies on production) and expenditure (sum of consumption expenditure (household, government and NPISHs), gross fixed capital formation, change in inventories and net exports)

The SUTs framework, therefore, enables to cross-check information at a very detailed level, replacing doubtful data, estimating missing information and ensures consistency in the GDP estimates.

1.2. Features of SUTs

12. Supply and use tables exist as pairs with common valuation and the same list of products at the detailed level. The SUTs contain two matrices (called tables), namely, the supply table and the use table. The tables have values of commodities in rows and industries as columns. SNA recommends Central Product Classification (CPC) for classifying the products and the International Standard of Industrial Classification (ISIC) for classifying the industries. Supply and use tables are most often rectangular (having more products than industries). Countries may choose the level of details of products and industries to be included in their SUTs on the basis of availability of detailed data at industry/product level in their countries. However, the quality of national accounts improves with the increase in the number of products and industries in the SUTs, as the coherence between supply and uses is ensured and product balances achieved at a more detailed product level.
13. The most common format of supply and use tables is at purchasers' prices. A use table at purchasers' prices consists of a set of product balances covering all products available in an economy arranged in the form of a rectangular matrix with the products, valued at purchasers' prices, appearing in the rows and the columns indicating the disposition of the products to various types of uses. A supply table at purchasers' prices consists of a rectangular matrix with the rows corresponding to the same groups of products as the matching use tables and columns corresponding to the supply from domestic production valued at basic prices plus columns for imports and the valuation adjustments necessary to have total supply of each [group of] product[s] valued at purchasers' prices⁴.
14. The statistical units for the SUTs are the establishments, which normally are expected to engage in only a single kind of productive activity at a single location. Industries are groups of establishments engaged in the same kind of productive activities. However, it is often not possible to identify establishments which produce a single product, more often they are identified on the basis of their ability to supply meaningful information. That means the unit for SUTs is one which can be observed and for which data can be collected, which implies that these units are rather, groups of 'establishments', and more often they carry out more than one activity. Such activities are classified as principal activity and subsidiary activities and they produce more than a single product. Therefore, under the industries columns in the supply table, we may have a characteristic product (whose contribution to the total output is maximum) and secondary products, shown against their respective product rows.

Supply Table

⁴ SNA, 2008, Para 14.13

15. The supply table gives information about the resources of goods and services. As already mentioned, the supply table is a product by industry table with products in the rows; and industries and imports in the columns. The supply table provides output of goods and services at their detailed product level (which are in rows) and also by domestic industries and imports (which are columns). Thus, the supply table provides availability of individual products in the economy. The supply table is generally at basic prices, as output is normally valued at basic prices⁵. However, to bring this table to the valuation at purchasers' prices, valuation columns of transport costs, wholesale and retail trade margins and product taxes less product subsidies are added. A broad framework of the supply table for three broad groups of industries and commodities, is given below in Table 1.

Table 1 : Supply Table

Industry product	Agri- cultur e	Indust ry	Servic es	Total dom. supply	Imp. <i>c.i.f.</i> (total <i>f.o.b.</i>)	<i>c.i.f./ f.o.b.</i> adjust ment	Total supply at BP	TTM	Taxes - subs. on prods.	Total supply at PP
1	2	3	4	5=2+3 +4	6	7	8=5+6 +7	9	10	11= 8+9+10
1. Agriculture										
2. Industry										
3. Services						-A				
<i>c.i.f./ f.o.b.</i> adjustment					-A	+A				0
<i>Purchases of residents abroad</i>					R					R
Total industry output at BP										

BP: basic prices, f.o.b: free on board, TTM: trade and transport margins, PP: purchasers' prices

Use Table

16. The use table gives information on the uses of goods and services, and also on cost structures of the industries. A use table shows the use of products by type of use, i.e. as intermediate consumption by industry, final consumption, gross capital formation or exports. A special feature of the use table is that it also shows the components of value added by industry, i.e. compensation of employees, other taxes less subsidies on production, consumption of fixed capital and net operating surplus, though these are not directly derived from the SUTs. Their data is included in the use table directly from other sources.

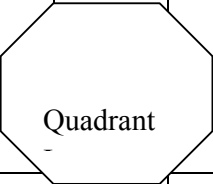
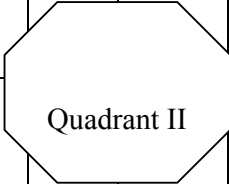

⁵ It is possible to compile supply table in producer prices

17. Just as the supply table, the use table is also a product by industry table with:

- Products and components of value added in the rows;
- Industries, categories of final uses and exports in the columns.

18. The Table 2 provides the broad framework of Use Table.

Table 2 : Use Table

Industry product	Agri- culture	Industry	Services	Total inter- industry use	Exports (fob)	HFCE/ NPISH	GFCE	GCF	Total use at PP	
1	2	3	4	5=2+3+ 4	6	7	8	9	10=5+6+ 7+8+9	
1. Agriculture										
2. Industry										
3. Services										
Purchases of residents abroad						R			R	
Purchases of non-residents in the domestic market					NR	-NR			0	
Total IC at PP										
GVA at BP										
COE										
Other taxes on prodn										
CFC										
OS/MI										
Total industry output at BP										

Fob: free on board, BP: basic prices, PP: purchasers' prices, TTM: trade and transport margins, IC: intermediate consumption, OS: operating surplus, MI: mixed income, COE: compensation of employees, CFC: consumption of fixed capital, HFCE: household final consumption expenditure (including those of NPIs), GFCE: government final consumption expenditure

18. The table of intermediate use shows the intermediate consumption by products and by industry (quadrant I), the table of final uses shows the uses of products for final consumption, gross capital formation and exports (quadrant II), and the table of value added shows the components of value added by industry (quadrant III). The totals of each of the columns of intermediate and final uses show total use by all products. The totals of the rows of intermediate table and the use of value added table for each industry shows the total inputs by industries. The use table is valued at purchasers' prices⁶.
19. The use table is very important in the SUTs, as it provides data on (i) gross value added at basic prices by industry (production approach), (ii) breakdown of industry-wise gross value added into income components of compensation of employees, operating surplus (plus mixed income), other taxes less subsidies on production and consumption of fixed capital (income approach), and (iii) GDP at purchasers' prices obtained by deducting imports from final uses (expenditure approach). Another interesting feature of the use table is that it provides GDP (at purchasers' prices) disaggregated by products, as: column of total final uses in the use table, *minus*, the column of imports from the supply table. Such disaggregation of GDP by products can only be derived from the SUTs.
20. In the SUTs, the row totals of both supply and use tables should match. The column totals of industries, which refer to total output by industries in the supply table; must also be consistent with total inputs by industries in the use table. The supply and use tables are dealt with in more detail in separate lecture notes on these topics.

1.3. Uses/Applications of SUTs and Commodity flows

(i) GDP estimation

21. SUTs provide a coherent and consistent framework for estimating GDP (together with its major components) from the production, income and expenditure approaches of GDP simultaneously, and thereby enables balanced estimates of GDP to be compiled that are identical in all the three approaches.
22. Normally, most developing countries compile annual estimate of GDP from the production approach and treat this as a firmer estimate of GDP of the country. Subsequently, the estimates of GDP from expenditure approach are compiled, and if there is a statistical discrepancy, this is recorded in the expenditure approach GDP. In the SUT framework, there is no scope for statistical discrepancy, as this framework enables the national accountants to scrutinise the flows of goods and services in both

⁶ It is possible to compile use table at basic prices.

supply and use tables and make appropriate adjustments in the weak areas of estimation, either on the supply or on the use sides, in a systematic manner.

23. Also in countries which currently produce only GDP estimates from the production approach, the SUTs and the commodity flow approaches present a framework and a basis to compile expenditure approach GDP through the product balances, provided that at the minimum, the data on imports and exports and government expenditures are available.
24. The SUTs framework enhances the accuracy of both production and expenditure approach GDP considerably as the balancing is done not only for the overall economy, but at each individual product level. Most developed countries now derive their GDP estimates through SUTs.
25. From the SUTs, it is possible to obtain a disaggregation of GDP by products. This is done by subtracting the vector of imports, fob from the vector of final uses. Such disaggregation of GDP by products is available only from the SUTs. Also in this disaggregation, the share of primary and industrial products in the GDP is much higher as compared to those of primary and secondary industries, since trade and transport margins get embedded into the primary and industrial products, resulting in lesser share of services in the GDP.

(ii) *Product balances*

26. The most important use of commodity flow approach is achieving balances at product level in which the supply of the product matches with the uses of the product (intermediate uses and final uses in the hands of producers and final users, respectively). This ensures a systematic accounting of all flows of goods and services in the economy at product level.

(iii) *Consistency of definitions and classifications, valuations standards*

27. Since, SUTs serve as a coordinating framework for economic statistics, it ensures consistency of the definitions and classifications of all primary data used in the accounting framework. The source data generally comes according to different classifications, such as the CPC for products, ISIC for industries, functional classifications for final consumption, HS and SITC for foreign trade or country specific industry and product classifications. The SUTs ensure that all these source data are transformed to standard industry and product classifications through the development of appropriate concordance tables.
28. Supply and use tables contain the full framework for establishing the connection between the various valuation concepts in national accounts. It involves the distribution of margins, taxes and subsidies on products for the transformation of output from basic prices to producers' prices and finally to purchasers' prices.

(iv). *Estimation of missing data*

29. In cases where statistical information is missing for certain transactions (for example the gross fixed capital formation or the private consumption), alternative estimates can be made in a transparent way using the commodity flow approach and SUTs framework. Though this is not an ideal way of compiling national accounts, still it

allows the national accounts to be compiled in a coherent manner even in situations when the source data is incomplete or weak in quality. Commodity flow approach also provides a basis for logical substitution of a weak data source, either on the supply side or on the use side.

30. The commodity flow approach is used in several developing countries for estimating HFCE (especially for services component) and gross fixed capital formation, , as estimates for these two components are mostly based on incomplete source data.

(v) *Confrontation of data sources*

31. SUTs incorporate all primary economic data into a framework that is interconnected and integrated. These data generally come from different kinds of statistical sources, such as administrative sources, industrial surveys, household income-expenditure surveys, investment surveys, foreign trade statistics and balance of payments statistics. The SUT's framework enables an efficient confrontation of all these primary data sources. This in turn, helps in the identification or detection of inconsistencies in these source data and provides a coherent and transparent basis for making appropriate corrections in the primary data.

32. Based on the findings from the confrontation of economic data, feedback can be provided to the survey agencies to make appropriate corrections in the survey design with the aim to improve their quality and adherence to statistical standards. This procedure also enables data-gaps in the statistical system to be identified and provides a basis for advocacy to introduce mechanisms to collect such data in future on a regular basis.

(vi) *Assessment of data requirements for NA compilations*

33. Since the commodity flow approaches and the SUTs integrate all primary economic data available in the economy, it helps the national accountants as well as the management of the statistical system to understand the data requirements for national accounts compilations and correspondingly assess the gaps and weaknesses in the information system. These findings can form a vital input to the preparation of documents for National Strategy for Development of Statistics (NSDS).

(vii) *Capacity building on NA*

34. Compilation of SUTs on a regular basis helps not only to improve the national accounts, but also to improve the understanding of national accounts and the statistical capacity of the countries. This will help in taking up compilation of additional tables and accounts and enable them to meet the challenges in implementing 2008 SNA.

(viii) *Implementation of 1993 SNA*

35. Construction of SUTs has been included under the scope of 1993 SNA implementation by the countries in terms of Minimum Requirement of Datasets (MRDS). The SUTs also enable the first three accounts of the National Accounts framework to be

compiled: Goods and Services Account; Production Accounts by industry and sector; and Generation of Income Accounts by industry and sector. Therefore, compilation of SUTs is a step towards implementation of 1993 SNA.

(ix) *SUTs in the 2011 ICP*

36. For the 2011 ICP, the Global Office recommends on several grounds, the use of SUTs framework for effectively estimate expenditure values for the various basic headings in the GDP classification for ICP – which contains 155 basic headings. This framework enables a detailed breakdown of expenditure values to be derived even if the original sources do not provide such detailed information.

(x) *Updating preliminary estimates*

37. Benchmark SUTs compiled when full set of source data are available, form the basis for preparing SUT updates to be used in the compilation of provisional or preliminary national accounts. The SUTs framework offers options for incorporating information that is periodically available. Therefore, the SUT updates can be prepared even if partial and aggregated information is available on the economy in the current year. These SUT updates assume that product uses or input-output coefficients are constant over a short period.

(xi) *Construction of Input-Output tables*

38. SUTs are the basis for the construction of symmetric input-output tables. Input-output tables cannot be compiled without passing through the supply and use stage.

Suggested readings:

Global Office, ICP 2011: The ICP and National Accounts Practices: Operational Material

_____:National Accounts Framework in the ICP: Operational Material

_____:Advantages of Supply and Use Tables in the International Comparison Program

Commission of European Communities, International Monetary Fund, Organisation for Economic Cooperation and Development, United Nations and World Bank (1993): System of National Accounts 1993

_____: System of National Accounts 2008

United Nations (1999): Handbook of Input-Output Table Compilation and Analysis.

Eurostat (2008): Eurostat Manual of Supply, Use and Input-Output Tables

Understanding National Accounts, François Lequiller and Derek Blades, OECD Paris 2006 National Income and Production Accounts of the USA.

Chapter 2: The use of commodity flow approach: consistency and missing values

Commodity flow

This is the basic SUT equation:

$$DP + IMP = IC + GFCE + HFCE + NPISH + GFCF + \Delta INV + EXP \quad (1)$$

It shows how the supply from domestic production (DP) and imports of goods and services (IMP) is equal to the uses on the right-hand side – intermediate consumption (IC), government final consumption expenditure (GFCE), household final consumption expenditure (HFCE), final consumption expenditure of non-profit institutions serving households (NPISH), gross fixed capital formation (GFCF), change in inventories (ΔINV), and exports of goods and services (EXP).

Although equation (1) applies to the complete SUT, it is equally applicable to individual goods and services without necessarily going on to compile a complete SUT. When equation (1) is used for an individual good or service it is usually described as “commodity flow”. This is a technique for:

- ensuring consistency between the supply and uses side; or for
- estimating a missing values, either on the supply or uses side.

Some practical examples of the practical application of commodity flow are given below but before doing so we need to make a refinement to equation (1). This is because both DP and IMP on the supply side are reported at basic prices while the uses on the right hand side are recorded at purchasers’ prices. In order to bring the supply side up to purchasers prices we need four extra columns in the left hand side of equation (1):

- trade margins;
- transport costs;
- taxes on products; and
- subsidies on products (minus).

Examples of commodity flow:

1. Poultry meat: missing value for household consumption expenditure

Here is the information we have to start with:

- All poultry is domestically produced. The value of domestic production comes from estimates of the total numbers of poultry in the country, take-off (slaughter) rates and average prices per bird obtained from various sources such as the Ministry of Agriculture and the Veterinary Department. Pet food manufacturers have reported purchases of 1,000 and exports of poultry meat come to 45.
 - Now the national accountant has to make some assumptions to fill in the gaps:
 - Transport charges are roughly estimated at 1% of the value of domestic production and retail margins on poultry for domestic consumption are estimated at just over 2%. These margins are low because most poultry in this country is produced by farm households for own consumption and only a small part is commercialized.
 - A nominal figure of 10 is assigned to “other trade margins” to represent the margin on sales of poultry meat to the pet food manufacturers. The national accountants have no firm information on the actual margin, but they are sure that it is not zero and that 10 must be closer to the truth than zero.
 - Inventories are always very small because of the problems of storing the slaughtered poultry for any length of time so it is reasonable to assume zero change in inventories.
 - We now put this information into a Commodity Flow framework.
 - Final consumption expenditure by households on poultry is the difference between the estimated total supply at purchasers’ prices – 6,705 – and total known uses, also at purchasers prices – 1,045.
39. Notice that in this example, we only had three firm pieces of information: domestic production of poultry, purchases by pet-food manufacturers for intermediate consumption, and exports of poultry. The other estimates – for trade margins and transport costs and for changes in inventories were all based on assumptions made by the national accountant. This is quite a typical situation.

Box 1. Commodity Flow Calculation for Poultry	
Supply	
Domestic production (value at farm gate)	6,500
<i>plus</i> Imports (c.i.f.)	0
<i>plus</i> Taxes on poultry	0
<i>less</i> Subsidies on poultry	0
<i>plus</i> Trade margins (on household consumption)	130
<i>plus</i> Trade margins (other)	10
<i>plus</i> Transport charges	65
<i>equals</i> Total supply	6,705
Uses	
Intermediate consumption (for pet food)	1,000
<i>plus</i> Household final consumption expenditure	Unknown
<i>plus</i> Government final consumption expenditure	0
<i>plus</i> Gross fixed capital formation	0
<i>plus</i> Change in inventories	0
<i>plus</i> Exports	45
<i>equals</i> Total known uses	1,045
Residual calculation	
Total supply	6,705
<i>less</i> Total known uses	1,045
<i>equals</i> Final consumption expenditure by households	5,660

2. *Household consumption of tobacco: consistency check*

Here is the information we have to go on:

- A household expenditure survey from a few years ago reported expenditure on tobacco at 7,000.
- Updating this value by the CPI gives 8,000 for the current year. This is just the increase in value due to the price increase. No allowance is made for population increase because smoking rates are known to have dropped but there are no details as to by how much. The national accountant makes the simple assumption that the increase in population of smoking age and the decline in smoking rates offset each other.
- The latest industrial census shows domestic production at basic prices came to 8,200.
- Imports (c.i.f.) are 1,200.
- The Ministry of Finance reports that sales taxes and import duties on tobacco, which are each levied at a rate of 5%, amounted to 940 for the year.
- The tobacco companies reported a fall in inventories of tobacco of 10.
- Exports of 350 were recorded in the merchandise trade statistics.

There is no firm information on trade margins or transport costs. Some assumptions will be needed:

- A trade survey some years showed that wholesale and retail margins added about 10% to the basic prices plus excise taxes so trade margins are set at 10% or 1,340.
- A neighboring country made a transport survey recently and found that for all consumer goods, transport margins were about 3% of values at basic prices plus product taxes. Transport charges are estimated at 3% or, roughly 300.

Box 2. Commodity Flow Calculation for Tobacco Consumption	
Supply	
Domestic production (basic prices)	8,200
plus Imports (c.i.f.)	1,200
plus Taxes on tobacco	940
less Subsidies on tobacco	0
plus Trade margins (on household consumption)	1,340
plus Transport charges	300
equals Total supply	11,980
Uses	
Intermediate consumption	0
plus Household final consumption expenditure	8,000
plus Government final consumption expenditure	0
plus Gross fixed capital formation	0
plus Change in inventories	-10
plus Exports	350
equals Total uses	8,340
Discrepancy	
Total supply	11,980
less Total uses	8,340
equals Discrepancy	3,640

In the case of poultry, we used the commodity flow method to estimate a missing value – household consumption expenditure on poultry.

In this tobacco example we use the commodity flow method to check the consistency of our estimates. The problem is that our estimate of total supply is bigger than our estimate of total uses by 3,640. Now what?

- The imbalance between supply and uses (which should be equal, by definition) is very large.
- Checking the source data shows that all the supply components are based on reliable sources and the taxes received are consistent with the value of domestic production and imports.
- Similarly, the change in inventories and the value of exports are considered to be fairly firm estimates.
- However, experience has shown that household expenditure surveys are renowned for underestimating the true value of tobacco consumption and so the estimate of 8,000 from the household expenditure survey is replaced by 11,640, which is the balance between the total supply (11,980) and the uses other than household final consumption expenditure (340).

Suggested readings:

Handbook of Input-output Table Compilation and Analysis, United Nation, New York 1996 (Studies in Methods Series F, No. 74) Chapter VIII Commodity Flow Method and Table Balancing

System of National Accounts, 2008, United Nations New York 2008, Chapter 14. The Supply and Use Table and the Goods and Services Account

Understanding National Accounts, François Lequiller and Derek Blades, OECD, Paris 2006 Chapter 12 National Income and Production Accounts of the USA.

Chapter 3: ICP requirements from the national accounts and SUTs

Brief Background

40. The International Comparison Program (ICP) is a worldwide statistical partnership to collect comparative price data and compile detailed expenditure values of countries' gross domestic products (GDP), and to estimate purchasing power parities (PPPs) of the world's economies. Using PPPs instead of market exchange rates to convert currencies makes it possible to compare the output of economies and the welfare of their inhabitants in real terms (that is, controlling for differences in price levels)⁷.
41. The first step involved in the ICP, therefore, is identification of goods and services for which prices are to be collected by the countries. The list of goods and services to be priced in the ICP corresponds to the final goods and services that comprise GDP expenditures, as the primary objective of ICP is to compile deflators (PPPs) and subsequently use them to compile the estimates of real GDP that are comparable between the countries. Since the ICP typically focuses on a reference year (such as ICP 2005 and ICP 2011), the price data to be collected also refers to one particular year.
42. For the ICP 2011, the framework for identifying the products to be priced is based on the 155 basic headings⁸, the expenditures on which add up to the GDP comprising household consumption, government consumption, gross fixed capital formation (GFCF), change in inventories, acquisitions less disposals of valuables and balance of exports and imports. Within these basic headings, product lists are drawn up within the region that are comparable across the countries and are broadly representative of the goods and services purchased in each country involved. These products/items are needed to be priced in the ICP by the countries.
43. Once the price data are collected by the countries at the item level, these are initially averaged, without weights, to arrive at the national average prices for each of the basic headings. The PPPs are then computed for each basic heading, between the countries. The basic heading PPPs, therefore, refer to specific baskets of goods and services. Essentially, PPP is a spatial price relative representing the ratio of price in the country to that of the base country.
44. At the item level within a basic heading, only price data are available but at the basic heading level, weights are also available (from the national accounts). Using these weights, PPPs computed at the basic heading level are aggregated to calculate the PPPs for GDP and its major aggregates for all the countries.

⁷ World Bank (http://siteresources.worldbank.org/ICPEXT/Resources/ICP_2011.html)

⁸ The basic heading is the lowest level of aggregation of items in the GDP breakdown for which parities are calculated. In theory, a basic heading is defined as a group of similar well-defined goods or services. In practice, it is defined by the lowest level of final expenditure for which explicit expenditure weights can be estimated. Thus, an actual basic heading can cover a broader range of products than is theoretically desirable. Basic headings are the building blocks of a comparison. It is at the level of the basic heading that expenditures are defined, products selected, prices collected, prices edited, and PPPs first calculated and averaged (paragraph 129, National Accounts Framework in the ICP: Operational Material, Global Office, ICP 2011).

45. PPPs are compiled for different national accounts aggregates, including GDP itself, to convert them to a numeraire currency⁹. The PPP of the currency of a country is that number of that country's currency units that are equivalent in purchasing power to one unit of the currency of the reference country.
46. The PPP represents the “*number of currency units required to purchase the amount of goods and services equivalent to what can be bought with one unit of the currency of the base country*”. The PPPs are used to calculate volumes of real expenditures of GDP, real per capita GDP and other economic statistics that are internationally comparable. Although official exchange rates are also available for computing comparable economic statistics across the countries, PPPs are considered to be more suitable for this purpose as they take into account the differences in purchasing power of local currencies within each country. Comparing countries' GDPs after converting them to a common currency using exchange rates is like comparing changes over time in a single country's GDP using current prices. In both cases the comparisons are difficult to interpret because they mix up differences in prices with differences in the underlying volumes of goods and services. In order to make real (volume) comparisons of GDP between countries we must use PPPs not exchange rates.
47. The PPPs are also used to compute relative price levels between countries in the form of price level indices (PLI). The PLI is the ratio of a PPP to the corresponding exchange rate, multiplied by 100. It shows how the price levels of countries compare with each other. Countries with PLIs greater than 100 are more expensive than the base country, and those with PLIs less than 100 are cheaper countries. As in the case of PPPs, the PLIs can be computed at basic heading level or for different components of GDP or for the whole of GDP.
48. The purpose of ICP is to provide measures of real expenditures. Accordingly, the output of ICP is mainly the internationally comparable price and volume measures for gross domestic product (GDP) and its component expenditures, based on PPPs. The PPPs are both currency converters and spatial price deflators and when applied to the nominal GDPs of countries, these GDPs are converted to a common currency and are revalued at a uniform price level. As a result, differences between the GDPs reflect only differences in the volumes of final goods and services purchased. These GDP volumes facilitate comparisons of the economic size of countries and, when put on a per capita basis, the economic welfare of their populations.
49. From the countries' perspective, the main activities of the complex program of ICP include the following:
- Collecting comparative one-time price data on identified products through extensive price surveys (for a year spread over different sub-annual periods and that are nationally representative);
 - Compiling detailed expenditure values of countries' GDP disaggregated by the 155 basic headings.

⁹ A currency unit selected to be the common currency in which PPPs and final expenditures on GDP (nominal and volumes) are expressed.

II. ICP Requirements from National Accounts

50. From the above background, it is evident that detailed data (at basic heading level) on GDP expenditures from national accounts of the participating countries is the key requirement of the ICP. This is because of their multiple role in the ICP. Firstly, they form a basis for selection of goods and services (items or products) on which prices are to be collected by the countries. Secondly, GDP expenditures provide the weighting diagram for aggregating the price relatives (PPPs) calculated at the most detailed (basic heading) level to derive the PPPs for the progressively higher levels of GDP expenditure components (such as household and government consumption, capital formation and net exports) and eventually to the whole GDP. Since the basic headings (155) add up to the GDP, the weights are the expenditures on each basic heading as a share of GDP. Thirdly, the GDP expenditure data that has been supplied by the countries in nominal terms in their currency units is used to derive volumes or real GDP that compare real expenditures on GDP and its components between countries on a uniform currency units.
51. The importance of GDP expenditures in the ICP makes it essential that the national accounts statistics of the participating countries are as accurate, reliable and exhaustive as possible and follow the conceptual compliance of System of National Accounts, 1993 (1993 SNA)¹⁰. Since the key objective of ICP is to prepare estimates of macro-economic aggregates in real terms that are comparable across the countries, it also becomes essential that the national accounts of all the countries are internationally comparable in their own currency units, as they provide weights for computing PPPs for GDP and its components, which are used for this objective. Any errors in the national accounts data will have a direct impact on the quality of real expenditures derived by applying PPPs to the national accounts values. Further, the ICP objectives being relative and spatial across the countries, weaknesses in the national accounts of some countries can distort the ICP results of the entire region.
52. Countries participating in the 2011 ICP round will be required to provide a very detailed breakdown of the final expenditure categories of gross domestic product (GDP). There are 155 detailed expenditure sub-classes or basic headings involved, and they are defined in the ICP Expenditure Classification. A detailed breakdown of the national accounts aggregates is needed to provide the values that are converted into real expenditures at the basic heading level. These values also provide the weights that are used in calculating the PPPs at more aggregated levels, up to the level of GDP itself¹¹.
53. While furnishing the national accounts data to the ICP regional coordinators, certain compilation guidelines are required to be followed by the countries, as the national accounts data provided need to be reliable and internationally comparable in terms of methodology and databases used. The Global Office of ICP 2011 has provided the following operational material for the benefit of the countries and regional coordinators, for providing national accounts data to the ICP 2011.

¹⁰ prepared and published under the auspices of the Inter-secretariat Working Group on National Accounts (ISWGNA)

¹¹ Para 3, National Accounts Framework in the ICP: Operational Material, Global Office, ICP 2011.

- The ICP and National Accounts Practices: Operational Material;
 - National Accounts Framework in the ICP: Operational Material; and
 - Advantages of Supply and Use Tables in the International Comparison Program
54. The Global Office recognizes that commodity flow approaches and supply-use tables (SUTs) provide an effective framework for the compilation of detailed expenditure values needed in the ICP due to their several advantages, particularly in providing consistent GDP estimates from the three approaches of compiling GDP.
55. The ICP requirements also stipulate that the countries' national accounts meet the compilation and conceptual guidelines of 1993 SNA, so that they are exhaustive and internationally comparable. Under-coverage or weaknesses in national accounts eventually reflect on the quality of PPPs and the real GDPs that are compiled using the PPPs and the national accounts data provided by the countries. The above mentioned three documents of Global Office of ICP 2011 deal with these national accounts aspects in the context of ICP, in detail. Some these aspects are described in the following paragraphs.

Conceptual basis

56. The conceptual basis for the national accounts in the 2011 ICP is the 1993 SNA of the international agencies (United Nations, World Bank, International Monetary Fund, Organization for the Economic Cooperation and Development and the Eurostat). Though, 2008 SNA is also available, the Global Office has decided to follow 1993 SNA for conceptual compliance, since 2008 SNA is yet to be implemented by the countries (barring few). Therefore, the national accounts data that need to be supplied for 2011 ICP by the countries should meet 1993 SNA standards.
57. If some countries are still following the 1968 SNA, they are now required to either compile their national accounts according to the 1993 SNA standards or adjust their accounts for the major differences between the 1993 SNA and the 1968 SNA. For this purpose, guidance is available from the set of indicators developed by the Inter-Secretariat Working Group on National Accounts (ISWGNA)¹² for determining whether or not a country's national accounts comply with the 1993 SNA standards.
- Is government defense expenditure on fixed assets that can be used for civilian purposes included in Gross Capital Formation (GCF)?
 - Is consumption of fixed capital included on all government fixed assets?
 - Is all mineral exploration (successful and unsuccessful) capitalized?
 - Is expenditure on computer software purchases included in GCF and on software development included in output and in GFC?

¹² The ISWGNA is an interagency body set up by the United Nations Statistical Commission (UNSC) on national accounts and consists of European Commission, International Monetary Fund, Organization for Economic Co-operation and Development, United Nations and World Bank.

- Is expenditure on entertainment, literary or artistic originals included in GCF and on their development included in output?
- Is expenditure on valuables included in GCF?
- 1993 SNA extends the production boundary of households to include goods that are not made from primary goods: are these goods included in output?
- 1993 SNA extends the production boundary of households to include goods that are processed from primary goods that are not self-produced: are these goods included in output?
- Do non-life insurance estimates include premium supplements?
- Are reinvested earnings estimates included in the rest of the world account?
- Is FISIM allocated to final users?

58. If the above questions are answered in affirmative, the national accounts comply with 1993 SNA to a large extent. However, if it is not so, necessary adjustments are required to be made to the countries' national accounts for the 2011 ICP.

Values for all basic headings

59. Several countries at present do not show the estimates for non-profit institutions serving households (NPISH) and valuables in the national accounts. The 2011 ICP requires that these need to be shown separately. Also, the estimates of change in inventories are compiled through residual methods in some countries. To the extent feasible, the available data sources on government stocks, accounts of corporations and enterprise surveys should be looked at and estimates of change in inventories derived independently.

60. Countries also need to ensure that values are provided for each of the basic headings, as zero values indicated against a basic heading will distort the weighting diagram and subsequently the PPPs at aggregated levels.

Pricing basis

61. The prices underlying the national accounts values of products should be consistent with the prices reported for products within the basic heading, so that the two sets of data conceptually conform to each other. The GDP expenditures are always compiled at purchasers' prices¹³, as these are the prices paid by the final users. However, some countries may only have GDP estimates compiled through production approach and may, therefore, not have data on GDP expenditures. In such cases, the commodity flow techniques and supply and use tables (SUTs) provide a framework to estimate the GDP expenditures. The commodity flow techniques and SUTs are also useful in estimating missing values on either the supply or use sides. While applying these techniques, it should be ensured that the values of products compiled at basic or producer prices are converted to those at purchasers' prices by adjusting them for trade margins, transport costs and taxes less subsidies on products. The values on imports

¹³ Also referred to as market prices

are generally available on c.i.f. (cost, insurance and freight) basis. In the SUTs, these need to be adjusted to bring them to f.o.b. (free on board) prices.

Classifications

62. In the compilation of national accounts, several international and national classifications are used. These relate to classifications on activities, products and purposes. In the GDP expenditures, the classifications (recommended in the SNA) used are the Classification of Individual Consumption by Purpose (COICOP) for the household consumption expenditure; Classification of the Purposes of Non-profit Institutions serving households (COPNI) for the NPISHs; Classification of the Functions of Government (COFOG) for the government consumption expenditure, the Central Product Classification (CPC) for the gross fixed capital formation, the Standard International Trade Classification (SITC) or the Harmonized Commodity Description and Coding System (HS) for imports and exports. The ICP basic headings also use these classifications. However, if countries are attempting to compile GDP expenditures through a SUT framework, it is necessary to bring all the data available according to these classifications to a standard product classification (such as CPC) through concordance tables.

GDP exhaustively measured

63. Measuring GDP exhaustively and according to the production boundary of SNA is an important feature of the national accounts of countries. For the ICP, this is one of the key aspects, as GDP estimates need to be comparable across the countries in the ICP. However, in the compilation of GDP estimates, generally some activities get excluded because they are underground, illegal, informal, household production for own final use, or due to deficiencies in the basic data collection. The handbook, *Measuring the Non-Observed Economy* (OECD, IMF, ILO, and CIS STAT (2002)) is an important document in this context which provides guidelines on measuring the non-observed economy.

64. The non-observed activities normally overlap each other and it is difficult to estimate its various components separately. Among these, however, informal sector is a major component in the developing countries. Labour input methods¹⁴ can be used to estimate the value added for the informal sector segments of various economic activities.

65. Another area that sometimes gets omitted or under-covered from the GDP estimates refers to household production for own final consumption. This relates to

- goods (especially agricultural, livestock, fishing and forestry produce);
- services of owner occupied dwellings and services produced by employing paid domestic staff;

¹⁴ This procedure involves three basic steps: (i) obtaining estimates of the supply of labor input for selected economic activity and size of enterprise, from a household labor force survey and/or other demographic sources; (ii) obtaining estimates of output per unit of labor input and value added per unit of labor input for the same activity and size breakdown from regular or special purpose enterprise survey; and (iii) multiplying the labor input estimates by the per unit ratios to get output and value added for the activity and size categories.

- values of goods and services produced by unincorporated enterprises owned by households and which are consumed by members of the household that owns the unincorporated enterprise.

66. It is important that household production for own consumption is appropriately accounted for in the GDP estimates. Values are imputed for these goods or services based on the prices of similar goods or services sold on the market or by the costs of production when suitable prices are not available. For the services produced by employing paid domestic staff, values are imputed on the basis of wages paid to the domestic staff, which is recorded as both output and household final consumption expenditure.

Income in kind

67. Sometimes wages are paid to employees in kind in the form of goods and services, either free or at very low prices. In the national accounts, their values need to be imputed and included as compensation of employees and in the household final consumption expenditure.

Barter transactions

68. Barter is the exchange of goods or services without money changing hands. In principle, final consumption expenditure by households should include the value of barter transactions, which should be valued at the market value of the goods or services exchanged. If the goods or services exchanged are not of equal value then the average market value of the goods or services involved should be used.

FISIM allocation to final users

69. The financial intermediaries provide services (lending and borrowing) for which they do not charge explicitly. The output of their services is estimated indirectly, which is labelled as the financial intermediation services indirectly measured (FISIM). The national accounts measure the output of FISIM as total property income receivable by financial intermediaries minus their total interest payable. The value of FISIM would then be equal to interest receivable minus interest payable. However, the SNA also recommends use of reference rates to compute the output of FISIM.

70. In principle, FISIM should be allocated among various users of the services of financial intermediaries, i.e., as intermediate consumption by producers, final consumption by households, government or exports of services. Generally, FISIM is allocated on the basis of deposits and loans of different users using reference rates (the choices are inter-bank lending rate, central bank lending rate, or the average of loan and deposit rates). In the 1968 SNA, FISIM was not allocated to final users or countries could show this as intermediate consumption of a “nominal industry”. However, according to 1993 SNA, FISIM needs to be allocated to final users. This increases the GDP level as compared to the practice followed in 1968 SNA. The allocation of FISIM to final uses (particularly to the household consumption

expenditure) is also very important for the ICP and need to be ensured by the countries.

Net expenditures abroad included preferably allocated through TSA

71. While adopting the SUT framework, two adjustment items come into picture: purchases abroad by the residents and purchases of non-residents in the domestic economy. While the former is treated as both imports and consumption expenditure of households, the later is treated as exports and netted from the household consumption expenditure. The data on these purchases of households is generally available in the balance of payments accounts. These adjustment entries are needed only when household final consumption expenditure is compiled from sources other than a household expenditure survey, especially the retail sales surveys.
72. The ICP recommends that these net purchases of households be allocated against individual products (basic headings) under household final expenditure. Guidance for this is available if countries have compiled tourism satellite accounts (TSA). If not, the tourism characteristic or tourism connected products could be chosen for allocation of these expenditures.

Services of owner occupied dwellings

73. The imputed value of housing services provided to owner-occupiers can be estimated on the basis of the rentals that would be paid on the market for accommodation of comparable size, quality and type. However, where few dwellings (Less than 25% of all dwellings) are rented, rents actually paid cannot be regarded as typical and the standard procedure cannot be applied. When the standard procedure cannot be used (when more than 75% of the houses are owner occupied), the suggestion is to estimate expenditure on dwellings by the user cost approach. The user cost approach consists of estimating each of the expenditures that owners of dwellings would need to take into account in fixing a market rent if they decided to rent their dwellings to other people rather than to live in them, that includes the net return on the owners' capital (which can be estimated by applying an interest rate to the estimated value of dwellings; the interest rate should be what the owners could realistically earn if, instead of buying dwellings, they had invested in a safe financial asset, such as a savings account or government bond). These expenditures for estimation at basic prices are:
 - Intermediate consumption (the costs of regular repairs and maintenance and the costs of insuring the dwelling against fire, other damage and natural catastrophes)
 - Taxes on production less production subsidies
 - Consumption of fixed capital
 - Net operating surplus (net return on the owner's capital)

Consumption of fixed capital for government fixed assets

74. Government produces goods and services that are supplied free, or at prices that are not economically significant, to other institutional units or the community as a whole. In such cases, the receipts from the sale of these goods and services are much smaller as compared to the costs of production. The balance is met by the government from taxes and other income. The output of general government is, therefore, estimated on cost basis, that is as sum of purchase of goods and services (intermediate consumption), compensation of employees, other taxes on production and consumption of fixed capital (CFC). If the receipts from sale of goods and services are netted from the government output, the aggregate obtained is the government final consumption expenditure (GFCE). In this measure of output, consumption of fixed capital (CFC) is an important component. Some countries do not compile estimates of CFC and may omit this component from the estimation of government output (and hence GFCE). This results in under-estimation of output and GDP. Countries should make efforts to either compile CFC estimates for government fixed assets or make suitable adjustments to account for this.

Defense expenditures

75. The 1968 SNA treated all defense expenditures as intermediate consumption and consequently as government consumption expenditure. The 1993 SNA introduced a change in this concept - expenditures by the military on fixed assets of a kind that could be used for civilian purposes of production are treated as gross fixed capital formation. This is an important change in the context of GDP expenditures and countries should make efforts to identify these expenditures and include them in the GFCF.

Advantages of providing GDP expenditures through SUT

76. The ICP 2011 requires ‘one-off’ detailed national accounts data from the countries for computing PPPs at the basic heading level and real GDP of countries. These ‘one-off’ detailed data should be reliable, internally consistent, exhaustive and internationally comparable, so that the end outputs of ICP 2011 are qualitative. To achieve this objective, the countries could adopt the commodity flow approaches and supply-use tables (SUTs) recommended in the 1993 SNA. The Global Office recognizes the advantages of using commodity flow approaches and SUTs for the compilation of detailed expenditure values needed in the ICP 2011. The Global Office documents on national accounts in the ICP provide illustrations on the use of these techniques and their advantages and features. Some of these are listed below:

77. As a quality framework for ICP, the SUTs

- Provide a platform to bring together all source data and assumptions;
- Assist in ensuring GDP exhaustiveness;
- Help in assessing and reviewing the data sources for compiling national accounts;
- Enable comparisons of the GDP estimated through the production, income and expenditure approaches;
- Provide a basis for estimating a missing component;

- Helps in building capacity;
- Enable compilation of quality GDP estimates for a subsequent year based on fewer data sources through updating of benchmark SUTs.

78. In estimating GDP expenditures for ICP, the SUTs and commodity flow approaches

- Provide a link between production and expenditure GDP, particularly when expenditure GDP data is not compiled or is deficient in quality, thereby enable the production of consistent estimates of GDP expenditures;
- Facilitate the estimation of GDP expenditures at basic heading level in a coherent manner;
- Depict the flows of goods and services at individual product level, in the sense that a supply of a product has to match with the uses of that product;
- Are used as editing tool if both supply and use components are independently estimated;
- Are used for estimation purpose, if one component in the supply or use tables is missing;
- Can be compiled for a subsequent year based on fewer data sources through updating a benchmark SUT ;
- Enable the removal of the statistical discrepancy.

Updating an earlier SUT/data on GDP expenditures

79. If countries compile regularly the quarterly and annual GDP estimates from production and expenditure approaches at sufficient detailed level, it is easy to meet the requirements of ICP 2011. However, some countries may not have quarterly estimates or even the annual GDP estimates from expenditure approaches. On the other hand, some countries may compile GDP expenditures data, but with some time-lag. Similarly, some countries may have compiled an SUT in the past. In all these cases, it becomes necessary to adopt various procedures, assumptions and approximations to derive the estimates of expenditures on GDP for the ICP 2011, which differ from country to country depending on the data sources and administrative set-up. The Global Office provided some guidance on estimating GDP expenditures in these situations, in the ICP 2011 national accounts documents for the benefit of countries.

Editing checks

80. Some simple editing checks have been provided by the Global Office that can be applied by each country before the data are provided to the regional office. These are:

- GDP and its major aggregates are identical to the information supplied in the annual national accounts questionnaire (if “No”, please explain any differences)
- All basic heading values have been supplied (please explain the reasons for any valid zero basic headings)
- Basic heading values for each aggregate of GDP sum to the values reported for those major aggregates in the national accounts questionnaire (please explain any discrepancies)

- The correct sign (+ or -) has been assigned to change in inventories when aggregating expenditures to gross capital formation and GDP
- The correct sign (+ or -) has been assigned to net acquisition of valuables when aggregating expenditures to gross capital formation and GDP
- The correct sign (+ or -) has been assigned to the balance of exports and imports when aggregating expenditures to GDP

Reporting forms and Metadata

81. To help the national accountants in the countries to compile detailed expenditure values for each basic heading of the ICP classification, the Global Office has developed five tables/forms. These include the estimates and underlying metadata (data sources, basic data, reference years, adjustments made, as well as any other method used to estimate the expenditure values). These reporting forms are required to be filled up by the countries.

PART 2: Procedures related to SUT and commodities flow approach

Chapter 4: Structure of SUT

Description of a simplified Supply and Use Table

82. Figure 1 is a simplified Supply and Use Table. The total *Supply* of goods and services that becomes available during a given period is shown in the first two columns and the various *Uses* to which those goods and services are put are shown on the right-hand side. *Change in Inventories* (Δ INV) is shown as one of the Uses. Δ INV includes, as a positive entry, any goods and services that became available during the period but which have not yet been put to any of the other Uses. It also includes, as a negative entry, any goods and services used in the current period that were produced or imported in an earlier period. *Change in Inventories* ensures that **the two sides of the SUT – the Supply on the left-hand side and the Uses on the right – will always be equal.**

Figure 1 : Simplified Supply and Use Table

SUPPLY		TOTAL SUPPLY AND USES	USES						
Domestic Production (DP)	Imports (IMP)		Intermediate Consumption (IC)	Final Consumption Expenditure			Capital Formation		Exports (EXP)
				Government (GFCE)	Households (HFCE)	Non-profit institutions serving households (NPISH)	Gross Fixed Capital Formation (GFCF)	Change in Inventories (Δ INV)	
Goods									
1									
2									
..									
Services									
1									
2									
..									
TOTAL									

83. *Domestic production (DP)* mostly comes from enterprises in agriculture, industry, construction, trade, transport and other services, but it also includes the services produced by government which are valued at their costs of production. *Imports (IMP)* and *exports (EXP)* both include services as well as goods. *Intermediate consumption (IC)* includes all the goods and services that are used up in producing *Domestic production*. *Household final consumption expenditure (HFCE)* is the largest item on the uses side. *Non-profit institutions serving households (NPISH)* include trade unions, political parties, religious and charitable organisations as well as sporting and recreational associations. In many countries, expenditure by *NPISH* are included in *HFCE* but the SNA recommends that consumption expenditures of *NPISH* should be shown in a separate column. *Gross fixed capital formation (GFCF)* is usually broken down into its main components - residential and non-residential buildings, other construction, machinery and equipment and “other GFCF” which consists mainly of the increase in stocks of certain types of farm animals, purchases and development of computer software, and the costs of mineral exploration

84. As the two sides of Figure 1 are equal, the SUT can be written as an equation:

$$DP + IMP = IC + GFCE + HFCE + NPISH + GFCF + \Delta INV + EXP \quad (1)$$

Subtracting *Imports* and *Intermediate Consumption* from both sides gives:

$$DP - IC = GFCE + HFCE + GFCF + NPISH + \Delta INV + EXP - IMP \quad (2)$$

85. Equation (2) is the “GDP Equation” showing that *Domestic Production* minus *Intermediate Consumption* is equal to the sum of “final uses”, namely *Government* and *Household Final Consumption Expenditure*, *Capital Formation* and *Exports* minus *Imports* - or the “*Trade Balance*”. The left-hand side is usually called “GDP from the Production Side” - or GDP (P) - and the right-hand side is called “GDP from the Expenditure Side” - or GDP (E).

Uses of the SUT

86. Equation (2) demonstrates a key property of the SUT: **it generates GDP (P) and GDP (E) simultaneously** and, because they are both produced at the same time, **they must always be equal**.

87. Most countries find it easier to make their first GDP estimates from the production side –GDP (P). Once they are satisfied with GDP (P) they then try to estimate the uses side to obtain GDP (E). If the various uses are estimated independently of supply, there is invariably a statistical discrepancy between GDP (P) and GDP (E) and this discrepancy is usually attributed to GDP (E) which is considered to be the less reliable estimate of GDP. Sometimes there is no statistical discrepancy because household final consumption or change in inventories (or both) are derived as residuals. The problem with this is that GDP (E) is more useful for policy purposes than GDP (P). Fiscal and monetary policy instruments – product and income taxes, money supply, interest rates and exchange rates – work on the expenditure components of GDP, and so policy-makers in central banks and ministries of finance need to know how these various policy measures affect the expenditure components of GDP.

88. Estimating GDP through a SUT is the best way to make sure that both GDP (P) and GDP (E) are equal since there is no room in the SUT for a statistical discrepancy. Compilation of a SUT involves balancing uses and supplies at a detailed commodity level and in this process the accuracy of both GDP (P) and GDP (E) are enhanced. Most developed countries now derive their regular GDP estimates through annual Supply and Use Tables. Annual SUTs are probably out of reach of most developing countries but more and more of them are now estimating bench-mark SUTs at regular 4 or 5 year intervals.

Value –added components

89. The supply and use table in Figure 1 can be expanded by adding a third “quadrant” as shown in Figure 2. The value added quadrant is obtained by subtracting intermediate consumption from domestic production. In a SUT, both domestic production and intermediate consumption are broken down by kind of activity so value added is also shown using the same kind of activity classification.

Figure 2 : The Value Added Quadrant of the Supply and Use Table

SUPPLY		USES	
Domestic production (DP) (by kind of activity)	Imports	Intermediate consumption (IC) (by kind of activity)	Other uses
		VALUE ADDED (obtained as the difference between DP and IC and broken down by kind of activity)	

Value added in the lower quadrant can be broken down into the following components:

- Compensation of employees;
- Taxes less subsidies on production, other than taxes and subsidies on products;
Consumption of fixed capital;
- Operating surplus/Mixed income (obtained as a residual).

Note that only total value added by kind of activity is obtained from the SUT. The components of value added and labour input are all obtained from other sources and are not generated within the SUT. The value added quadrant clearly adds to the analytic value of the SUT but it should be seen as an appendix to the SUT rather than an integral part of it.

Further readings :

Handbook of Input-output Table Compilation and Analysis, United Nation, New York 1996 (Studies in Methods Series F, No. 74) Chapter II. The system of national accounts (SNA) framework of supply and use tables (SUT): overview

System of National Accounts, 2008, United Nations New York 2008, Chapter 14. The Supply and Use Table and the Goods and Services Account

Chapter 5: Supply table

Domestic Production or Gross Output

What we have been referring to as Domestic Production is also called “Gross Output” in the SNA

General definition

90. The SNA “Production Boundary” is a means of defining what is included in gross output. Essentially gross output covers five kinds of activities:
- i. The first of these is by far the most important. It covers the production of goods and services for sale – crops, livestock, minerals, manufactured goods, business services for example. Note that it also includes services produced by government and by non-profit institutions serving households (NPISH). These are services that the government or NPISH produces and “sells” back to itself.
 - ii. The second is particularly important in countries with a large agricultural sector. Farmers usually produce for the market but also keep back enough of what they grow to feed the family. All this produce is included as agricultural output, whether sold or not. Building your own house or storage shed also counts as production.
 - iii. Authors, film producers and musicians are also producers. The SNA treats their output as a kind of capital asset. The original manuscript or piece of music will go on producing an income for the producer over several years.
 - iv. When you live in a flat or house that you own, the SNA considers that you are an entrepreneur selling housing services to yourself.
 - v. Finally, households can produce domestic services which they “sell” to themselves by employing cooks, butlers, gardeners and body-guards.

Output is not always the same as sales

91. For services, output and sales are always the same. A restaurant's output is what it gets from its customers for the meals it serves: the output of an airline is the tickets it sells. But for goods, some of what is produced may not be sold immediately. It goes into stocks. This means that goods output may be smaller or greater than its sales. It will be smaller if it is running down its stocks of finished goods and larger if it is accumulating more stocks of goods for sale at a later date. Output can be calculated as sales plus the increase in stocks of finished goods, where the increase can be either positive or negative.

Special cases in defining and measuring gross output

a) **Government and NPISH gross output** is valued as the “costs of production”. These are:

- Compensation of employees is the biggest item. It consists of wages and salaries and allowances in cash and the value of any income in kind – free or subsidized housing, food and meals, transport to and from work. An important point to notice here is that wages and salaries include employer’s contributions for social security – health care,

unemployment insurance and pensions for example. Mostly governments provide these social benefits without making actual contributions to a social security fund. In this case the national accountant has to estimate what the government should have paid into a fund in order to finance the benefits that employees actually receive. This amount is then added to wages and salaries to obtain compensation of employees.

- Intermediate consumption includes office stationery, electricity, rent and other current cost of running government offices, hospitals, schools, police forces and armies.
- Consumption of fixed capital (CFC) is the decline in the value of government fixed assets through wear and tear and obsolescence. Government computers, vehicles and office buildings, hospital and school equipment and so on are being used up in the process of producing government services. The national accountant must include this “using up of capital” in the cost of producing government services even if governments themselves do not always show it in their accounts.
- Operating surplus is usually zero or negligible. It may include the operating surplus of restaurants or bookshops in museums.
- Taxes and subsidies on production are usually zero for government but they may apply for the output of NPISH.

b) The **output of retailers and wholesalers** is not the total value of sales but rather the margin.

The margin is the difference between the value of goods sold and the cost of purchasing those same goods. The margin measures the cost of the services retailer or wholesaler provides by storing goods for resale, keeping them in good condition, displaying them in an attractive fashion and providing advice to customers.

Some examples of how we calculate gross output of trade:

- A trader buys goods for resale for 50 and has sales of 75. Assuming there is no change in stocks of goods for resale, the gross output will be $75 - 50 = 25$. Twenty five is the margin on the goods sold.
- A trader does not buy any goods for resale but sells 100 this year. Those sales must have come out of the stock purchased in an earlier year. In this case the increase in stocks for resale will be a minus figure - minus 60 for example. The gross output is then $100 + (\text{minus } 60) = 40$. Forty is the margin on the goods bought in an earlier period for resale that were actually sold in the current year.
- A trader buys goods for resale for 70 and over the year the stock of goods for resale increases by 10. If sales are 80, gross output equals $80 - 70 + 10 = 20$. Twenty is the margin on the goods bought for resale that were actually sold.

c) **Bank output** is the value of services sold (usually quite small) plus the difference between the interest paid to depositors and the property income earned by banks (usually very big).

The difference between interest and other property income received and interest paid to depositors is now called FISIM – financial intermediation services indirectly measured. In the older versions of the SNA it was called “Imputed Bank Service Charges” and was calculated in the same way as FISIM. **FISIM is not new**. It is just a new name.

d) **Insurance output** covers insurance against road accidents, unemployment, ill health, death while abroad, and any of the other misadventures that may befall you.

In the 1968 SNA the output of insurance was only the difference between premiums and claims. The SNA 1993 added “premium supplements” which are equal to the interest earned on the contingency funds which are held by insurance company and from which claims are paid. The reasoning behind “premium supplements” is that the contingency funds really belong to the customers and not to the insurance companies. It is as though the customers earn interest and other property income from investing those funds and then pay it to the insurance companies as an additional or “supplementary” premium.

Basic Prices and Purchasers’ Prices

92. In statistical surveys, producers usually report the value of their output at “farm-gate” or “ex-factory” prices. In a market economy, producers set these prices to generate an operating surplus in addition to the costs of intermediate inputs, employee compensation, and any fees or taxes on production that they must pay to government. Examples of these taxes include property taxes on land and buildings, vehicle licence fees, and taxes on employment. Sometimes producers transport their goods to the purchaser so that the price charged by the producer will also include these transport costs. These ex-factory or farm-gate prices are referred to in the SNA as *Basic Prices*.
93. The import column shows goods and services at their c.i.f. prices. These are prices that include the costs of any transport and insurance charges to bring them to the port of entry but they exclude any customs duties that will later have to be paid by the eventual purchasers. These c.i.f. prices are also referred to as *Basic Prices*.
94. The users of these domestically produced or imported goods will need to pay *Purchasers’ Prices* for them. These will be higher than the *Basic Prices* because of a number of costs that intervene between sale of commodities at the place where they are produced or imported and the place where they will be used. The relationship between *Basic* and *Purchasers’ Prices* is as follows:

	Basic price
<i>plus</i>	Transport costs
<i>plus</i>	Wholesale and retail trade margins
<i>plus</i>	Taxes on products (such as sales taxes, customs duties, and value added taxes)
<i>minus</i>	Subsidies on products
<i>equals</i>	Purchasers’ price

In the case of services there are no transport costs or trade margins but there will often be taxes or subsidies on products.

To convert supply at basic prices to supply at purchasers prices, the full Supply quadrant of the SUT therefore looks like this.

Figure 3 : Supply Quadrant of the SUT

Supply at Basic prices		<i>plus</i> Adjustments to move from Basic to Purchasers' Prices			<i>equals</i> Total Supply at Purchasers' Prices
Domestic Production (DP)	Imports (IMP)	Transport costs separately invoiced to the purchaser	Wholesale and retail margins	Taxes on products <i>minus</i> subsidies on products	
Goods					
1					
2					
..					
Services					
1					
2					
..					
TOTAL					

The final column of **Figure 3** now shows the total supply of goods and services at *Purchasers' prices*. This column will now equal the total of the Uses in the right-hand side of the SUT as these are valued at the prices paid by those who purchase the various goods and services.

Transport costs and trade margins

95. Since transport costs and trade margins are now shown in columns in the Supply quadrant, there is a problem of double counting because trade and transport services are also included in the list of commodities that are produced or imported. **Figure 2** shows the counter-entries that are required to avoid double counting.

Figure 4 : Adjustment for Transport Costs and Trade Margins

Supply at Basic prices		Adjustments to move from Basic to Purchasers' Prices			Total Supply at Purchasers' Prices
Domestic Production (DP)	Imports (M)	Transport costs invoiced to the purchaser	Wholesale and retail margins	Taxes on products minus subsidies on products	
Food		8	50		58
Clothing		5	90		95
Transport services 13		-13			0
Trade services 140			-140		0
·					
·					
Other services					
TOTAL 153		0	0		153

96. Transport costs and trade margins (13 and 140 respectively in this example) are shown as services produced in the *DP* matrix, but these same amounts are also included in the transport and trade columns as adjustments required to move from *basic* to *purchasers' price* – 58 in the case of food and 95 for clothing. The value of the transport and trade services must now be cancelled out by negative entries of -13 and -140 in their respective columns to avoid double counting. *Total supply at purchasers prices* now includes 153 only once.

C.i.f. / f.o.b. adjustment

97. In the SNA, both imports and exports are theoretically valued f.o.b. In practice exports are so valued but almost all countries record imports c.i.f. When imports are valued c.i.f. there is another double counting problem:

- The value of imported goods includes the transport and insurance services incurred in bringing them to the importing country;
- But these transport and insurance services will also be included either in Domestic production if the transport and insurance services are provided by residents, or in Imports (of services) if the transport and insurance services are provided by non-residents.

Figure 3 shows the adjustments required to avoid double counting freight and insurance services when, as is usually the case, imports are recorded c.i.f. Both an additional column and an additional row have to be introduced into the supply quadrant of the SUT.

98. In this example, the difference between imports c.i.f. and imports f.o.b. came to 20. This is the total amount of insurance and freight charges on all imports. Some of it will have been paid to domestic transport and insurance enterprises and some to non-resident enterprises and will have been included in either in domestic production or imports of services. This 20 is the total amount that we need to deduct in order to avoid counting it twice. Note that we do not need to know how much was provided by domestic producers and how much by non-residents; we only need to deduct the total amount of 20.
99. In this example it is estimated that insurance on imports was 5 and the freight transport charge was 15. These are subtracted in the c.i.f./f.o.b. column in the rows for transport and insurance. Total Supply at Purchasers' Prices is therefore reduced by the same amounts and double counting has been avoided. Imports, in total, are now valued at f.o.b. prices as required by the SNA, and an offsetting entry of +20 is required at the intersection of the c.i.f./f.o.b. column and row so that the c.i.f./f.o.b. adjustment has no further impact on the SUT.

Figure 5 : Adjustment from C.i.f. to F.o.b. for imports

Supply at Basic prices			Adjustments to move from Basic to Purchasers' Prices			Total Supply at Purchasers' Prices
Domestic Production (DP)	Imports (IMP)	Cif/fob adjustment	Transport costs invoiced to the purchaser	Wholesale and retail margins	Taxes on products minus subsidies on products	
Food						
Clothing						
Transport		-15				-15
Insurance		-5				-5
.						
.						
Other services						
Cif/fob adjustment	-20	+20				0
Total	-20	0				-20

Of course, if imports are recorded f.o.b., these adjustment items are not required.

Purchases abroad by residents and purchases in the domestic market by non-residents

100. In the SNA, household final consumption expenditure (HFCE) refers to the resident population. This means that:

- HFCE must include purchases abroad by residents and exclude purchases in the domestic market by non-residents;
- Exports must include purchases in the domestic market by non-residents, and imports must include purchases abroad by residents.

101. Consider first HFCE. Many countries estimate HFCE by household expenditure surveys. Only resident households are covered in these surveys and such surveys usually ask respondents to record expenditures made abroad. This means that if a country uses a household expenditure survey to estimate HFCE, this estimate will usually be fully consistent with the SNA: purchases in the domestic market by non-residents will have been automatically excluded because non-residents were not covered by the survey, and resident households will have reported their expenditures abroad. Of course if the household expenditure survey does not ask

households to report their expenditures abroad, HFCE will need to be adjusted to include them. But this is rare and household expenditure surveys usually generate estimates of HFCE that are consistent with the SNA. These countries do not need to make any adjustment to their HFCE to take account of direct purchases.

102. Some countries, however, base their estimates of HFCE on retail sales or production statistics and in these countries their first estimate of HFCE will not be consistent with the SNA rules. Purchases in the domestic market by non-residents will be included and purchases by resident households abroad will be excluded. Countries whose initial estimate of HFCE is not consistent with the SNA can do one of two things:
 - if they have detailed information on purchases abroad by residents and on purchases in the domestic market by non-residents, they can adjust their initial HFCE estimate at a detailed level;
 - if they can only estimate the total value of purchases abroad by residents and of purchases in the domestic market by non-residents, they can add the former and subtract the latter as two, one-line adjustments to their initial HFCE estimate.
103. Many countries choose the second method because it is less data-demanding and in this case they will show purchases of residents abroad as a plus entry and purchases in the domestic market by non-residents as the last entries in the HFCE column of the SUT.
104. Now consider Exports and Imports. As noted above, these must include, respectively, purchases in the domestic market by non-residents and purchases of residents abroad. In the standard SUT shown in the SNA, the Supply quadrant of the SUT includes a line for purchases of residents abroad so that these can be added to other imports, and the Uses quadrant includes a line for purchases in the domestic market by non-residents so that these can be added as a single figure to other exports.
105. In practice, however, these two adjustment lines will almost always be empty. This is because standard Balance of Payments of the IMF includes these purchases in exports and imports of services. Provided the national accountant uses the BOP statistics for imports of services, the adjustment for direct purchases is not required.

Taxes and subsidies on products

106. This is the final adjustment column needed to bring supply at basic prices up to purchasers' prices. Taxes on products include customs duties, excise duties, sales taxes and value added taxes. All product taxes are paid by purchasers and so must be included in supply at purchasers' prices.
107. Subsidies are transfers from government to producers and are proportional to the values or quantities of output. Subsidies are quite common in developing countries but are usually confined to only a few products such grain and fuel for cooking and heating. They are treated in the SNA as negative product taxes.

References

System of National Accounts, 1993, United Nations, New York, 1993. Paragraph 6.14 (Production Boundary) and Chapter XV Supply and Use and Input Output Tables.

System of National Accounts, 2008, United Nations New York 2008, Chapter 6. The Production Account

Understanding National Accounts, François Lequiller and Derek Blades, OECD Paris 2006 Chapter 4. Production: What it Includes.

Chapter 6: Use table

108. The central framework of SNA provides for compilation of supply and use tables (SUTs) with focus on the processes of production and consumption of individual types of goods and services, in addition to the compilation of a set of sequence of accounts that depict the working of the economy.
109. The SUTs build up on the concept that the amount of a product available for use within the economy must have been supplied either by domestic production or by imports. The same amount of the product entering an economy in an accounting period must be used for intermediate consumption, final consumption, capital formation (including changes in inventories) or exports.
110. The SUTs contain two matrices (called tables), namely, (i) supply table and (ii) use table. The tables have values of products in rows and industries in columns, with the same set of products and industries in both the tables. The supply table provides output of goods and services at their detailed commodity level (which are in rows) and also by domestic industries and imports (which are columns). Thus, the supply table provides availability of individual commodities of goods and services. The use table details the use of these products by type of use, namely intermediate and final consumption, gross capital formation and exports.
111. This lecture note presents the structure, concepts and procedures to compile the use table and its application in national accounts as well as for ICP 2011. The previous lecture note 5 covered these aspects in respect of supply table.

Overview of the Structure

112. A use table shows the uses of products (goods and services) in a cross-classification structure of (a) products and (b) types of use, namely, (i) intermediate consumption by industry, and (ii) final consumption (by households, NPISHs and government), gross capital formation (gross fixed capital formation, change in inventories and valuables) and exports. The use table also provides the cost structure of industries.
113. The use table shows: (a) products in the rows and (b) industries and categories of final uses in the columns. In addition to these, the use table also includes (c) the components of value added by industry, i.e. compensation of employees, other taxes less subsidies on production, consumption of fixed capital and net operating surplus, as rows under the industries columns, though these data are not generated through the SUT process and are taken from sources independent of the SUT itself.
114. **Table 2** presents an illustration of the use table. For the sake of cross referencing of data on products and industries, the corresponding supply table has also been presented in Table 1. It may be noted that both supply and use tables are constructed for an identical set of products and industries.

Quadrants of Use Table

115. The use table is broadly divided into three quadrants on the basis of its structure.

- Quadrant I refers to the intermediate use (rows limited to products and columns limited to industries);
- Quadrant II refers to the final use (rows limited to products and adjustment items and columns limited to final uses); and
- Quadrant III (rows limited to value added components or its uses and columns limited to industries).

Quadrant I

116. The quadrant I (intermediate use quadrant) shows intermediate consumption at purchasers' prices of industries in the columns and disaggregated by products in the rows. The total-row shows intermediate consumption by industries at purchasers' prices. (*in Table 2, these values are: 802 for agriculture, 3717 for industry, 2492 for services and 7011 for all industries*). In the Use table, the rows of trade and freight transport products will have zero entries, as their values are embedded into the tangible products of agriculture and industry (goods) since they are valued in purchasers' prices and these prices include the trade and transport margins and taxes less subsidies on products. Therefore, at purchasers' prices there will be no entries for trade and transport margins and taxes less subsidies on products. It may be recalled that the supply table too has zero values for the rows of trade and freight transport under the total-supply column at purchasers' prices.

Quadrant II

117. The quadrant II (final use quadrant) shows exports; final consumption expenditure of households, NPISHs and government; and gross capital formation (broken down into gross fixed capital formation, change in inventories and valuables) at purchasers' prices - with some further subdivision of final uses (such as exports into goods and services, and government consumption expenditure into individual consumption and collective consumption¹⁵). The total-row shows final use by use categories at purchasers' prices. (*in Table 2, these values are: 865 for exports, 5946 for household and NPISH consumption expenditure, 962 for government consumption expenditure and 1965 for gross capital formation, with total final use being 9738*).

Quadrant III

118. The quadrant III (uses of value added) shows the production costs of producers other than intermediate consumption values presented in quadrant I. These value added components are the following:

- Compensation of employees (*1000 in agriculture, 700 in industry, 2000 in services and total 3700 in table 2*);

¹⁵ Individual and collective consumption of government are dealt in a separate lecture note.

- Taxes less subsidies on production and imports broken down into taxes on products, subsidies on products and other taxes less subsidies on production (*0 in table 2*);
 - Consumption of fixed capital (*240 in agriculture, 140 in industry, 410 in services and total 790*);
 - Net mixed income and net operating surplus (*1203 in agriculture, 606 in industry, 1692 in services and total 3501*).
119. Quadrant I gives rise to production approach gross value added by industry (total domestic output by industry in basic prices from supply table, *minus* total-row of quadrant II, which is the intermediate consumption by industry at purchasers' prices). *In this SUT example, the GVA values are 2443 for agriculture, 1446 for industry and 4102 for services with total GVA at basic prices being 7991. If we add the taxes less subsidies on production of 780 from supply table to the GVA at basic prices, the GDP which is at purchasers' prices for the total economy comes to 8771.*
120. Quadrant II gives expenditure approach GDP estimates (total final use, *minus*, imports, f.o.b. – from the supply table) at purchasers' prices. *In this SUT example, these values are 9738 for total final uses, minus 967 for imports, f.o.b., which gives GDP as 8771.*
121. Quadrant III gives the income approach GVA as sum of compensation of employees, other taxes less subsidies on production, consumption of fixed capital and net operating surplus/mixed income of self-employed. *In this example, these values are 3700 for compensation of employees, 0 for taxes less subsidies on production, 790 for consumption of fixed capital and 3501 for net operating surplus/mixed income, giving GVA at basic prices as 7991 and GDP purchasers' prices as 8771 (7991+780).*

Table 3: Supply Table

Product	Industry	Agri culture	Indu stry	Serv ices	Total dom. suppl y	Imp. c.i.f. (total f.o.b.)	c.i.f./ f.o.b. adjustm ent	Total supply at BP	TT M	Taxes less subs. on prods.	Total supply at PP
1	2	3	4	5=2+3 +4	6	7	8=5+6+ 7	9	10	11=8+9 +10	
1. Agriculture	3245			3245	23		3268	30	10	3308	
2. Industry		5163		5163	850		6013	100	-115	5998	
3. Services			659 4	6594	94	-10	6678	-130	885	7433	
4. c.i.f./ f.o.b. adjustment					-10	10	0			0	
5. Purchases of residents abroad					10		10			10	
6. Total (industry output at basic prices)	3245	5163	659 4	15002	967	0	15969	0	780	16749	

Table 4 : Use Table

Product	Industry	Agri-culture	Indus try	Servic es	Total inter-industry use	Exports fob	HFCE/ NPISH	GFCE	GCF	Total use at PP
1		2	3	4	5=2+3+4	6	7	8	9	10=5+6+7+8+9
1. Agriculture		400	450	130	980	57	2229	15	27	3308
2. Industry		160	2050	1000	3210	513	1271	130	874	5998
3. Services		242	1217	1362	2821	275	2456	817	1064	7433
4. Purchases of residents abroad							10			10
5. Purchases of non-residents in the domestic market						20	-20			0
6. Total IC at PP		802	3717	2492	7011	865	5946	962	1965	16749
7. GVA at BP (8-6)		2443	1446	4102	7991					
7.1 COE		1000	700	2000	3700					
7.2 Other taxes on Prodn					0					
7.3 CFC		240	140	410	790					
7.4 OS/MI		1203	606	1692	3501					
8. Total industry output at basic prices		3245	5163	6594	15002					

Fob: free on board, BP: basic prices, PP: purchasers' prices, TTM: trade and transport margins, IC: intermediate consumption, OS: operating surplus, MI: mixed income, COE: compensation of employees, CFC: consumption of fixed capital, HFCE: household final consumption expenditure (including those of NPIS), GFCE: government final consumption expenditure

Classifications

122. SNA recommends use of Central Product Classification (CPC) for classifying the products and the International Standard of Industrial Classification (ISIC) for classifying the industries.
123. The source data from surveys or administrative records for compiling national accounts generally comes according to different classifications, such as the

Classification of Individual Consumption by Purpose (COICOP) for the household consumption expenditure; Classification of the Purposes of Non-profit Institutions serving households (COPNI) for the NPISHs; Classification of the Functions of Government (COFOG) for the government consumption expenditure, the Central Product Classification (CPC) for the gross fixed capital formation, the Standard International Trade Classification (SITC) or the Harmonized Commodity Description and Coding System (HS) for imports and exports. While compiling the supply and use tables, it becomes necessary to convert all the source data available according to these classifications to a standard product classification (such as CPC) through concordance tables¹⁶.

Valuations

124. The use side shows different categories of uses of products, namely, the industries and the final users. Both the intermediate uses and the final uses are all valued at purchasers' prices, as purchases made by industries and final users are always at market prices. As explained in the previous lecture note, the supply table, which is initially compiled at basic prices (as domestic production at basic prices and imports, c.i.f) is converted to that at purchasers' prices by adding trade and transport margins and taxes less subsidies on products, so that both supply and use tables are brought to the same valuation basis.
125. In the use table, exports are valued on f.o.b. prices. This price represents the value at the border of the exporting country and includes all distributive services up to the border as well as any export taxes minus export subsidies. The f.o.b. (free on board) price is considered to be a special purchasers' price applied to exports. It may be recollected that the c.i.f. (cost, insurance and freight) price applied for imports is considered to be the basic price and to bring these to f.o.b. price, the columns and rows for c.i.f./f.o.b. adjustment are added in the supply table.
126. In the use table compiled at purchasers' prices, there are no entries for consumption of wholesale and retail services as these are included with the expenditure on the goods. Also, taxes less subsidies on products are included in the purchaser's value of products and are not shown separately in the use table.
127. The non-market services produced by government and NPISHs are valued on non-market basis¹⁷ as the sum of the costs incurred in their production; that is, as the sum of: intermediate consumption, compensation of employees, consumption of fixed capital, and other taxes, less subsidies, on production. This procedure is adopted due to the fact that suitable prices are generally not available to value such production. The net operating surplus on the production of non-market goods or services produced by government units and NPISHs is assumed always to be zero.

¹⁶ These tables provide correspondences between various international classifications, and are generally available in the documents on such classifications.

¹⁷ Non-market means that the services or goods are provided free or at prices that are not economically significant, that is at prices which do not have a significant influence on the amounts that producers are willing to supply or on the amounts that purchasers wish to buy.

Intermediate Consumption of industries (quadrant I)

128. Intermediate consumption consists of value of goods and services that are used as inputs in the production process. These products are entirely used up and transformed in the production process resulting in output of products which may further be used in the production process (such as wheat flour for making bread) or for final use. The intermediate consumption excludes the use of fixed assets, which is recorded as consumption of fixed capital and also excludes expenditures on valuables. However, expenditures on hand tools which are of low value are also included in the intermediate consumption, though they are not used up in the production process. Similarly, there are many borderline cases of intermediate consumption with regard to compensation of employees, fees, fines and taxes, and gross fixed capital formation. Correct identification of intermediate consumption expenditures is therefore important, because otherwise the GDP estimates can be under or over stated.
129. Intermediate consumption is recorded on an accrual basis, i.e. at the time when a good or service is actually used in the production process, as distinct from the time of acquisition. For services, of course, the two times coincide. On the other hand intermediate consumption of goods is equal to purchases (including other types of acquisitions) minus additions to inventories plus withdrawals from inventories:

$$\text{Intermediate consumption} = \text{acquisitions} - \text{changes in inventories}$$

130. Intermediate consumption is normally valued in purchasers' prices, as that is the price paid by the producers for the intermediate inputs. Though, this price consists of (i) basic price received by the producer of the good or service, (ii) transportation costs paid separately by the purchaser, (iii) wholesale and retail trade margins, and (iv) any non-deductible tax less subsidies on the product payable, in the use table, these elements are not separately shown.

Components in the final use quadrant (quadrant II)

(i) Consumption of Non-profit institutions serving households (NPISHs)

131. Non-profit institutions (NPIs) are legal or social entities created for the purpose of producing goods and services but whose status does not permit them to be a source of income, profit or other financial gain for the units that establish, control or finance them¹⁸. The NPIs can have surpluses but they cannot be appropriated by the institutional units which establish them.
132. NPIs that are controlled by government are treated as government units, while NPIs controlled by corporations fall under the institutional sector of corporations¹⁹. All other NPIs are treated as a special group of units called NPISHs. The 1993 SNA defines NPISHs as non-profit institutions which provide goods or services to households free or at prices that are not economically significant. This definition of NPISHs indicates its two special features – (a) they provide their services (and

¹⁸ Para 4.8, SNA 2008.

¹⁹ These NPIs typically charge membership fees to cover their costs.

sometimes goods) on a non-market basis, and (b) they are mainly financed by donations or regular subscriptions from households, though they may also receive donations from other institutional units or from other sources such as property incomes to fund their activities.

133. Some NPISHs provide services only to their members (trade unions, sports bodies and political parties), while other types of NPISHs serve the entire community (charities, relief and aid agencies). Health services, recreation, culture, education and welfare services are provided by either type of NPISHs. Conventionally, services provided by NPISHs are treated as individual, though few of them have the characteristics of collective services (research activities).
134. Final consumption expenditures of NPISHs are equal to the gross output of producers of NPISHs services less sales (including own account capital formation as that is part of output) plus social transfers in kind. The treatment of NPISHs is very similar to that of general government and its valuation is as mentioned in paragraph 20 above.
135. The final expenditures of NPISHs are generally classified according to COPNI (housing, health, recreation and culture, education, social protection, religion, political parties, labour and professional organizations) and these need to be converted to a product classification for compiling the Use table. Generally, NPISHs is clubbed with households for estimating consumption expenditure due to the absence of data on NPISHs. In most countries, NPISHs are exempt from paying taxes, but the tax authorities do collect accounts of NPISHs. This could be a source for data on NPISHs. The other sources could be economic censuses, enterprise surveys, annual accounts, and labour force surveys.

(ii) *Government final consumption expenditure*

136. The term “general government” in the 1993 SNA includes all levels of government (municipal, local, state, provincial and federal). General government incurs expenditures on a wide range of consumption goods and services to produce services for own final use on non-market basis. Though these services are provided to people either individually and collectively, the costs of producing these services are shown as final consumption expenditure by the government. Receipts from sale of government services is generally very little compared to the costs involved and the government meets most of its expenditures from taxes and other revenues.
137. The output of government services is measured on the basis of costs of production (see paragraph 20 above). The government final consumption expenditure is equivalent to government output, less the value of government sales of non-capital goods and services, plus social benefits in kind²⁰. Other government expenditures such as subsidies to industries to reduce operational costs or costs of capital goods, interest payments, costs of capital goods procurement, etc. do not form part of government output or consumption expenditure.

²⁰ the value of goods and services purchased from market producers for delivery to households free or at economically insignificant prices. These do not form part of government output.

138. The final consumption expenditures of the general government sector are divided into two categories of consumption - individual and collective on the basis of who is consuming these services – households or the community as a whole. Individual consumption expenditure benefits individuals or small groups of individuals whereas, collective consumption expenditure comprises payables for services that are provided to the community as a whole or to large sections of it.
139. Individual final consumption expenditures of government are mainly towards (a) Health services including public health, (b) Recreation, culture and religion, (c) Education, (d) Social security and welfare services, and (e) Housing, refuse collection and sewerage services. The main characteristic of individual consumption expenditure is that, “it must be possible to observe and record the acquisition of the good or service by an individual household or member thereof and also the time at which it took place”.
140. The final consumption expenditures by general government for individual goods and services are also called social transfers in kind by general government (further sub-divided into (a) social benefits in kind, and (b) transfers of individual non-market goods and services, which are produced by the government on non-market basis).
141. The goods and services purchased by the government to be given to households without any further processing are valued at purchasers’ prices, while the services produced by government for consumption by individual households are valued at cost.
142. Collective final consumption expenditures include only services (there are no collective goods) with the following characteristics:
 - (a) Collective services can be delivered simultaneously to every member of the community or of particular sections of the community;
 - (b) The use of such services is usually passive and does not require the explicit agreement or active participation of all the individuals concerned;
 - (c) The provision of a collective service to one individual does not reduce the amount available to others in the same community or section of the community. There is no rivalry in acquisition.
143. Current expenditures defined as collective fall under the broad headings of general public services, defense, public order and safety, economic affairs and environment protection but they also include certain expenditures under housing, health, recreation and culture, education and social protection that are considered to be for the benefit of the community at large. The government consumption expenditures are recorded according to the classification, COFOG and the sources of data are the general government budget documents. Collective consumption expenditure by government is valued at cost.
144. A more detailed write-up on individual and collection consumption of general government and NPISHs is included in a separate lecture note.

(iii) *Household final consumption expenditures*

145. Household final consumption expenditure consists of expenditure incurred by resident households on consumption goods or services. This includes the estimated value of barter transactions, goods and services received in kind, and goods and services (as per the production boundary of SNA) produced and consumed by the same household. However, household final consumption expenditure excludes expenditure on fixed assets in the form of dwellings or on valuables.
146. Typically, household final consumption expenditures include:
- a) All purchases of consumer non-durable and durable goods except dwellings;
 - b) Imputed purchases of consumer durables by financial leasing;
 - c) Imputed gross rental for owner-occupied housing services;
 - d) Own-account production and consumption of goods;
 - e) Bartered consumer goods and services (net);
 - f) Domestic services provided by domestic servants;
 - g) Goods and services in kind provided by enterprises as wages;
 - h) Imputed financial intermediary (banking, insurance, pension, etc.) service charges;
 - i) Purchases by residents abroad;
 - j) (Minus) Purchases by non-residents at home.
147. The use table also has a provision to record actual final consumption of institutional sectors - households, NPISHs and general government. Of these sectors, conventionally, the NPISHs do not have actual final consumption, as their expenditures are of the nature of individual final consumption (being social transfers in kind made available to the households) and, therefore, become part of household actual final consumption. The actual final consumption of general government is its collective consumption expenditure. The individual consumption expenditure of general government becomes part of actual final consumption of households. Thus, the actual final consumption of households includes:
- a) Household final consumption expenditures;
 - b) Final consumption expenditures of NPISHs; and
 - c) Individual final consumption expenditures of general government
148. The 1993 SNA states that household final consumption expenditure should be recorded at the purchasers' prices²¹ paid by households including any transport charges and taxes on products that may be payable at the time of purchase. Individual consumption expenditure of households includes a number of imputed expenditures. Goods that are consumed by the households (including family members) that produce them should be valued at purchasers' prices although in practice purchasers' prices for goods consumed from own production will usually be identical to basic prices because trade and transport margins and net taxes on products consumed from own production will usually be zero. Income in kind is

²¹ The purchaser's price of a good is defined as the amount payable to take delivery of a unit of the good at the time and place required by the purchaser.

valued at purchasers' prices if the employer has purchased the goods or services that are being provided to the employees. It is valued at producers' prices if the goods or services have been produced by the enterprise itself. The data sources for household consumption expenditures are the household income-expenditure surveys, retail trade surveys and other administrative data. Commodity flow approaches are widely used to estimate the household consumption expenditure.

(iv) Gross fixed capital formation

149. Gross capital formation comprises gross fixed capital formation, changes in inventories and acquisition less disposal of valuables. All these components are separately shown in the use table. Gross fixed capital formation (GFCF) is measured by the total value of a producer's acquisition, less disposal, of fixed assets during the accounting period plus certain additions to the value of non-produced assets realized by productive activities of resident producers. Fixed assets are tangible or intangible assets which are outputs of production processes. They must have a life span of not less than one year, except for small tools of economically insignificant value. Examples of GFCF are the acquisition of dwelling and other buildings/structures, machinery and equipment, mineral exploration, and computer software.
150. GFCF also includes major improvements to tangible non-produced assets, including land, plus any costs associated with the transfers of ownership of non-produced assets, major renovations to existing assets, own account GFCF, capital transfers in kind and fixed assets acquired through barter. However, GFCF excludes outlays by government on construction and durable equipments that can only be used for military purposes (they are treated by SNA as intermediate consumption by the producers of government services). However, other capital goods that can also be used for civilian purposes like military airports, roads, troop carrying transport equipment like buses, aircraft, ships, etc. are treated as capital goods²².
151. GFCF estimates are based on construction surveys, building permits, enterprise surveys, accounts of corporations and NPISHs, government budget documents, foreign trade statistics and the household surveys (on own account construction). However, commodity flow methods are widely adopted to estimate GFCF by developing countries. GFCF is valued at purchasers' prices (that these include costs of transport and installation and any fees or taxes for transfer of ownership). Own-account GFCF is valued at basic prices or at the costs of production plus estimated operating surplus.

(v) Changes in inventories

152. Changes in inventories are measured by the value of the entries into inventories less the value of withdrawals and less the value of any recurrent losses of goods held in inventories during the accounting period. Some of these acquisitions and disposals

²² This asset boundary is according to 1993 SNA. There are significant changes made in 2008 SNA on GFCF, especially on military expenditures.

are attributable to actual purchases or sales, but others reflect transactions that are internal to the enterprise²³.

153. Inventories are usually classified into three broad categories – finished goods, materials and fuels, and work-in-progress. Finished goods include goods acquired for resale by wholesalers and retailers, all goods stored by government as strategic reserves, such as food and fuel, as well as finished goods that are awaiting delivery to customers. Materials and fuels include raw materials and supplies which will be used up as intermediate consumption in the course of production in a future year. Work-in-progress consists of goods and services on which some processing has taken place but which are not yet in a finished form suitable for delivery to customers. In agriculture, work-in-progress consists of the natural growth of vineyards, orchards, plantations and timber tracts and the natural growth in livestock that are being raised for slaughter.

154. Valuing change in inventories is more complicated than in the case of other aggregates. The value of changes in inventories is the value of the inventories acquired less the value of the inventories disposed of during the year. SNA recommends the perpetual inventory method (PIM) for compiling change in inventories. The measure of inventories required for national accounting purposes is the change in inventories valued at the average prices ruling during the year. It can be calculated by taking the difference between closing (i.e. end of year) inventories and opening (i.e. beginning of year) inventories both valued at average annual prices for the year in question. The data required are prices for inventories at the end of the year, at the beginning of the year and the average for the year as a whole. The physical change in inventories valued at average annual prices is then obtained as follows:

Table 5 : Calculating change in inventories at average 2011 prices Inventories data

²³ Paragraph 10.118, SNA, 2008

(Source: National Accounts Framework in the ICP: Operational Material, ICP 2011 Global Office)

(a) Value of inventories at beginning of 2011 (i.e. at 31 December 2010)		660
(b) Value of inventories at end of 2011 (i.e. at 31 December 2011)		855
(c) Change in value of inventories (i.e. change in book value) in 2011	(a) – (b)	195
Price indexes for inventories		
(d) Price index at beginning of 2011 (base year of volume estimates =100)		110
(e) Price index at end of 2011 (base year of volume estimates =100)		114
(f) Average price index for 2011 (base year of volume estimates =100)		112
Inventories at constant prices		
(g) Book value level at beginning of 2011, at constant prices	(a)/(d) x 100	600
(h) Book value level at end of 2011, at constant prices	(b)/(e) x 100	750
(i) Change in book value in 2011, at constant prices	(h) – (g)	150
Change in inventories at average 2011 prices		
(j) Change in inventories at average 2011 prices	(i) x (f)/100	168
Capital gain	(c) – (j)	27

(vi) *Acquisitions less disposals of valuables*

155. Valuables are produced goods of considerable value that are not used primarily for purposes of production or consumption but are held as stores of value over time. Valuables are expected to appreciate or at least not to decline in real value, nor to deteriorate over time under normal conditions. They consist of precious metals and stones, jewellery, works of art, etc. Valuables may be held by all sectors of the economy²⁴. Valuables may be held by any of the institutional units (government, financial and non-financial corporations, households and NPISHs).

²⁴ Para 10.13, SNA, 2008

156. Just as in the case of fixed assets, acquisitions of valuables are valued at their purchase prices together with associated costs of ownership transfer. Disposals are valued at their sale prices less any associated costs of ownership transfer.

(vii) Exports

157. Exports of goods and services consist of sales, barter, or gifts or grants, of goods and services from resident to non-residents²⁵. In theory, exports occur when transfer of ownership from residents to non-residents takes effect, but in practice change of ownership is deemed to occur when goods cross international boundaries. Exports are valued f.o.b. i.e. measured without the transnational costs of transport and insurance services to bring goods from the border of one country to that of another country. As mentioned earlier, f.o.b. price is regarded as the purchaser's price. Data for exports of merchandise (goods) come mainly from foreign trade statistics. Data for exports of services come mainly from balance of payments.
158. As measured in the balance of payments, exports of services include direct purchases in the domestic market by non-resident households ("tourist expenditures"). Provided exports of services do in fact include direct purchases the adjustment item for exports in the standard SUT table "direct purchases by non-resident households" will be zero.

Value Added Components (Quadrant III)

159. In the use table, the total-row of products shows the intermediate consumption at purchasers' prices, by each of the industries. In the supply table, the total-row of products shows the total output at basic prices, again by industries. The difference between the two rows gives gross value added at basic prices, by industry, and is recorded in the use table. It may be mentioned that gross value added is derived as a residual and not directly observable. Recording of GVA and output in the use table as separate rows shows the consistency of industry output between the supply and use tables. In the use table, besides the row of gross value added, rows are also added to show its components, namely, the compensation of employees, other taxes less subsidies on production, consumption of fixed capital and net operating surplus/mixed income. While taxes less subsidies on production have been explained in the other lecture notes, net operating surplus/mixed income is derived as residual.

Compensation of employees

160. Compensation of employees is defined as the total remuneration, in cash or in kind, payable by an enterprise to an employee in return for work done by the latter during the accounting period²⁶. Compensation of employees is recorded on an accrual basis. It consists of (a) Wages and salaries payable in cash or in kind, and (b) Social insurance contributions payable by employers.

²⁵ Para 14.88, SNA, 1993

²⁶ Para 7.40, SNA, 2008

Consumption of fixed capital

161. Consumption of fixed capital (CFC) is the decline, during the course of the accounting period, in the current value of the stock of fixed assets owned and used by a producer as a result of physical deterioration, normal obsolescence or normal accidental damage²⁷. Business accounts use the term of ‘depreciation’ and several countries use the depreciation figures in place of consumption of fixed capital. However, it is avoided in the SNA because in commercial accounting the term depreciation is often used in the context of writing off historic costs whereas in the SNA consumption of fixed capital is dependent on the current value of the asset. SNA recommends preparation of estimates of capital stock and changes in the capital stock over time through the perpetual inventory method (PIM) (briefly described under change in inventories above). Estimates of consumption of fixed capital are obtained as a by-product of the PIM. However, preparation of capital stock estimates through the PIM requires long-term data on GFCF. It may also be mentioned that CFC is applicable only to the produced assets and not to valuables.

*Adjustment items*²⁸

The adjustment for purchases of residents abroad

162. Direct purchases by residents abroad are treated as both imports and household final expenditure by the SNA. While these values are recorded under the imports column in the supply table against the adjustment row (*10 in the table 1*), the same amount is recorded in the use table under household consumption column against the adjustment row (*10 in table 2*). Though, SNA mentions that the values of residents purchases abroad to be shown against adjustment rows, the European System of National Accounts (ESA) recommended classifying these expenditures by products. The ICP 2011 too recommends allocating the expenditures to respective products. It may also be mentioned that ESA recommends allocation of these direct purchases abroad also to intermediate consumption in addition to household consumption.
163. Countries that base their estimates of household final consumption expenditure on a household budget survey will not need to make this adjustment if, as is usually the case, the survey covers expenditures by resident households abroad. The adjustment for resident purchases abroad is only required if the household budget survey excludes expenditures by resident households abroad or if the estimates for household consumption expenditure are based retail sales or other statistical sources which exclude purchases by resident households abroad.

The adjustment for purchases of non-residents in the domestic market

164. Direct purchases in the domestic market by non-residents are included in exports of goods and services and also as a negative entry in the household consumption. In

²⁷ Para 6.240, SNA, 2008

²⁸ These adjustment items are not applicable if the household consumption is estimated through household consumer expenditure surveys.

the use table, these are normally shown as adjustment entries in a separate row at the end of the product rows, under exports and household consumption columns (20 in table 2). However, both 1995 ESA and ICP 2011 recommend that these be broken down by types of goods and services. One way of achieving this is using the tourism satellite accounts (TSA) if the country has compiled, otherwise, distributing the total expenditures to tourism specific products and tourism connected products on the basis of a specifically conducted survey.

165. Countries that base their estimates of household final consumption on a household budget survey will never need to make this adjustment because such surveys cover only resident households. This adjustment is only required if the estimates for household consumption expenditure are based retail sales or other statistical sources which include purchases by non-resident households in the domestic market.

III. Procedures to compile Use Table

166. The use table is compiled from the data available through enterprise surveys, agricultural surveys, administrative data, foreign trade statistics and balance of payments. One approach of compiling the use table is through product balances achieved through commodity flow approach (row approach). The second procedure is using the product-wise information on intermediate consumption by industries, consumption expenditure, capital formation and exports, which is normally available from the above stated sources (column approach). However, this approach results in different values for product outputs between supply and use tables. For achieving consistency between the two tables in which total output by products is identical in both the tables, balancing procedures need to be adopted. A separate lecture note deals with the balancing procedure. Most countries adopt the column approach for compiling use table, as source data is available in this format.

IV. Applications

167. The SUTs are one of the recommended tables under the "minimum requirement data set," (MRDS) included under the scope of the compilation of 1993 SNA tables and accounts. SNA recommends that SUTs be compiled as a first step in the preparation of national accounts, as they provide consistency to the national accounts. The SUTs are also recommended for compiling expenditures values for the ICP 2011.
168. The use table is very important in the SUTs, as it provides data on (i) gross value added at basic prices by industry (production approach), (ii) breakdown of industry-wise gross value added into income components of compensation of employees, operating surplus (plus mixed income), other taxes less subsidies on production and consumption of fixed capital (income approach), and (iii) GDP at purchasers' prices as final uses minus imports, f.o.b. (expenditure approach) in a single table, thus providing a consistent and identical GDP estimate from all the approaches.
169. Another interesting feature of the use table is that it provides GDP (at purchasers' prices) disaggregated by products, as: column of total final uses in the use table,

minus, the column of imports from the supply table. Such disaggregation of GDP by products can only be derived from the SUTs.

Suggested readings:

- 1) Global Office, ICP 2011: The ICP and National Accounts Practices: Operational Material
- 2) _____: National Accounts Framework in the ICP: Operational Material
- 3) _____: Advantages of Supply and Use Tables in the International Comparison Program
- 4) Commission of European Communities, International Monetary Fund, Organisation for Economic Cooperation and Development, United Nations and World Bank (1993): System of National Accounts 1993
- 5) _____: System of National Accounts 2008
- 6) United Nations (1999): Handbook of Input-Output Table Compilation and Analysis.
- 7) Eurostat (2008): Eurostat Manual of Supply, Use and Input-Output Tables
- 8) Understanding National Accounts, François Lequiller and Derek Blades, OECD Paris 2006
National Income and Production Accounts of the USA.

Chapter 7: Balancing supply and uses

170. If the supply and use tables were based on perfect knowledge, the two sides would automatically balance for each commodity. But of course in the real world both the supply and uses sides contain many estimates that had to be made to fill gaps. The data sources for almost all commodities are incomplete and the two sides will usually not be in balance. The SUT compiler's task is to bring the two sides into balance. There are two ways of doing this – manual balancing and automatic balancing.

7.1. Manual balancing

171. “Manual balancing” means that the SUT compiler inspects the supply and use of each commodity and adjusts one or more entries so that the two sides are equal. The balancing must be done at the most detailed level – that is for each of the commodities listed in the first column of the SUT. In manual balancing we use the identity $Supply \equiv Uses$ and one estimate will always be derived as a residual.

172. Here is an example of manual balancing for the commodity *garments*.

Below are unbalanced statistics:

Domestic production at basic prices	48,920
Imports at c.i.f values	145,770

Transport costs	5,841
Trade margins	74,345
Product taxes	21,990
Subsidies	0
Total supply	296,776
Intermediate consumption	0
Government final consumption expenditure	570
NPISH final consumption expenditure	4,230
Household final consumption expenditure	291,175
Gross fixed capital formation	0
Change in inventories	-75
Exports at fob values	46,980
Total uses	342,880

Total uses are more than 15% higher than total supply. If the difference had been only one or two percent we could have made an automatic adjustment using the RAS method explained later but as the difference is so large we need to look carefully at each estimate to see where the error may lie:

- Some figures are quite firm and we should not change them. The SUT compiler decides to treat the following as firm estimates: imports, product taxes and subsidies, government and NPISH consumption expenditure, gross fixed capital formation, change in inventories and exports.
- Household final consumption expenditure is taken from a household expenditure survey. The problem with the survey is that coverage of low income households is weak. Richer households tend to spend more on garments than poorer households, so the SUT compiler assumes that the household expenditure survey has overestimated expenditure on garments. After discussion with the survey specialists, the compiler decides that expenditure on garments may be overestimated by between 4% and 5%.
- Domestic production is taken from an establishment survey but the survey was made three years ago. In addition it only covered enterprises with five or more employees but a lot of garments are made by tailors working from their homes with help from family workers and they were not covered in the survey.
- The compiler decides to reduce the household consumption estimate by 4% and to keep all the other uses the same. This gives a new estimate of total use of 331,233 – slightly lower than the unbalanced estimate of 342,880. This becomes the new control figure for total supply.

- Transport margins were originally estimated as 3% of domestic production plus imports at basic prices, and trade margins were estimated as 37% of supply at basic prices plus transport costs. Both these percentages are based on a recent trade and transport survey and are thought to be accurate. However the new domestic production that has been “discovered” is production by very small enterprises – usually just one person - and the garments they produce are sold directly to the purchaser so there are no trade margins or transport costs and no taxes on products. These three items- transport costs, trade margins and product taxes will not be changed.
- Domestic production now becomes the balancing item i.e.

$$331,233 - 145,770 - 5,841 - 74,345 - 21,990 = 83,287$$

Supply/Use	Unbalanced estimates	Balanced estimates
Domestic production at basic prices	48,920	83,287
Imports at cif values	145,770	145,770
Transport costs	5,841	5,841
Trade margins	74,345	74,345
Product taxes	21,990	21,990
Subsidies	0	0
Total supply	296,776	331,233
Intermediate consumption	0	0
Government final consumption expenditure	570	570
NPISH final consumption expenditure	4,230	4,230
Household final consumption expenditure	291,175	279,528
Gross fixed capital formation	0	0
Change in inventories	-75	-75
Exports at fob values	46,980	46,980
Total uses	342,880	331,233

In the balanced supply and use estimates for garments, a small downward adjustment has been made to household consumption expenditure on the supply side and on the uses side a large upward revision has been made for domestic

production. These revisions were based on the compiler's assessment of the reliability of the underlying data sources. The revision for domestic supply is large but there had to be a mistake somewhere and the compiler has used his/her knowledge of the data sources to make the best possible adjustment.

Note that both GDP (P) and GDP (E) will need to be revised: there is now more value added in garments manufacture and less household consumption expenditure on garments. The two new revised estimates of GDP (P) and GDP (E) will now balance and, we hope, will be more accurate.

173. Here is another example – **advertising services**. Below are the unbalanced statistics:

Domestic production at basic prices	68,000
Imports at cif values	0
Transport costs	0
Trade margins	0
Product taxes	48
Subsidies	0
Total supply	68,048
Intermediate consumption	0
Government final consumption expenditure	0
NPISH final consumption expenditure	45
Household final consumption expenditure	0
Gross fixed capital formation	0
Change in inventories	0
Exports at fob values	0
Total uses	45

Most of the cells in the unbalanced table are zero. For services there are never any transport costs, trade margins, or changes in inventories and there is usually no gross fixed capital formation. In this case there were no imports or exports either.

The only uses recorded were purchases of 45 by NPISH, but the three advertising agencies in the country reported sales of 68,000. How were the other 67,955 of advertising services used?

The SUT compiler decides that:

- Government does not usually purchase any advertising services so government final consumption expenditure will be set at zero. This means that the rest of the advertising services must have been purchased by either enterprises as intermediate consumption or by households.
- The only product taxes are value added taxes. These must have been paid by households because enterprises do not pay VAT on intermediate consumption and NPISH do not pay VAT either. VAT is charged at 10% so households must have purchased advertising services valued at 480 before tax and advertising services including VAT of $480 + 48 = 528$
- The rest of the advertising services (67,475) must have been purchased by enterprises as intermediate consumption.

Here is the balanced table for advertising services

Supply/Use	Unbalanced estimates	Balanced estimates
Domestic production at basic prices	68,000	68,000
Imports at cif values	0	0
Transport costs	0	0
Trade margins	0	0
Product taxes	48	48
Subsidies	0	0
Total supply	68,048	68,048
Intermediate consumption	0	67,475
Government final consumption expenditure	0	0
NPISH final consumption expenditure	45	45
Household final consumption expenditure	0	528
Gross fixed capital formation	0	0
Change in inventories	0	0
Exports at fob values	0	0
Total uses	45	68,048

7.2. Automatic balancing.

174. The commonest method of automatic balancing is called the RAS method. It is used to revise the internal entries in a matrix so that they agree with the margin totals. RAS is used when the margin totals – total supply/use of commodities, or total gross output by kind of activity, for example – are believed to be correct but the breakdown inside the matrix is not consistent with the margin totals.
175. The table below is a matrix of domestic production showing three commodities and three kinds of activity. The margin totals are assumed to be known accurately while the internal entries have been estimated from various less reliable sources and do not sum to the correct marginal totals. The task now is to revise the internal entries so that they agree with the correct margin totals.

Basic data: Correct Margins but Internal Entries Not Consistent

	Agriculture	Industry	Services	Row total	Correct total
Crops	<i>20,0</i>	<i>30,0</i>	<i>15,0</i>	<i>65,0</i>	70,0
Manufactures	<i>10,0</i>	<i>60,0</i>	<i>20,0</i>	<i>90,0</i>	80,0
Services	<i>40,0</i>	<i>55,0</i>	<i>5,0</i>	<i>100,0</i>	120,0
Column total	<i>70,0</i>	<i>145,0</i>	<i>40,0</i>		
Correct total	80,0	140,0	50,0		

The RAS adjustment can be seen as an iterative process in which columns and rows (or rows and columns) are successively forced to sum to the correct marginal totals. In this example the internal entries rapidly converge to the correct row and column margin totals. After four iterations the sums of the three rows are within 0.2 of the correct row totals. By the fifth iteration (not shown here) the rows and columns sum to the correct margin total at one decimal place.

Table 1. First iteration: Recalculate the Rows

	Agriculture	Industry	Services	Row total	Correct total
Crops	<i>21,5</i>	<i>32,3</i>	<i>16,2</i>	<i>70,0</i>	70,0
Manufactures	<i>8,9</i>	<i>53,3</i>	<i>17,8</i>	<i>80,0</i>	80,0
Services	<i>48,0</i>	<i>66,0</i>	<i>6,0</i>	<i>120,0</i>	120,0
Column total	<i>78,4</i>	<i>151,6</i>	<i>39,9</i>		

Correct total	80,0	140,0	50,0
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In this first iteration, each row is forced to agree with its correct row total. To achieve this, each row entry was multiplied by the ratio of the correct row total to the actual row total. The first row (Crops) was multiplied by 70/65, the second row (Manufactures) was multiplied by 80/90 and the third row (Services) by 120/100. The rows now sum to the correct totals, but the column totals are still wrong

Table 2. Second iteration: Recalculate the Columns

	Agriculture	Industry	Services	Row total	Correct total
Crops	22,0	29,8	20,2	72,0	70,0
Manufactures	9,1	49,2	22,3	80,6	80,0
Services	49,0	60,9	7,5	117,4	120,0
Column total	80,0	140,0	50,0		
Correct total	80,0	140,0	50,0		

In the second iteration, the new column totals obtained in Table 1 were forced to agree with the correct column totals. The column totals are now correct but the row totals are wrong again.

This process is repeated until the actual and recalculated row and column totals are judged to be sufficiently close.

Table 3. Third iteration: Recalculate the Rows					
	Agriculture	Industry	Services	Row total	Correct total
Crops	21,4	29,0	19,7	70,0	70,0
Manufactures	9,0	48,9	22,1	80,0	80,0
Services	50,0	62,3	7,7	120,0	120,0
Column total	80,4	140,2	49,4		
Correct total	80,0	140,0	50,0		

By the fourth iteration, the new row totals are still wrong but very close to the correct figures. After a fifth iteration, in which the row totals are recalculated, they will be close enough for most purposes.

Table 4. Fourth iteration: Recalculate the Columns

	Agriculture	Industry	Services	Row total	Correct total
Crops	21,2	29,0	19,9	70,1	70,0
Manufactures	9,0	48,8	22,4	80,1	80,0
Services	49,8	62,2	7,8	119,8	120,0
Column total	80,0	140,0	50,0		
Correct total	80,0	140,0	50,0		

176. RAS can be used in either a complete or **modified form**. In the complete form all the internal entries in the matrix will be revised; in the modified RAS certain cells or vectors, which are believed to be accurate, can be frozen and only the unfrozen entries are revised. In the modified RAS, the correct vectors or cells are removed from the matrix and new margins are calculated without these correct figures. The RAS is then performed as described above and when enough iterations have been made the correct vectors or cells are reinserted.
177. RAS can be used to ensure consistency in a bench-mark SUT and can also be used to update it when the next year's margin totals become available. If it is used for the benchmark SUT, the internal entries should be first adjusted manually so that remaining differences between supply and use are quite small – say 5% or less. Either the estimate of total supply or the estimate of total use is then taken as the correct margin figure, depending on the compiler's judgement, and the RAS procedure will eliminate any small remaining differences.
178. One final point: you do not need to go through the iteration procedure described above if your statistical software incorporates RAS. Most of them do.

Further reading:

Handbook of Input-output Table Compilation and Analysis, United Nation, New York 1996 (Studies in Methods Series F, No. 74) Chapter IX. Updating input-output tables: RAS methods.

Chapter 8: Some problematic areas

8.1. Production of goods for own consumption

179. The SNA requires that all goods that are produced should be assigned a value and included in gross output. This applies both to goods that are sold and to those that are used by the producer either as consumption goods or as capital assets. In the African context this means that GDP should include the values of crops and livestock products that many farm households produce as part of their “subsistence” income and the value of dwellings and farm buildings that many rural households build for themselves.

Crops

180. You will first need an estimate of the total production of the main food crops. This can come from agricultural surveys conducted by the statistical office, or from estimates made by the ministry of agriculture which might also be based on surveys. The food balances compiled by the FAO are another source you can use. Although these are based on statistics supplied by the countries themselves they have been edited and improved by the FAO after comparing trade statistics between countries and by applying various credibility checks such as minimum calorie consumption per person.

Table 6 : FAO Food Balance: Malawi: 2007: Million kilograms

	Production	Import	Stock Variation	Export	Domestic supply	Feed	Seed	Processing	Other Uses*	Food
Maize	3226	39	-322	392	2551	380	52	12	240	1867

* Mainly maize grain lost to pests or through bad storage.

Source: <http://faostat.fao.org/site/368/DesktopDefault.aspx?PageID=368#ancor>

181. Table 6 is from the FAO data base and shows the food balance for maize in Malawi in 2007. The food balances are in an SUT-type format except that household, NPISH and government consumption are all shown as a single column “food” and no column is included for gross fixed capital formation (because none is needed for food crops.) Of course, the FAO food balances may not be the best source for your country and you may prefer to use household survey data or some other source but in any event you will need to derive an estimate of how much of the total supply of maize was used for food – the last item in Table 6.
182. The food balance shows that 1,867 million kilos of grain were available for consumption as food. To simplify, let us suppose that there was no NPISH or government consumption of maize. In that case the SUT compiler needs to value that part of the 1867 million kilos that was bought by households from shops and markets at purchasers prices and that part that was consumed by the producers at basic (“farm-gate”) prices.

183. Here is how the SUT compiler proceeds:
- She knows that the latest household survey shows that on average 80% of maize consumed by households is from own production – i.e. 1494 million kilos. The remaining 373million kilos were bought in shops and markets.
 - The average farm-gate price of maize in 2007 was 450 kwacha per kilo. The value of consumption of maize from own production is therefore $450 \times 1494 = 672,300$ million kwacha.
 - Transport costs are about 3% of farm-gate prices and trade margins are 18% of the farm gate price plus the transport cost. There are no product taxes on basic food items like maize. She therefore calculates the purchasers price as $((450 \times 1.03) \times 1.18) = 547$ kwacha per kilo.
 - The total value of household consumption of maize is therefore: $(450 \times 1494) + (547 \times 373) = 876,331$ million kwacha.
184. There is no point in trying to cover subsistence consumption and production of every last type food crop. Focus on the main ones which in most countries will include grains like maize, sorghum, millet, rice, and wheat, root crops including manioc (cassava), sweet potatoes and yams and fruit and vegetables like pumpkins, bread-fruit, mangoes, pineapples, tomatoes, bananas, and coco-nuts.

Livestock

185. As with crops, focus on the main types of livestock products. Chicken eggs and poultry meat are important in all countries. Other foraging animals - animals that feed themselves - are also important in many countries. They include goats, ducks, geese and pigs. Cattle require extensive grazing land and are only important in a countries with low population densities - in South Africa, Botswana the Sahel, the Horn of Africa, for example.
186. Data on the total numbers of livestock will come from an agricultural or livestock census or surveys of farm households. In countries where cattle are important, the agriculture ministries may make animal counts every year. Agriculture ministries and veterinary departments can usually supply information on production and slaughter rates. These are generally similar across countries so you could borrow estimates made in a neighbouring country.
187. Here is an example of how own account consumption of poultry meat light be estimated. The compiler starts with the following basic information:
- A recent survey showed that on average, farm households each have 7 chickens.
 - The population census held two years ago showed there were 1,250,000 farm households and that the farm population was growing at 1% per year.
 - The Veterinary Department recently made a study of poultry farming and concluded that in a normal year the national poultry flock renews itself every 15 months. In other words, all the chickens alive at the beginning of the year will have been eaten by the end of the third month of the next year and replaced by the same number of new chickens.

Using this information the compiler first estimates the number of chickens slaughtered for food this year:

- Number of farm households: $1,259,000 \times 1.001^2 = 1,261,519$
- Number of chickens at the beginning of the year: $1,261,519 \times 7 = 8,830,635$
- Chickens slaughtered for food the year: $8,830,635 \times 12/15 = 7,064,508$

From the consumer price index the compiler learns that the average market price of a live chicken was *45 lari*. Although this is the purchasers' price he decides to take it as the basic, or farm-gate, price because the sellers bring their own chickens to market so there are no transport costs and he reckons that the farm-gate and market price must be virtually the same. Conclusion: household consumption of chicken meat this year was $7,064,508 \times 45 = 317,9903,860 \text{ lari}$.

Buildings

188. In many countries rural households build their own houses and farm buildings – often using a mixture of purchased inputs such as window glass, doorframes, and corrugated roofing sheets and locally collected materials such as sun-dried bricks, mud, thatch, and palm fronds. The value of these buildings is the cost of purchased materials plus the labour input to collect and process the other inputs and erect the buildings. Purchased inputs are valued at their purchasers' prices and the labour input equals the time taken multiplied by a wage rate. The minimum rural wage could be used as the wage rate.
189. The number of dwellings constructed each year has two components – new dwellings needed to house the increase in the population and dwellings needed to replace those that are demolished each year. Suppose that on average an own-constructed dwelling lasts for 19 years and the population is growing at 1.8% each year. Suppose also that there were 46,000 dwellings at the beginning of the year. With these assumptions there will need to be $0.018 \times 46,000 = 828$ new dwellings and $46,000/19 = 2,421$ replacement dwellings constructed in the course of the year – i.e. $828 + 2,421 = 3,249$ dwellings.

Similar calculations can be made for the values and numbers of the different kinds of farm buildings such as food stores and animal pens.

8.2. Estimating imputed rents for owner occupied dwellings

190. Rents for dwellings are a large component of Household Final Consumption Expenditure in all countries but they are difficult to estimate because in many countries by far the largest part of rents is for owner-occupiers and has to be

imputed. The standard procedure recommended in the SNA for owner-occupied dwellings is to assume that the rents that would be paid by owner occupiers are the same as the rents actually paid for similar dwellings. But the standard procedure cannot always be applied. This is the case where so few dwellings are rented that rents actually paid cannot be regarded as typical. For example, in some countries, most of the dwellings available for rent are occupied by foreigners or by employees of government or large public enterprises at rents which cannot be regarded as representative, while in other countries, dwellings may only be available for rent in the capital city or other principal urban areas. And of course dwellings that families construct for themselves are almost never rented to another family.

191. When the standard procedure cannot be used, expenditure on dwellings is estimated by the **user cost** method. The user cost method consists of estimating each of the costs that owners of dwellings would need to take into account in fixing a market rent if they decided to rent their dwellings to other people rather than living in them themselves. These costs are:

- Intermediate consumption:
 - Repairs and maintenance
 - Insurance service charges
- Land and property taxes
- Consumption of fixed capital
- Net operating surplus

192. Information on repairs and maintenance and on insurance could come from a household expenditure survey. Remember that the insurance cost is the service charge not the gross premium paid. In practice most dwellings will not be insured at all so this item will be zero in many countries. Land and property taxes – if any – should be available from the tax authorities. The main problems are caused by the last two items since they are both calculated as percentages of the current market value of the capital stock.

193. The standard procedure for estimating the stock of a capital asset is the Perpetual Inventory Method (PIM). The PIM requires long time series on gross fixed capital formation (GFCF) and on prices of capital assets as well as assumptions about the average service lives of assets and about how retirements of assets are distributed around this average. Most countries, however, do not have the means to derive capital stock estimates by the PIM so it is necessary to use an alternative method as follows:

- The first step is to draw up a classification of dwellings which distinguishes between the main types of owner-occupied dwellings in the country. The stocks of owner-occupied dwellings will then be estimated separately for each type. A simple classification such as traditional (own-built) dwellings, modern single family dwellings (houses or villas), and two or three size classes of apartments could be used but if more detail is available a more detailed breakdown can be used.

- Information on the numbers of dwellings may be obtained from a recent population or housing census. The population growth rate can be used to update information from the most recent census.
 - The next step is to obtain the **average price of a new dwelling of each type**. We discussed above how to estimate the price of a traditional (own-built) dwelling. New prices for modern dwellings could be obtained from estate agents or from classified advertisements' in newspapers or magazines specialising in property sales. As prices of dwellings vary according to location, prices need to be collected in all the main conurbations and averaged for the country as a whole using population densities as weights.
 - The stock of each type of dwelling is then valued at **half** of the new price for each type of dwelling. Using half of the new price assumes a) that the stock of dwellings is stable in number, and b) that dwellings lose their value by the same amount each year from when they are newly constructed until they are demolished at the end of their useful lives. These are crude assumptions and you may be able to improve on them if, for example, you know that the stock of dwellings is not stable but is actually increasing or falling.
194. Once an estimate of the current market value of the stock of dwellings has been obtained, consumption of fixed capital is most easily calculated by “geometric depreciation” this involves multiplying the stock of dwellings by a fixed coefficient. This coefficient could be $1/L$ where L is the average life of the dwelling. Countries in Europe that apply the user cost method for owner-occupied dwellings use **accelerated** depreciation meaning that depreciation is bigger than $1/L$. Some experimented with $2/L$ but in the end they agreed that this was too high and they now use $1.6/L$. This means, for example, that if L (the average life of a particular type of dwelling) is assumed to be 70 years the depreciation rate will be $1.6 / 70 = 0.023$ and consumption of fixed capital will be $V * 0.023$, where V is the current market value of the stock of dwellings.
195. The current market value of the housing stock is also used to estimate the operating surplus. The operating surplus is usually assumed to be the real (i.e. inflation adjusted) rate of return that the owner could have obtained by investing in a safe long-term financial asset instead of investing in a dwelling. European countries that apply the user cost method calculate the operating surplus at 2.5% of the value of the current market value of the housing stock. This means that the operating surplus will equal $V * 0.025$ using the notation above. (In the case of traditional, own-built dwellings, you may decide that the operating surplus is zero.)

8.3. Domestic services

196. The employment of domestic servants – cooks, maids, security guards – is seen in the SNA as production by households of services for their own consumption. These services are valued at the wages paid to domestic servants. Remember that the wages

must include income in kind and this may be an important part of the total wages paid to domestic servants. Domestic servants will often be provided with living quarter, they may be provided with shoes and clothing and they may receive food and meals. Income in kind is valued at the costs to the employer of providing the goods and services they receive as part of their wages.

8.4. Trade margins

197. Trade margins have a separate column in the SUT and are one of the adjustments to move from the supply of goods and services at basic prices to supply at purchasers' prices. Trade margins are the difference between the prices at which the traders sells goods and the prices they paid to purchase them. Some points to note:
- Trade margins include both wholesale and retail margins; no distinction is called for in the SUT.
 - There are no trade margins on services. Trade margins are only relevant for transactions in goods.
 - The trade margin is not the difference between the value of sales and the cost of goods bought for resale because some goods sold may have come out of inventories and some of the good bought for resale may have been added to inventories. Trade margins should be calculated taking account of changes in inventories. Some countries ignore this refinement but it will not usually result in significant errors.
198. In the column of the SUT showing trade margins, they are allocated to each of the goods commodities shown in the rows of the SUT. Trade margins differ between various types of goods. They are usually lower on goods with a fast turnover such as food, beverages and household consumables and higher on goods that have a lower turnover and therefore remain in stock for longer periods. Goods that generally have high trade margins include clothing and footwear, household durable goods and motor vehicles.
199. Information on trade margins usually comes from business surveys or censuses. As trade margins are fairly stable from year to year, estimates obtained from a survey even 4 or 5 years ago will still be relevant. A more important problem is that surveys often provide information on trade margins only according to type of store – grocery store, furniture store, vehicle show-room, department store, kiosk, etc – and not on the specific types of commodities sold, so there is inevitably some approximation in assigning trade margins to particular types of goods specified in the SUT.
200. Countries where subsistence agriculture is important generally record low trade margins for crops and livestock products. In general, countries with high per capita GDP will usually have higher trade margins in percentage terms than poorer countries. In richer countries, trade margins will be set to cover costs of air-

conditioning, better informed sales assistants, more elaborate displays of goods on sale, and a generally luxurious ambience.

8.5. Transport costs

201. The costs of transporting goods from where they are produced or where they arrive as imports to the place where they are acquired by purchasers, must also be added to basic values to obtain supply in purchasers' prices. Transport costs are shown in a column alongside that for trade margins and, like trade margins, transport costs must be also allocated to the various goods listed in the SUT29. Two points to note:
- As with trade margins, transport costs are incurred only on goods. Services are not transported.
 - Producers and importers may sometimes pay the costs of transporting goods to the purchaser. If so, the SNA recommends that these costs should be included in the basic price, and only transport charges "invoiced to the purchaser" are included in the transport column of the SUT.
202. Total transport costs are the earnings from freight transport by land, air, sea, and inland waterways. Most countries will have an estimate of total transport costs from their calculation of GDP from the production side and the problem is to allocate the total to each of the goods listed in the SUT. For a given mileage, transport costs depend mainly on weight. There are very marked differences in transport cost as a percentage of basic values for, on the one hand, heavy low-value goods like coal and iron ore and light high-value items such as clothing and electronic goods.

8.6. Financial intermediation services indirectly measured (FISIM)

203. All versions of the SNA defined FISIM in the same way, i.e. as the difference between interest received by banks on loans and interest paid by banks on deposits. Earlier versions of the SNA referred to this as "imputed bank service charges" while the 1993 SNA calls it "FISIM". FISIM is not new – it is just a new name!
204. However, the 1993 SNA differs from the 1968 SNA because it recommends that FISIM should be allocated to the institutional sectors that consume it – either as intermediate consumption if it is consumed by enterprises or as final consumption if it is consumed by households, government, NPISH or the rest of the world.
205. The SNA suggests that the best way to allocate FISIM is by the reference rate method. The reference rate is a "pure" interest reflecting only what borrowers charge for having to postpone consumption. FISIM paid by borrowers is the difference between the interest they actually pay and what they would have paid at the

reference rate, and FISIM paid by lenders is the difference between what they actually earn as interest and what they would have earned at the reference rate of interest. In practice countries have found it difficult to apply the SNA's reference rate system and many prefer the other alternative suggested by the SNA – namely to allocate the total FISIM according to the shares of bank loans and deposits of each sector.

206. To summarise: the supply of goods and services in the SUT will include FISIM as one component of the output of financial institutions; some of that FISIM will be shown as intermediate consumption of enterprises and the rest will be shown as final consumption by government, households, NPISH, and the rest of the world. The reference rate method is the best in theory but in practice many countries will allocate FISIM as intermediate or final consumption according to bank loans and bank deposits of each sector.

Further reading:

System of National Accounts, 1993, United Nations, New York, 1993. Paragraph 6.124 – 6.131(FISIM)

System of National Accounts, 2008, United Nations New York 2008,

Chapter 6 The Production Account, Section 7. Financial services other than those associated with insurance and pension funds.

Chapter 24 The Households Sector, Part D. Households as Producers

ICP 2003-2006 Handbook, World Bank 2006

(<http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/ICPEXT>) Chapter 10 Dwelling Services.

Chapter 9: GDP exhaustiveness

207. Ensuring the exhaustiveness of GDP is one of the most important challenges faced by the national accountants. By exhaustiveness, we mean that the GDP measure takes into account all economic activities undertaken in the economy that are included within the production boundary³⁰ of the 1993 System of National Accounts.
208. The main activities which usually get under-reported or not reported by the data source agencies are:
- informal activities,
 - illegal activities,
 - own account construction of dwellings and farm buildings
 - agricultural produce for own consumption,
 - services of owner occupied dwellings
 - paid domestic servants
 - wages paid in kind, and
 - local administrative units (at village or block level).

In addition to these activities, under-estimation of GDP can also result due to:

- defective sampling frames, especially due to the failure to keep business registers up to date
 - non-response,
 - under-reporting by establishments/enterprises etc.
209. Lack of exhaustiveness in the GDP measure results in loss of international comparability of the data and may lead to wrong policies, since many financial parameters, such as the tax collections, fiscal deficit, government debt, health and education expenditures, etc. are benchmarked to GDP estimates. Besides, this can provide incorrect GDP growth rates, which is a key indicator for measuring the performance of economy. The 2011 ICP also requires that countries ensure GDP exhaustiveness for the sake of their comparability across the countries, as purchasing

³⁰ Production boundary includes for (a) goods – (i) Production of goods for supply to units other than their producers; and (ii) Own-account production that is retained by their producers for final consumption or gross fixed capital formation; and (b) services – (iii) Individual and collective services intended to be supplied to units other than their producers, (iv) Own-account production of housing services by owner-occupiers, and (v) Domestic and personal services provided by employing paid domestic staff.

power parities (PPPs) computed using GDP expenditures might get distorted if countries do not ensure exhaustiveness.

210. The 2011 ICP recommends the use of the Eurostat “tabular approach” to ensure GDP exhaustiveness. Another document that is also frequently referred to in the context of GDP exhaustiveness is the handbook, “Measuring the Non-Observed Economy”³¹. The term “Non-Observed Economy” (NOE) refers to those economic activities which should be included in the GDP but which, for one reason or another, are not covered in the statistical surveys or administrative records from which the national accounts are compiled.
211. The different types of non-exhaustiveness described in the Eurostat tabular approach and the non-observed activities mentioned in the OECD handbook, normally overlap each other and it is difficult to estimate their various components separately. The end objective, however, is to identify and include all these items in the GDP estimates. Among the non-observed activities, informal sector is a major component in the developing countries and it is often not properly accounted in the GDP estimates.
212. This lecture note briefly outlines the Eurostat tabular approach to exhaustiveness of GDP and the OECD handbook on NOE, while covering the important aspect of informal sector and its accounting in GDP estimates, in detail. The text for the Eurostat tabular approach has been drawn from the document “National Accounts Framework in the ICP” of 2011 ICP Global Office.

9.1. Eurostat tabular approach to exhaustiveness

213. This approach provides a consistent and complete conceptual framework by classifying adjustments into seven types of “non-exhaustiveness” (listed under N1 to N7 in the table below). It also suggests suitable compilation methods (such as the employment method, fiscal audits, VAT comparisons, etc.) for the non-exhaustiveness types (indicated in bold letters in the table below).
214. The starting point in identifying the seven types of non-exhaustiveness is the production (or output) approach, by activity. Once gross output has been corrected for non-exhaustiveness, the SUT provides the framework for correcting the estimates of intermediate and final consumption.

Table 7 : The Eurostat tabular approach to exhaustiveness

³¹ OECD, IMF, ILO, and CIS STAT (2002)

Not registered	N1 - Producer deliberately does not register (underground activity)	<p>The producer does not register in order to avoid tax and social security obligations or to avoid losing some social benefits. Typically this category includes small producers with income above the threshold set for registration. Producers who do not register because they are engaged in illegal activities should be classified to N2, while producers who deliberately misreport their activities should be classified to N6.</p> <p>The methods that can be used to estimate the adjustments required include labor inputs (from household-based labor force surveys), commodity flows and supply-use tables.</p>
	N2 - Producer deliberately does not register (illegal activity)	<p>The producer deliberately fails to register because he is involved in illegal activities such as prostitution, sale of stolen goods, dealing in drugs, smuggling, illegal gambling, etc. This category excludes any illegal production not reported by registered producers (which should be classified to N6) and illegal production by units not required to register (classified to N3).</p> <p>The methods that can be used to estimate the adjustments are the quantity-price method, unit per input or use, and expert judgment.</p>
	N3 - Producer not required to register	<p>Such producers are not required to register because they do not have any market output or it is below a set threshold. Activities include production for own final consumption, own fixed capital formation including construction of own dwellings and repairs to dwellings. They also include market output of households that is below the level at which the producer is obliged to register as a business, paid domestic services, etc. No adjustment is necessary if the estimation method for a particular activity (or survey) implicitly takes account of the non-registered activity.</p> <p>The methods that can be used to estimate adjustments are household expenditure surveys, building permits, commodity-flow methods, administrative data and time use surveys.</p>
Not surveyed	N4 - Legal producers not surveyed	<p>Legal producers who may be registered can still be excluded from statistical surveys. For example, the producer may be newly registered and not yet recorded on the business register because the register updating procedures may be slow or inadequate. On the other hand, a producer may be recorded on the business register but still could be excluded from survey frames because classification data used in developing the frames (e.g. activity code, size of business, geographic location) might be wrong, or there may be a size cut-off that precludes the producer from being selected to participate in a particular survey.</p> <p>The methods that can be used to estimate adjustments are surveys of the quality of the business register, a review of the lags involved in update procedures and whether they change over time, or cross checking the business register against other administrative sources of businesses.</p>
	N5 - Registered entrepreneurs not surveyed	<p>Registered entrepreneurs (e.g. consultants, private writers, freelance journalists) may not be recorded in the business register, either deliberately or because the register updating sources do not include details of such persons. Even if their details are recorded in the business register they may be excluded from statistical surveys either because of errors in details recorded (e.g. activity code, size of business, geographic location) or because of the small size of their individual activities.</p>

		The methods that can be used to estimate adjustments are surveys of the quality of the register, cross-checking against other administrative sources (e.g. income tax statements) or via specialized surveys.
Mis-reporting	N6 - Misreporting by producers	<p>Misreporting involves under-reporting gross output (and therefore revenues) and/or over-reporting intermediate consumption (and therefore the costs of production) in order to avoid paying income tax, other taxes such as value added tax (VAT), or social security contributions. Misreporting may involve maintaining two sets of books to conceal the full extent of sales, hidden secondary activities, cash settlements for sales that are unrecorded because no receipts are given, VAT fraud, salaries paid in cash to avoid social security payments or employment taxes (so-called “envelope salaries”) or salaries recorded as external contractual services.</p> <p>The methods that can be used to estimate adjustments are data from tax audits, comparing average salaries and profits with similar businesses, comparing input/output ratios with those of similar businesses, special surveys and expert judgment on the accounting relationships expected to be observed in such businesses.</p>
Other	N7 - Other statistical deficiencies	<p>This category can be divided into two parts - data that are incomplete or cannot be directly collected from surveys, or data that are incorrectly compiled during survey processing.</p> <p>The items that should be considered in determining the adjustments to be made include how non-response was taken into account, the extent to which wages and salaries were paid in kind, production for own final use by market producers, tips, valuation techniques and adjustments for accruals.</p>

9.2. Non-Observed Economy

215. The handbook, “*Measuring the Non-Observed Economy*” is another important document which provides guidelines on measuring the non-observed economy which encompasses the informal sector as one of its components. Non-observed activities are those that are missing from the basic data used to compile the national accounts because they are underground, illegal, informal, household production for own final use, or due to deficiencies in the basic data collection.

216. The 5 components of the NOE mentioned in the handbook are:

- Economic Underground
 - (1) Underground Production
 - (2) Illegal Production
 - (3) Informal Production
- (4) Household Production for own final use
- (5) Statistical Underground

217. The underground production refers to the deliberate concealment of legal activities from public authorities to avoid payment of taxes, social security contributions, meeting certain legal standards, like minimum wages, health and safety regulations, compliance costs (filling up of returns, etc) or to claim unemployment benefits.
218. The illegal production is defined as “all illegal actions that fit the characteristics of transactions – notably that there is mutual consent – are treated in the same way as legal actions”. The illegal production covers activities forbidden by law, such as production of goods and services whose production or sale is forbidden by law, and activities which are usually legal but illegal for unauthorised producers.
219. The informal sector, as defined by the 15th International Conference of Labour Statisticians, covers “units engaged in production of goods/services with primary objective of generating employment and incomes to the persons concerned”. These units typically operate at low level of organization, with little/no division between labour and capital and on a small scale. Labour relations, where they exist, are based mostly on casual employment, kinship or personal and social relations rather than contractual arrangements. A vast majority of informal sector activities provide goods and services whose production and distribution are perfectly legal.
220. The household production for own final use includes production of crops, livestock, other goods, construction of own houses, imputed rents, and services produced by domestic servants.
221. The statistical underground refers to production missed due to deficiencies in data collection programme, undercoverage of enterprises, non-response, under reporting and conceptual issues such incorrect treatment of tips and wages and salaries in kind.
222. The handbook outlines the action on two fronts for measurement of NOE:
 - improvements in direct measurement by the data collection programme, resulting in fewer non-observed activities and hence fewer non-measured activities; and
 - improvements in indirect measurement during compilation of the national accounts, resulting in fewer non-measured activities.

9.3. Accounting for Informal Sector

223. Informal economy encompasses the informal sector enterprises and informal employment. In most developing countries, the informal sector and informal employment account for a significant share in the employment and gross domestic product (GDP). As an example, India’s informal sector accounted for 93% of total employment including agriculture and 82.4% of employment in non-agricultural economic activities in the year 2004-05. The informal sector generates almost 50% of India’s GDP.

224. Availability of separate data on employment and output in the informal sector is important for policy purposes, besides helping in measuring the GDP exhaustively. However, this sector is often missed in the current surveys and data collection mechanisms in the countries due to various reasons. This calls for procedures to identify the informal sector and laying down a methodology to measure its contribution, either directly or indirectly.
225. There are several documents and guidelines available in the public domain on the issues relating to informal sector. Some of these are, (i) proceedings of 15th International Conference of Labour Statisticians (ICLS) on informal sector (1993) and 17th ICLS on informal employment (2003), (ii) System of National Accounts 1993, (iii) OECD publication Measuring the non-observed Economy, A Handbook, (iv) UN-ECE publications Non-observed Economy in National Accounts: Survey of Country Practices (2003, 2008) (v) Delhi Group deliberations and recommendations, (vi) several ILO documents on informal sector and (vii) Chapter 25 on Informal Aspects of the Economy, System of National Accounts, 2008. Another development in this context is the launching of the Project “Interregional Programme of Technical Cooperation on the Measurement of the Informal Sector and Informal Employment” by the UN regional commissions under the leadership of the UN Economic and Social Commission for Asia and the Pacific (ESCAP).

9.4. Conceptual Framework for Informal Sector and Informal Employment

9.4.1. Informal Sector

226. The term “informal sector” is used to denote tiny units, engaged in the production of goods and services but whose activities were not recognized, recorded, protected or regulated by the public authorities and includes a wide range of activities from street vending, shoe-shining, food processing and other petty activities requiring little or no capital and skills to activities involving some amount of skill and capital such as tailoring, repair of electrical and electronic goods, and operation of transport equipment. The definitional and measurement issues of this sector outlined in some important documents are summarized below:

(a) 15th ICLS and 1993 SNA

227. In 1993, the ILO included a resolution in the ICLS (15th ICLS) giving a conceptual framework and guidelines for the collection of statistics on the informal sector. The resolution was intended to provide the first internationally approved technical guidelines for the development of statistics on the sector. The resolution also led to including informal sector accounting in the 1993 SNA. The 1993 SNA characterised the informal sector as consisting of units engaged in the production of goods or services with the primary objective of generating employment and income to the persons concerned.

228. The broad characteristics of the informal sector outlined in 15th ICLS and 1993 SNA are that these are:

- Private Un-incorporated Enterprises owned by households (Enterprises owned by individuals or households that are not constituted as separate legal entities independent of their owners), as part of the household sector in SNA, with further bifurcation as (i) Own-account enterprises (that do not employ employees on a continuous basis) and (ii) Enterprises of employers (that employ one or more employees on a continuous basis). (There is also a terminology difference between the ICLS and the SNA, although ICLS terms the informal sector as a sub-sector of household sector of SNA. The informal sector referred to in the 15th ICLS refers to a group of producing units, whereas the household sector in SNA refers to an institutional unit consisting of both production and consumption units);
- Units for which no complete accounts are available that would permit a financial separation of the production activities of the enterprise from other activities of its owners;
- Produce *at least some* of their goods or services for market (sale or barter) (as against the SNA concept of market producers as those that sell *most or all* of their production on the market at economically significant prices);
- Produce goods and services using labour as input (as against the SNA concept which also includes production for own consumption without using labour as output, such as owner occupation of dwellings). The ICLS recognized that depending on national circumstances, certain production units of the households sector may fall outside the distinction between formal and informal sectors, such as the units exclusively engaged in (i) agricultural activities, (ii) production of goods for own final use, and (iii) production of services for own final consumption by employing paid domestic workers;
- refers to a group of production units based on their characteristics, irrespective (i) kind of workplace where the productive activities are carried out, (ii) extent of fixed capital assets used, (iii) duration of the operation of the enterprise (perennial, seasonal or casual), (iv) operation as a main or secondary activity of the owner;
- The employment size of the enterprise is below a certain threshold (to be determined according to national circumstances);
- And/or not registered under specific form of national legislation.

(b) Expert Group on Informal Sector Statistics (Delhi Group)

229. The “Expert Group on Informal Sector Statistics” commonly known as the “Delhi Group” was set up in 1997 as one of the city Groups of United Nations Statistical Commission (UNSC) to address various methodological issues involved in the treatment of the informal sector.

230. The Delhi Group held 12 meetings since its inception and came to the conclusion that the informal sector manifests itself in different ways in different countries. Therefore, national definitions of the informal sector cannot be fully harmonised. It

recommended that international agencies should disseminate informal sector data according to the national definitions used. In order to enhance the international comparability of informal sector statistics, the Delhi Group adopted several recommendations, principal among them are:

- (i) All countries use the criteria of legal organisation (un-incorporated enterprises), of type of accounts (no complete set of accounts) and of product destination (at least some market output);
- (ii) Specification of the employment size limit of the enterprise in national definition of the informal sector is left to the country's discretion. For international reporting, however, countries should provide figures separately for enterprises with less than five employees. In the case of multiple-establishment enterprises, the size limit should apply to the largest establishment;
- (iii) Countries using household surveys or mixed surveys should make an effort to cover not only persons whose main job is in the informal sector, but also those whose main job is in another sector and who have a secondary activity in the informal sector.

231. The current ongoing activity of the Delhi Group is the preparation of Manual on Surveys of Informal Employment and Informal Sector by the ILO.

(c) 2008 SNA

232. Chapter 25 of 2008 SNA, "Informal aspects of the economy" summarises the definitional and measurement issues dealt by the ICLS and the handbook on NOE and supplements these with the identification of informal sector units and approaches for collecting data from them.

233. The chapter examines the characteristics of production units and tries to identify those significant for the non observed economy, the informal sector or both. The chapter also discusses the differences in terminology and concepts between the SNA & ICLS, especially on 'sector'³², 'enterprise'³³, and 'sub-sectoring production'³⁴.

³² ICLS refers informal sector to a group of production units, whereas the SNA refers a sector to an institutional unit.

³³ The use of unincorporated enterprise in the ILO description of the informal sector does not correspond to the totality of unincorporated activity of a household but to each activity separately. In SNA terms, the unincorporated enterprise is broken down into a number of unincorporated establishments, some of which may be included in the informal sector and some excluded, even for the same household. Further, the ILO identifies individual members of a household as owning each establishment/enterprise and capable of employing workers. In the SNA, it is the household collectively that is responsible for all activity and for employing workers. (Para 25.50, SNA, 2008)

³⁴ Producers for own final use need to be sub-divided into those where some of the production is for sale or barter and those where the production is exclusively for own final use for the ILO concept. In the case of unincorporated enterprises where only some of the production is sold or bartered, all of the production of the unit of those goods and services is still included in production by the informal sector. (Para 25.51, SNA, 2008)

234. The 2008 SNA notes that ICLS always regarded informal sector as a subset of household unincorporated enterprises operating within the production boundary of the SNA. Thus, for identification of informal sector, the SNA household sector is divided into:

- households containing an unincorporated enterprise that is registered or has more than a given number of employees;
- institutional households, such as prisons, religious orders and retirement homes etc.;
- households with no unincorporated enterprises;
- households only undertaking production for own final use (services of owner occupied dwellings, subsistence farming, and services of paid domestic staff);
- **Informal sector enterprises** (Households containing unincorporated enterprises that are not registered and/or have less than given number of employees)
 - **without employees "informal own-account enterprises"**
 - **with employees "enterprises of informal employers"**

235. The operational guidelines to identify activities undertaken by informal enterprises within the national accounts are in the following manner:

- exclude the following from SNA households sector
 - Institutional households such as prisons, and retirement homes
 - Households with no production activity
 - Produce exclusively for own final use
 - Households whose only activity is the production of services from owner-occupied dwellings, the production of services by employing domestic staff
 - NPISH, if included in household sector
 - Agricultural production
 - Households with enterprise that is registered or has more than a given number of employees
- to consider national practices in establishing the households sector to see if any adjustment to the first step is necessary.
- to provide a breakdown by type of activity so that common exclusions according to type of activity can be made.

9.4.2. Informal Employment

236. As a consequence of rapid economic development and specialization of services and the increase in demand for labour resources in the recent past, the business community has moved towards outsourcing of services. This phenomenon has contributed to the development of more casual arrangements between owners of enterprises and those contributing labour services in the form of informal employment.

237. Informality of employment is characterized by absence of contracts, social protection, entitlement to certain employment benefits and not being subject to

labour legislation or taxation. Broadly, the informal employment comprises informal jobs both in informal and formal enterprises and in households. A person can simultaneously have two or more formal and/or informal jobs. Due to the existence of such multiple job holding, jobs rather than employed persons are taken as the observation units for employment.

238. The conceptual framework of the informal employment endorsed by the 17th ICLS relates the enterprise-based concept of employment in the informal sector in a coherent and consistent manner with a broader, job-based concept of informal employment. There are five categories of jobs considered by the ILO. These are:

- a) own-account workers (the self-employed in SNA terms);
- b) heads of unincorporated enterprises with employees, treated as employers;
- c) unpaid family workers contributing labour to the unincorporated enterprise;
- d) employees; and
- e) members of producers' cooperatives.

239. Informal employment can be identified from the above five categories of jobs. Formal enterprises provide informal jobs only as employees or contributing family workers. Informal enterprises may offer any of the five types of informal jobs and also formal jobs. Households provide informal jobs as own-account workers, employees and family workers. Some domestic staff may have formal jobs.

9.4.3. Presenting data on informal sector and informal employment

240. For the reasons that the informal sector (i) comprises a group of production units (rather than as a sector in SNA concept), (ii) do not maintain complete accounts and (iii) its activities cannot be separated from other activities of the owners (other income flows, consumption and capital formation cannot be segregated between the activities and households to which the owners belong), it is not possible present their full sequence of accounts, according to 2008 SNA. However, since the informal sector comprises a group of production units engaged in industrial activities, it is possible to present the production and generation of income accounts, in the same manner as these accounts are compiled for activities.

241. The 2008 SNA recommends that where possible two supplementary tables should be prepared, one covering production and the generation of income and one covering employment.

- **Production and generation of income**

- Production
 - *of which* for own use
- Intermediate consumption
- Value added
- Compensation of employees
- Gross mixed income
- Consumption of fixed capital

- Net mixed income.
- **Employment**
 - *Employment in the informal sector*
 - formal jobs
 - informal jobs
 - *Informal employment outside the informal sector*
 - in the formal sector
 - in other household unincorporated enterprises.

9.4.4. Approaches to measuring activities undertaken in the informal economy

242. The approaches for measuring the informal sector and informal employment have been discussed in detail in the documents mentioned above, especially, the handbook on NOE and the “Interregional Programme of Technical Cooperation on the Measurement of the Informal Sector and Informal Employment”. The 2008 SNA suggests either direct or indirect approaches to measure the informal sector, through the following surveys:

- Household surveys
 - Mainly labour force surveys
- Establishment surveys
- Mixed household-enterprise surveys (In these surveys (also known as 1-2 surveys), an enterprise module is attached to the labour force or other household surveys, and information on the activities of the enterprises is collected from the entrepreneurs identified in the household surveys. In another variant of these mixed surveys, informal sector enterprises are identified through household survey and information is collected from these identified units).

(a) Direct approach

243. The activities undertaken in the informal sector are measured through direct approaches in which data on output (if possible by products), intermediate consumption and changes in inventories are collected from the informal sector enterprises, through the establishment surveys or mixed household-enterprise surveys. Generally, the production approach is considered the best approach to estimate informal sector value added.

(b) Indirect approach

244. One of the indirect approaches to estimate the output of informal sector in particular and the non observed economy in general, is through the labour input method suggested in the Handbook on Non-Observed Economy. This procedure involves three basic steps: (i) obtaining estimates of the supply of labour input to GDP, according to kind of economic activity and size of enterprise, from a household

labour force survey, population census and/or other demographic sources; (ii) obtaining estimates of output per unit of labour input and value added per unit of labour input for the same activity and size breakdown from regular or special purpose enterprise survey; and (iii) multiplying the labour input estimates by the per unit ratios to get output and value added for the activity and size categories.

245. It is generally observed that establishment surveys under-report employment numbers, as informal sector units may conceal employment in order to evade taxes or administrative regulations. Therefore, direct estimation of informal sector through establishment surveys could result in under-estimation of informal sector GDP. On the other hand, the labour input method takes care of this under-estimation by using the workforce data from labour force surveys/population censuses. These sources are expected to give a more complete coverage of labour input to GDP than the enterprise surveys, and therefore, would provide a basis for GDP exhaustiveness and consistent estimates between employment and output. Also, persons engaged in illegal activities and underground production may report as workers in the labour force surveys, and thus the labour input method ensures covering more NOE activities, besides the informal sector.
246. For the labour input method, it is necessary to prepare a labour input matrix for estimating the formal and informal jobs, by activity and by institutional sectors with further disaggregation within household sector by formal and informal units. Such detailed data are generally available in the labour force or other demographic surveys. Alternatively, the employment by activity in the formal sector available from regular enterprise/establishment surveys or administrative sources could be subtracted from the overall estimates of jobs obtained from the labour force surveys, to derive the data on informal jobs/jobs in informal sector, in various institutional sectors and informal sector units, as a residual. It is important to go through the reconciliation process when more number of sources are used, to prepare the labour input matrix.

9.5. A case study on measuring informal sector with India's data

247. Essentially, measuring value added in the informal sector through the labour input method requires two data sets, namely, (a) employment in the informal sector and (b) value added per worker (VAPW), at as detailed activity levels as possible, with further break-downs by rural and urban areas. The Indian employment & unemployment (EUS) and enterprise surveys provide such data and have been used to estimate value added and employment in 'informal sector', and 'informal employment', in accordance with the guidelines provided in 15th and 17th ICLS.

(i) Estimates of employment in informal sector and informal employment

248. The type of data that is available from the EUS surveys, the concepts and definitions used for 'informal sector' and 'informal employment' and the estimates are presented below.

A. Type of data that is available from India's EUS

a) Enterprise types for the following categories:

- i) proprietary male (code '1')
- ii) proprietary female (code '2')
- iii) partnership with members from same household (code '3')
- iv) partnership with members from different household (code '4')
- v) government/public sector (code '5')
- vi) public/private limited company (code '6')
- vii) cooperative societies/trust/other non-profit institutions (code '7')
- viii) employer's household (code '8')
- ix) other (code '9')

b) Number of workers in the enterprise for the following categories:

- i) less than 6 (code '1')
- ii) 6 to 9 (code '2')
- iii) 10 and above but less than 20 (code '3')
- iv) 20 and above (code '4')
- v) not known (code '9')

c) Type of job contract for the following categories:

- i) no written job contract (code '1')
- ii) written job contract for 1 year or less (code '2')
- iii) written job contract for more than 1 year to 3 years (code '3')
- iv) written job contracts for more than 3 years (code '4')

d) Status of employment for the following categories:

- i) Own Account Worker (code '11')
- ii) Employer (code '12')
- iii) Unpaid Family Worker (code '21')
- iv) Regular salaried / wage employee (code '31')
- v) Casual wage labourer in public works (code '41')
- vi) Casual wage labourer in other types of work (code '51')

B. Definitions adopted for 'informal sector' and 'informal employment'

i) Formal sector: All enterprises in the public sector, private corporate sector, and household enterprises employing more than 5 workers.

ii) Informal Sector: All household enterprises having less than equal to five workers.

iii) Formal Jobs: Principal Jobs which are regular salaried or wage employee and are subject to written contracts for more than one year.

iv) Informal Jobs: All subsidiary jobs and principal jobs other than those classified as formal jobs

249. The labour input matrix derived from processing the micro-data of 2004-05 EUS is presented below:

Table 8 : Labour Input Matrix for 2004-05 for the overall economy

Year	Institution/Sector		Number of Jobs in '00000)			% to total Jobs			% to total Jobs within institution		
			Formal Jobs	Informal Jobs	Total	Formal Jobs	Informal Jobs	Total	Formal Jobs	Informal Jobs	Total
2004-05	1. Formal Sector	1.1 Public Sector	166	84	250	3.0	1.5	4.5	66.4	33.6	100.0
		1.2 Private Corporate Sector	51	86	137	0.9	1.5	2.5	37.4	62.6	100.0
		1.3 Household Sector excluding Informal Sector	25	440	465	0.5	7.9	8.4	5.4	94.6	100.0
		total formal sector	242	609	852	4.4	11.0	15.3	28.5	71.5	100.0
	2. Informal Sector	7	4,707	4,713	0.1	84.6	84.7	0.1	99.9	100.0	
	Total	249	5,316	5,565	4.5	95.5	100.0	4.5	95.5	100.0	

250. It is possible to construct a labour input matrix on the lines of Table 8, for each of the economic activities. The following two tables, 9 and 10 present the labour input matrices at broad industry group level.

Table 9 : Labour Input Matrix for 2004-05 at the industry level

(Number of Jobs in '00000)

Sl.No.	Industry	Public Sector		Pvt. Corp. Sector		Household Sector excl. infl. sector		Informal Sector		Total Economy		
		Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Total
1	Agri. & allied	0.9	2.0	0.2	0.6	0.2	22	0.0	3363	1.4	3387	3388
2	Non-agri. activts.	165	82	51	85	25	418	6.6	1344	248	1929	2177
2.1	Manufacturing	6.9	3.1	21	43	11	163	1.1	355	40	564	603
2.2	Construction	1.2	15.2	0.4	7.3	0.7	135	0.1	159	2.4	316	318

Sl.No.	Industry	Public Sector		Pvt. Corp. Sector		Household Sector excl. infl. sector		Informal Sector		Total Economy		
		Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Total
2.3	Trade and hotels	1.0	1.0	2.7	5.4	3.3	47	1.7	478	8.7	531	540
2.4	Others	156	63	27	30	10	74	3.7	353	197	519	716
3	Total	166	84	51	86	25	440	6.6	4707	249	5316	5565

Table 10 : Labour Input Matrix for 2004-05 at the industry level – shares (%)

Sl.No.	Industry	Public Sector		Pvt. Corp. Sector		Household Sector excl. infl. sector		Informal Sector		Total Economy		
		Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Total
1	Agri. & allied	0.02	0.04	0.00	0.01	0.00	0.4	0.00	60.4	0.02	60.9	60.9
2	Non-agri. activts.	3.0	1.5	0.9	1.5	0.45	7.5	0.12	24.2	4.5	34.7	39.1
2.1	Manufacturing	0.12	0.06	0.4	0.8	0.2	2.9	0.02	6.4	0.7	10.1	10.8
2.2	Construction	0.02	0.3	0.01	0.13	0.01	2.4	0.00	2.9	0.04	5.7	5.7
2.3	Trade and hotels	0.02	0.02	0.05	0.10	0.06	0.8	0.03	8.6	0.2	9.5	9.7
2.4	Others	2.8	1.1	0.48	0.53	0.2	1.3	0.07	6.3	3.5	9.3	12.9
3	Total	3.0	1.5	0.92	1.5	0.45	7.9	0.12	84.6	4.5	95.5	100.0

(ii) Estimates of VAPW by activity

251. The estimates of VAPW by activity for the informal sector units can be derived from India's periodic enterprise surveys (usually carried out once every 5 years for each activity). These enterprise surveys typically cover units in household sector and corporations, except in the case of manufacturing industry, for which the enterprise survey covers only the household enterprises.

252. These enterprise surveys provide information on value added, employment, etc. separately for the units covered under private corporate sector and the household sector, by size of employment. Using the micro-data of these surveys, VAPW can be estimated for each activity for the informal sector as the ratio of gross value added to the total employment in all the units in that activity.

253. The GVA of the informal sector of a particular activity is the product of gross VAPW and the workforce in that industry group in the same year. Since, data on primary activities of agriculture and mining are generally available from

administrative sources, the labour input method is adopted mainly for the informal sector in industry and services.

254. In Table 11, estimates of GVA for the informal sector and informal employment and their contribution to the overall GDP estimates have been presented. Here, the GVA per employee of informal workers across all the institutional sectors has been taken to be the same as the GVA per employee available for the informal sector.

255. The Table 11 has been disaggregated to industry level in Tables 12 and 13.

Table 11 : Estimates of GVA for 2004-05

Ye ar	Institution/Sector	GVA at current price (in Rs.10bn.)			% to total GDP			% to total GVA with in institution			
		Formal Job	Informal Job	Total	Formal Job	Informal Job	Total	Formal Job	Informal Job	Total	
2004-05	I. Formal Sector										
	1.1 Public Sector	587	94	682	19.8	3.2	23.0	86.2	13.8	100.0	
	1.2 Private Corporate Sector	572	39	611	19.3	1.3	20.6	93.6	6.4	100.0	
	1.3 Household Sector excluding Informal Sector	51	200	250	1.7	6.7	8.4	20.2	79.8	100.0	
	total formal sector	1,210	333	1,543	40.8	11.2	52.0	78.4	21.6	100.0	
	2. Informal Sector	156	1,268	1,424	5.3	42.7	48.0	11.0	89.0	100.0	
Total	1,367	1,601	2,968	46.1	53.9	100.0	46.1	53.9	100.0		

Table 12 : Estimates of GVA for 2004-05 at the industry level

(in Rs.10bn.)

Sl.No.	Industry	Public Sector		Pvt. Corp. Sector		Household Sector excl. infl. sector		Informal Sector		Total Economy		
		Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Total
1	Agri. & allied	18	0	15	0	0	3	0	524	33	527	560
2	Non-agri. activts.	570	94	557	39	50	196	156	744	1334	1074	2407
2.1	Manufacturing	64	1	214	13	3	50	0	108	282	171	453
2.2	Construction	16	8	56	4	0	67	0	79	72	158	230
2.3	Trade and hotels	6	1	97	4	2	32	1	333	107	370	477

<i>Sl.No.</i>	<i>Industry</i>	<i>Public Sector</i>		<i>Pvt. Corp. Sector</i>		<i>Household Sector excl. infl. sector</i>		<i>Informal Sector</i>		<i>Total Economy</i>		
		<i>Forml jobs</i>	<i>Infl. jobs</i>	<i>Forml jobs</i>	<i>Infl. jobs</i>	<i>Forml jobs</i>	<i>Infl. jobs</i>	<i>Forml jobs</i>	<i>Infl. jobs</i>	<i>Forml jobs</i>	<i>Infl. jobs</i>	<i>Total</i>
2.4	Others	484	84	190	18	45	47	155	225	873	374	1247
3	Total	587	94	572	39	51	200	156	1268	1367	1601	2968

Table 13 : Estimates of GVA for 2004-05 at the industry level – shares (%)

Sl.No.	Industry	Public Sector		Pvt. Corp. Sector		Household Sector excl. infl. sector		Informal Sector		Total Economy		
		Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Forml jobs	Infl. jobs	Total
		1	Agri. & allied	0.61	0.00	0.51	0.00	0.00	0.1	0.00	17.7	1.11
2	Non-agri. activts.	19.2	3.2	18.8	1.3	1.68	6.6	5.26	25.1	44.9	36.2	81.1
2.1	Manufacturing	2.16	0.03	7.2	0.4	0.1	1.7	0.00	3.6	9.5	5.8	15.3
2.2	Construction	0.54	0.3	1.89	0.13	0.00	2.3	0.00	2.7	2.43	5.3	7.7
2.3	Trade and hotels	0.20	0.03	3.27	0.13	0.07	1.1	0.03	11.2	3.6	12.5	16.1
2.4	Others	16.3	2.8	6.40	0.61	1.5	1.6	5.22	7.6	29.4	12.6	42.0
3	Total	19.8	3.2	19.27	1.3	1.72	6.7	5.26	42.7	46.1	53.9	100.0

9.6. Summing Up

256. Table 7 on the Eurostat Tabular Approach suggests various methods to achieve GDP exhaustiveness. The Handbook on NOE also provides guidelines on accounting for the NOE activities in the GDP estimates. However, informal sector is a major activity in NOE and accounting for informal sector in the GDP estimates and has been a major challenge to the countries.

257. The practical approach to measuring informal sector is through the labour input method, which requires countries to prepare a labour input matrix depicting formal and informal jobs, by activity and by institutional sectors (household sector further divided into formal and informal units), from the labour force or demographic surveys or population censuses. Once the labour input matrix is prepared and employment in informal sector estimated, the VAPW can be estimated either from the data collected through the enterprise surveys or from other sources and expert judgements. If the enterprise surveys cover only formal units, the VAPW of informal sector units can be assumed to be equivalent to the VAPW of lowest employed formal units or a percentage of that. Another alternative could be to impute the VAPW of informal sector employee to that of per household consumption expenditure, on the assumption that the informal sector employee is meeting the household expenditures. However, the choices for estimating VAPW would vary between the countries, depending on the data sources and living conditions and characteristics of informal sector. Accounting for informal sector in GDP estimates through the labour input method takes care of some of the other NOE activities like the illegal and underground production, as persons engaged in these activities may report as employed in labour force surveys.

258. Generally, the GVA estimates of informal sector are prepared for a benchmark year using the labour input methods or benchmark surveys; and for other years, the

benchmark GVA estimates are extrapolated with appropriate proxy indicators relevant to the economic activity (these vary from activity to activity and could be formal sector growth rates, growth in consumption expenditure or employment, etc.).

PART 3: Data requirement

Chapter 10: Minimum data requirement for compiling SUT

259. Construction of SUT requires information from various sources on the following components of supply and use, disaggregated by products:

- **Supply**
 - Domestic output by industries
 - Imports
 - Goods
 - Services
 - Cif-fob adjustment
 - Purchases of residents abroad (no adjustment needed if it is included in the balance of payment statistics)
 - Trade margins
 - Transport costs
 - Taxes on products
 - Subsidies on products

- **Use**
 - Intermediate consumption by industries
 - Exports
 - Goods
 - Services
 - Purchases of non-residents in the domestic economy (no adjustment needed if it is included in the balance of payment statistics)
 - Household consumption expenditure
 - Adjustment items (no adjustment required if the estimates are based on household income-expenditure surveys)
 - Resident purchases abroad
 - Purchases of non-residents in the domestic economy
 - Consumption expenditure of NPISHs
 - Government consumption expenditure
 - Individual consumption
 - Collective consumption
 - Gross fixed capital formation
 - Change in inventories
 - Valuables

- **Value Added components**
 - Compensation of employees
 - Other taxes on production
 - Other subsidies on production
 - Consumption of fixed capital

- Net operating surplus/mixed income

260. It is clear that construction of SUT in the manner it is recommended to be compiled is very data demanding and uses information available in the statistical system from all sources, namely, censuses, surveys, administrative data, small scale sample surveys/studies, and expert judgements. The data requirements for constructing SUTs go beyond those required for preparing goods and services account in the national accounts, to the extent of individual product levels.

261. For constructing quality SUTs, countries ideally need detailed and independently available data at product level for each component of supply and use tables. Availability of such detailed data makes it possible to mix and confront different sources of data through the supply and use framework, so that weaknesses in the data systems, including their meeting national accounts concepts, are identified and appropriate adjustments made in the source data.

262. However, in reality, the economic database that is available in the countries (especially, in the developing countries) is much less than the ideal situation. Non-availability of complete data may affect the quality of SUTs (and consequently the national accounts) to some extent, but SUTs is the ideal framework (with its in built cross-checks and balances) to maximise the quality of national accounts, even with limited source data. Therefore, it is all the more important to use SUT framework for national accounts compilations (and more particularly for GDP expenditures by products for the 2011 ICP), when source data is incomplete. In such situations, countries may be required to adopt commodity-flow approaches, use auxiliary data sources, small sample surveys or studies or even be required to borrow ratios from neighbouring countries or similar economies and use expert judgements, wherever necessary.

263. The major sources for economic data are the following:

- Agricultural surveys and censuses
- Area, yield and prices of crops
- Livestock censuses and annual surveys on yield of livestock products
- Administrative statistics on agriculture, livestock, forestry and fishing
- Administrative data on mining (output of minerals) from regulatory bodies
- Economic censuses
- Annual manufacturing surveys
- Annual enterprise surveys covering all non-agricultural economic activities
- Accounts of companies/corporations – government owned and private
- Financial statistics from central bank
- Regulatory agencies of insurance companies
- Government budget documents/government finance statistics
- Administrative data for utilities and services (such as, electricity, gas, telecom, transport, airlines, etc.)
- Industry associations and commodity boards
- Tax data, disaggregated by products
- Research organisations
- Labour force surveys and population censuses
- Household income-expenditure surveys

- Retail trade surveys
- Capital expenditure and inventory surveys
- Merchandise trade from customs authorities
- Balance of payment statistics

264. All the above stated sources may not be available in the countries. Therefore, countries may have to resort to a combination of these sources, mix and match the data from different sources and apply commodity flow approaches, for compiling SUTs. Sometimes, the source data may restrict estimation of a component of SUTs only at broad commodity level (for example, cereals, food products, fuel, personal services, office expenses, travel, energy consumption, etc.). In such cases, further break-up of broad-product level expenditures to detailed product levels need to be done on the basis of small surveys or studies, or even using neighbouring countries' ratios with similar economic structure. The weighting diagrams of PPIs or CPIs or expert opinions could be other options.

10.1 Columns of domestic output (in supply table) and intermediate consumption (in the use table) by products and industry

265. The requirement of data for these components is the output and intermediate consumption by products further disaggregated by industries included in the SUT. Broadly, the major sources for these data by products/industry are those mentioned above. In addition, dedicated input-output surveys in which data is collected on inputs used by different industries from limited number of establishments in different industries, could be an important source.

266. In some countries, data on total output and total intermediate consumption by industry is collected, but further disaggregated data, product-wise, are not collected. In such situations, outputs could be assigned to the characteristic products of industries (diagonal entries), though this is a crude procedure³⁵ and should be adopted 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: (i) focused input-output surveys covering a few establishments in each industry, (ii) expert opinion of engineers and concerned entrepreneurs, (iii) standard input structures of different industries, and (iv) borrowing intermediate consumption coefficients from neighbouring countries with similar economic structure.

10.2. Imports (supply table) and exports (use table) by products for total economy

267. The requirement of data for these components is the data on imports and exports, by products for the total economy. Imports and exports comprise both goods and services. While, data on merchandise (goods) comes mainly from foreign trade

³⁵ Several products are produced by industries as by-products or as part of their secondary activities.

statistics maintained by customs authorities, data on services mainly comes from balance of payments compiled by central bank. Countries may also need to make adjustments for informal and illegal border trade, data on which can be estimated from small surveys or studies or seizures and penalties.

268. The SNA recommends valuation of imports and exports on f.o.b. basis. Though exports data is available on this valuation, imports data is usually available on c.i.f. basis. Therefore, countries need to introduce an adjustment column and row in the supply table to convert imports, c.i.f. to imports, f.o.b. The data on insurance and freight which is the difference between the two valuations, is normally available in the balance of payments statistics.
269. Another adjustment that is required to be made in the imports and exports columns is for purchases of residents abroad and non-resident purchases in the domestic economy. The source for these data is the balance of payment statistics or international passenger survey or consumption expenditure survey. This adjustment is, however, not necessary, if these data are already included in the balance of payment statistics. If these statistics are compiled according to IMF guidelines purchases of residents abroad and non-resident purchases in the domestic economy are always included in imports and exports of services so in practice this adjustment item is almost never required in the SUT.

10.3. Taxes and subsidies on products (supply table) and other taxes and other subsidies on production (use table)

270. Data on taxes and subsidies on products and other taxes on production are available from the government budget documents or tax authorities. While data on taxes and subsidies on products is required by products for the total economy, the information on other taxes on production are need only by industries (in the value added components quadrant). The source for other taxes on production and subsidies is the economic censuses or enterprise surveys or business accounts of corporations. In some countries, data on product taxes is available only at the aggregate level (such as total excise duties, total sales tax or VAT) for the total economy, and not with product-wise disaggregation. In such cases, countries first need to estimate product taxes for each commodity on the basis of average tax rates (output at basic prices multiplied by average tax rate) and then adjust these to the controlled figure of total product taxes on pro-rata basis. For a robust distribution of total product taxes to commodities, it is better to adopt this procedure for each type of tax on product (excise, VAT, sales tax, import duties, etc.), as tax rates are different for different types of taxes on the same product.

10.4. Trade margins (supply table)

271. The requirement of data is trade margins by products for the total economy. The data on trade margins³⁶ by products is mostly estimated through indirect methods. Usually, the enterprise surveys and business accounts provide data on total trade margins only by industries (and not by products within each industry). Also, for the informal trading enterprises, the output is estimated through the labour input method, which provides estimate of output for the entire activity together and this method can in no way provide trade margins at product level. Very few countries are able to collect information on trade margins by products through the survey on trading enterprises.

272. The indirect method involves four steps:

- (i) estimating total output of trade (in the supply table), which is equivalent to the sum of
 - (a) output of principal product of trading industry and
 - (b) output of trade of other industries³⁷;
- (ii) estimating (or assuming) trade margin ratios for each product;
- (iii) estimating trade margins for each product (only goods) by applying the trade margin ratios on the product's output at basic prices; and
- (iv) finally, adjusting the trade margins for each product to the controlled figure, which is the total output of trade.

273. In the above method, assumption of trade margin ratios for each product is a key requirement. These trade margin ratios for different products can be estimated on the basis of small surveys of wholesalers and retailers or seeking their expert opinion. Alternatively, these ratios can also be estimated from the product-wise data collected on outputs and inputs in the enterprise surveys (if such data is collected in these surveys). The difference between the output price of a product (which is at basic prices) and the input price of the same product (may be used by another industry) (which is at purchasers' price), duly adjusted for product taxes, can be assumed to be the trade and transport margins.

274. It is advisable to estimate trade margins by products separately for wholesale and retail trade, as trade margin ratios are different for the same product in the hands of wholesalers and retailers, especially for the agricultural and perishable goods. A more detailed and robust procedure to estimate trade margins by products has been suggested in the Eurostat Manual of Supply, Use and Input-Output Tables (Sections 4.2.3 and 6.3).

10.5. Transport costs (supply table)

³⁶ The output of trading activity is the trade margins which is derived as the difference between the sale and purchase price of traded goods.

³⁷ Several industries (other than trade), sell products in the same condition as they are purchased. The margins from such sales should be marked as output of trade, as a secondary activity of these industries.

275. The requirement of data is transport costs³⁸ by products for the total economy. As in the case of trade, the transport costs can also be estimated through indirect methods, in the absence of direct product-wise information on transport costs from the enterprise surveys. The procedure is exactly the same as mentioned under trade margins. The Eurostat manual provides a very detailed method for indirectly estimating transport costs by products. It is also advisable to estimate transport costs by products, separately for each means of transport, namely, railways, road, air, and water.

10.6. Household consumption expenditure (use table)

276. The requirement of data for this component is the expenditures of households, disaggregated by products (for the SUT) and purposes (for national accounts) for the total economy. Concordance tables between the purposes (COICOP classification) and the products (CPC) are available in public domain.

277. The data sources for household consumption expenditures are the household income-expenditure surveys, retail trade surveys, agricultural production surveys and other administrative data.

278. In some countries, household income-expenditure surveys are not carried out annually. In such cases, the benchmark estimates are prepared using survey results and annual estimates are based on retail trade surveys. Many 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 imputed expenditures of households (such as, imputed rents of owner occupied dwellings) that need to be accounted for in the household consumption expenditure, which are not collected directly from surveys. Besides these sources, commodity flow approaches are widely used to estimate the household consumption expenditure as residual, by many developing countries.

10.7. Government consumption expenditure (use table)

279. The requirement of data for this component is the expenditures of general government, disaggregated by products (for the SUT) and purposes (for national accounts) for the total economy. Concordance tables are available between the purposes (COFOG classification) and the products (CPC). The main data sources are the budget documents of federal government, provincial governments and local governments. The autonomous government organisations which are fully funded by the government also fall under the category of general government, and it is important to analyse their accounts and include their expenditures under the general government consumption expenditure. The government expenditures are further

³⁸ Freight transport charges paid by the purchasers on the products

classified as individual consumption and collective consumption. Though, it may sometime be difficult to distinguish the government expenditures between individual and collective consumption, the fall back procedure is to assume all government expenditure on the functions of housing, health, recreation and culture, education and social protection as individual consumption. If the accounts of local governments and autonomous government institutions are not available, their expenditures may be estimated on the basis of grants given to them by the federal or provincial grants, whose details may be available in their budget documents.

10.8. Consumption expenditure of NPISHs (use table)

280. The requirement of data for this component is the expenditures of NPISHs, disaggregated by purposes/products for the total economy. The main data sources are focused surveys on NPISHs (based on the frame available with the registering authorities) or annual accounts of NPISHs. The other alternative data sources could be the economic censuses or annual enterprise surveys in which a separate code of NPISH could be given to identify the NPISH enterprises.
281. 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. Another source could be the tax records. In most countries, NPISHs are exempt from paying taxes, but the tax authorities do collect accounts of NPISHs. This could be a source for data on NPISHs.

10.9. Gross fixed capital formation (use table), by products

282. The requirement of data for this component is the gross fixed capital formation, disaggregated by type of assets (products) (mainly construction and machinery & equipment, but will also include mineral exploration, software, etc.). The main data sources are construction surveys, building permits and construction starts, annual enterprise surveys, accounts of companies and NPISHs, government budget documents, foreign trade statistics and the household surveys (on own account construction).
283. In the absence of surveys, several developing countries adopt commodity flow methods, which are based on the availability of products for GFCF from domestic production and imports. Normally, data on GFCF is available for the government part from the budget documents, for the corporations from their annual accounts. The household GFCF part is estimated as residual from the overall GFCF estimates compiled through the commodity flow approach. If Household GFCF is estimated independently based on benchmark surveys and indicators, the sum of GFCF of government, corporations and households (including NPISH) can be cross-checked with the GFCF estimated through commodity flow approach.

10.10. Change in inventories (use table), by products

284. Some developing countries do not compile the estimates of changes in inventories and show them together with the statistical discrepancy (difference between production and expenditure GDP), derived as a residual. On the other hand, some countries only compile estimates of gross fixed capital formation and assume it be equivalent to gross capital formation.
285. The requirement of data for this component is the change in inventories disaggregated by goods (conventionally, services do not have inventories) for the total economy. The sources of data are the annual enterprise surveys, agricultural surveys, food balance sheets, dedicated surveys on inventories, company accounts, government budget documents and government strategic stocks of food, oil, etc.
286. Countries that do not regularly compile estimates of change in inventories, should focus on estimating inventories at least for the government and corporations from their annual accounts, which are generally available. For the household enterprises, indicators or benchmark surveys could be used for estimating change in inventories. For the product level distribution of change in inventories, the key characteristics of the industry in terms of its outputs and input structure could be a basis, if the enterprise surveys or business accounts do not provide such details.

10.11. Acquisition less disposals of valuables (use table), by products

287. Many countries do not compile estimates of net acquisition of valuables. Also, this item may not be of much significance in several developing countries, unless there are substantial imports of valuables and domestic production. The main sources of data for estimating this component are the imports and exports statistics and domestic production of valuables. While the imports and exports data comes from customs authorities, the domestic production can be estimated by identifying the establishments/enterprises associated with the production of valuables.

10.12. Compensation of employees (use table), by industry

288. The most common data sources for estimating compensation of employees by industry are (i) the annual enterprise surveys, (ii) business accounts, (iii) government budget documents, (iv) administrative data and (v) labour force surveys. 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. Compensation of employees data is normally compiled for an industry by its institutional break-up.
289. If the countries do not have annual enterprise surveys or do not have access to business accounts, the benchmark estimates based on economic censuses could be extrapolated with growth in employment numbers combined with a wage index or the CPI. Other alternatives could be applying data on wages per employee of

government (or a percentage of this) to those in different industries, or conduct a small sample survey on wage payments as percentage of value added (or output) in different industries and use the ratios on the overall value added or output of the industries. However, while using such ratios, it is advisable to apply them at institutional sector level within each industries, as ratios of compensation of employees to value added significantly differ between institutional sectors.

10.13. Consumption of fixed capital (use table), by industry

290. The estimation of CFC has been covered in some broad detail in the lecture note on use table. The recommended method of compiling CFC estimates by industry is the perpetual inventory method (PIM) alongwith the estimates of capital stock by industry. The perpetual inventory method requires long-term data (about 30 years) on gross fixed capital formation by type of assets cross-classified by industry/institutional sectors and the life cycle of these assets.
291. Some developing countries may not have such detailed long-term data on GFCF (and hence the capital stock and CFC estimates), therefore, 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”.

10.14. Net operating surplus/mixed income (use table), by industry

292. Though, this component can be derived independently through profit surveys, most countries compile this as residual, as the difference between the industry output and the sum of intermediate consumption, compensation of employees, consumption of fixed capital (CFC) and net other taxes on production.
293. If countries do not compile CFC estimates, then the residual becomes the gross operating surplus/mixed income. However, non-availability of CFC estimates can lead to under-estimation of output of non-market activities, which are estimated on cost basis.

Chapter 11: Updating Supply and Use Tables

294. Bench-mark SUTs are usually compiled on the occasion of a large scale industry survey or economic census. The benchmark SUT can be updated to the current year by a combination of manual and automatic (RAS) updating to produce an annual time series between benchmarks. The basic idea is that the marginal totals are updated using the latest information available and the internal cells of the SUT are then forced to agree with the new marginal rows and columns by a mathematical procedure such as RAS.³⁹
295. Although part of the work is left to RAS, a substantial amount of “manual” updating is required. By manual updating we mean using whatever information is available from the national accounts and other sources to fill the marginal totals and other key parts of the SUT. The shaded areas of the supply and use tables in Figures 6 and 7 are those parts that will need to be manually updated before applying RAS to automatically update the non-shaded parts of the SUT.

11.1. Supply Table

296. The first marginal total that must be updated manually is the column showing the total supply of goods and services at purchasers’ prices according to type of commodity. In this example we assume that it has been decided to estimate this column in the Supply Table rather than in the Uses Table. In most countries GDP is more accurately estimated from the production side rather than from the expenditure side so this will usually be the preferred option. The SUT compiler will need to manually update all the columns in the Supply Table that are needed to obtain the total supply of goods and services at purchasers’ prices. These are the shaded columns in Figure 6.
297. Here are some suggestions on how these shaded columns can be manually updated.
- It will usually be impossible to update the benchmark breakdown of domestic production in the full commodity breakdown used in the benchmark SUT. It may often be necessary to make several approximations such as using changes in gross value added (GVA) by kind of activity to update benchmark estimates of gross output by commodity or to update groups of commodities by a single GVA figure. As an example, gross output of manufactured commodities may have to be updated by changes in GVA for just a few broad groups of manufacturing industries, and all

³⁹ RAS is not the only method available for forcing the internal cells of a matrix to agree with the total row and total column. However, other methods have not been shown to be superior to RAS and RAS is included in most statistical software. See *Chapter IX Updating Input-Output Tables: RAS Methods* in “Handbook of Input-Output Table Compilation and Analysis,” (United Nations New York, 1999) for a discussion of other methods.

products of agriculture may have to be updated by a single figure for GVA in total agriculture.

- Imports of merchandise will usually be available in full commodity detail but it is possible that no up to date estimate is available for imports of services or there may only be an estimate of total service imports. International freight and insurance on merchandise imports are usually the most important service imports and they can be updated using the change in the value of merchandise imports. Other services could be updated by the latest growth trends and using total service imports, if available, as the control total.
- Trade and transport margins tend to be stable from year to year so the benchmark percentages can be applied to the new estimates of domestic production and imports at basic prices.
- Taxes and subsidies on products may not be available in commodity detail but provided figures are available for total product taxes and product subsidies the benchmark breakdown by commodity can be used to distribute the total figures. Of course, if rates of taxes or subsidies have been changed, the new rates will have to be used and not those from the benchmark table.

Com- modities ...	Supply at Basic prices				<i>plus</i> Adjustments to move from Basic to Purchasers' Prices				<i>equals</i> Total Supply at Purchasers' Prices
	Domestic Production by Kind of Activity				Imports: goods & services	Transport costs separately invoiced to the purchaser	Wholesale and retail margins	Taxes on products <i>minus</i> subsidies on products	
	1	2	..	Total					
Goods	..								
1									
2									
..									
Services									
1									
2									
..									
Total									

11.2. Use table

298. The manually-updated estimates of total supply by commodity at purchasers' prices then become the marginal control column for updating the Uses Table. The shaded parts of the Uses Table in Figure 2 are the rows and columns that will need to be manually updated before apply RAS to automatically update the non-shaded parts of the table.

299. Some points to notice:

- The marginal row totals for final expenditures – household, NPISH and government final consumption expenditure, gross fixed capital formation, changes in inventories and exports of goods and services - will be taken directly from the estimates of GDP (E).
- Total intermediate consumption (i.e. the total for all kinds of activities) can be obtained by deducting total final uses from total supply/use. This residually-obtained estimate of total intermediate consumption can then be used to update the row totals of intermediate consumption by kind of activity

on a *pro rata* basis. The internal entries – intermediate consumption of commodities by kind of activity – will be updated automatically by RAS.

- The final consumption expenditure of households, NPISH, and government by commodity can be updated automatically by RAS because experience shows that in most cases the commodity composition of these final expenditures changes only gradually over time. However if some commodity detail is available this should be used to update these vectors. For example, there may be information in the regular national accounts on household final consumption expenditure by broad groups of commodities – *food and beverages, footwear and clothing, etc.* If so, it will usually be better to update all the detailed items under food and beverages, footwear and clothing, etc by the changes in the group totals rather than leaving it to RAS.
- The commodity breakdown of merchandise exports may be available and if so this part of the export vector can be manually updated and exports of services can be updated by RAS.
- The commodity breakdown of gross fixed capital formation and of changes in inventories can also be done automatically by RAS but this is not advisable because there can be sharp changes from year to year in the commodity composition of both these vectors. The SUT compilers should, therefore, update these two vectors manually and that is why these two columns are shaded in Figure 2.
- Changes in inventories is a troublesome item for many countries. While it is not generally possible to measure changes in all inventories there will usually be some information on inventories held, for example, by electricity generating plants, petroleum producers and importers, large retailers, and stocks of food and strategic materials held by government. In any event, updating this vector cannot be left to RAS because changes in inventories can have different signs (+ or -) from year to year and so it must be manually updated.

Figure 7 : Use Table of the SUT

	Intermediate consumption by kind of activity				Final consumption			Capital formation,		Exports
	1	2	...	Total	Government	households	NPISH	Gross fixed capital formation	Change in inventories	
Goods										
1										
2										
...										
Services										
1										
2										
...										
Total										

Note: **Shaded areas** are the rows and columns that need to be manually updated.

11.3. Manually updating other parts of the SUT

300. In addition to the shaded portions of the Supply and Uses Tables it may be possible to manually update individual cells; RAS updating is a purely mechanical procedure and will never be better than manual updating based on knowledge of what has actually happened in the real world. For example, you may have information on sales of electricity to households or to enterprises in particular kinds of activity. If so, the relevant cells in the intermediate consumption matrix and the vector for household consumption can then be manually updated.

11.4. RAS updating

301. RAS is applied to the supply and use tables separately. Even though each table is updated separately, the updated supply and use tables will be consistent with each

other because the same marginal column has been used for the total supply/use of goods and services at purchasers' prices.

302. The modified version of RAS is used. This means that any internal cells or vectors that have been manually revised are removed, the marginal rows and columns are recalculated, RAS then forces the remaining internal cells to be consistent with these reduced marginal rows and columns, and the cells and vectors that were manually updated are put back into the supply and use tables. The SUT has been updated.
303. But caution! Although the updated RAS is now mathematically correct, it still needs to be reviewed critically by the SUT compiler. One useful check is to calculate GVA by kind of activity by deducting intermediate consumption in the Uses Table from gross output in the Supply Table. Are these GVA estimates consistent with the industry breakdown of GVA in the national accounts? GVA from the SUT is at basic prices rather than at the purchasers' prices used for the regular national accounts, but large differences should be investigated and, if necessary, corrections should be made and the SUT will have to be rebalanced by RAS. The vectors for government and household consumption expenditure should also be subjected to credibility checks. Such checks may again lead to manual revisions requiring a further round of RAS balancing.

Further reading

Handbook of Input-Output Table Compilation and Analysis, United Nations New York, 1999.
Chapter IX Updating Input-Output Tables: RAS Methods

Chapter 12: Individual and collective services

Actual Consumption *versus* Consumption Expenditure

304. The 1993 SNA introduced a measure of household and government consumption that had not been included in the 1968 version. It is called **Actual Consumption** and this is the measure that is used in the ICP for comparing household consumption across countries.
305. The basic idea is that in most countries what households **spend** on consumer goods and services is less than what they end up actually **consuming**. The difference arises because in most countries governments provide goods and, especially, services to households that are paid for out of the government tax revenue. For example, a pregnant woman may have consultations with government-paid health workers who monitor their progress and advise them on diet and lifestyle, the delivery may be attended by a government-paid midwife, and a few months later the infant may be inoculated against diphtheria and vaccinated against measles free of charge at a government-run clinic. Mothers and their babies are **consuming** more services than they are **buying** from their own income.
306. Household actual consumption is higher than household consumption expenditure and, following through on the example above, what governments can be said to actually consume themselves is lower than their total expenditure. In the 1993 SNA, government's **actual consumption** is confined to the services they provide for the community as a whole – defence, law and order for example. These are called **collective services** and are distinguished from the services they provide to individual members of the community – the kind of maternity services in the example above for example – and which are called **individual services**.
307. Household actual consumption is even broader if we think of the services provided by *Non-Profit Institutions Serving Households* (NPISH). A trade union, for example, may provide legal services by defending employees against unfair dismissal or by improving their safety at work. And religious organisations provide people with moral support and spiritual guidance which many households value highly. In the 1993 SNA, all expenditure by NPISH is considered to be providing individual services and so are part of household's actual consumption.

308. *Box 1* compares consumption expenditure with actual consumption of households, government and NPISH. Note that in total, consumption expenditure and actual consumption are identical.

Box 1 Consumption Expenditure versus Actual Consumption		
	Consumption expenditure	Actual consumption
Households	Household final consumption expenditure (HFCE)	Household final consumption expenditure (HFCE) Individual consumption expenditure of government Final consumption expenditure of NPISH
Government	Government final consumption expenditure (GFCE)	Collective consumption expenditure of government
NPISH	Final consumption expenditure of NPISH	Nil

309. To summarise, all the final consumption expenditure of households and NPISH is included in actual consumption of households, but only a part of government consumption expenditure. The national accounts compiler must decide which part is individual and which part is collective consumption expenditure. This is what we will consider next.

Individual services

310. Expenditures on individual services constitute *individual consumption expenditure by government*. Individual services are the services that government provides to specific identifiable households – that is, services, such as health and education, which are consumed by individual households. The distinction between individual and collective services is made by reference to the COFOG 1998 classification⁴⁰. Box 1 shows the functions of government that are defined as individual. They are denoted by “IS”.

⁴⁰ “Classification of the Functions of Government (COFOG)”, in *Classification of Expenditure According to Purpose*, United Nations, New York, 2000.

311. Individual consumption expenditure by government is of two kinds:
- First, the production of services by government for the benefit of individual households. Examples are running schools and hospitals. Here the government is itself organising and financing the production of services for consumption by individual households.
 - Second, the purchase of goods and services by government from other producers which are then passed on to households, either free or at prices below the costs of production, without any further processing by government. Examples are the provision to households of medicines and medical services for outpatients. In some cases, households get these goods and services free or at very low prices at the point of delivery, while in other cases households pay the full price at the point of delivery and are later reimbursed, in part or in full, by government. For the ICP 2004, the purchase by government of goods and services for delivery to households is relevant for two functions – health and education. In the Expenditure Classification they are described as *Health benefits and reimbursements* and as *Education benefits and reimbursements*.

Collective services

312. Government current expenditure that is not individual is termed collective. Again, *Box 1* shows what kinds of government expenditures are collective. They mainly fall under the broad headings of *general public services, defence, public order and safety, economic affairs* and *environment protection* but they also include certain expenditures under housing, health, recreation and culture, education and social protection that are considered to be for the benefit of the community at large. These are expenditures on the formulation and administration of government policy at the national level, the setting up and enforcement of public standards, and on research and development. In *Box 1* all the COFOG groups highlighted in grey are collective services and are denoted by “CS”.
313. By contrast with individual consumption expenditures, collective consumption expenditures are of one kind only, namely the production of services by government. Collective consumption expenditure does not involve the purchase of goods and services for delivery to households.

Distinguishing Individual and Collective in Practice

314. *Box 2* shows the basic headings of the *ICP Expenditure Classification* for Individual and Collective consumption expenditure by government. In the classification the various items of expenditure to be allocated to each basic heading are defined in terms of the Classification of the Functions of Government (COFOG). Countries which classify government expenditures by COFOG will therefore have no difficulty in finding the expenditures for each basic heading in *Box 2*.

315. Countries that do not classify government expenditures by COFOG will have difficulty in making the split accurately. In the 2005 round of ICP, some countries assumed that only the expenditure of the Ministry of Health and the Ministry of Education was individual and that all other government expenditure was collective. This means that no individual expenditures will be shown for the basic headings *Housing, Recreation and Culture*, and *Social Protection*. In many countries in Africa government expenditures for these functions is very low. Taking only health and education expenditure as individual is not an ideal solution but in many countries it will be a good approximation.

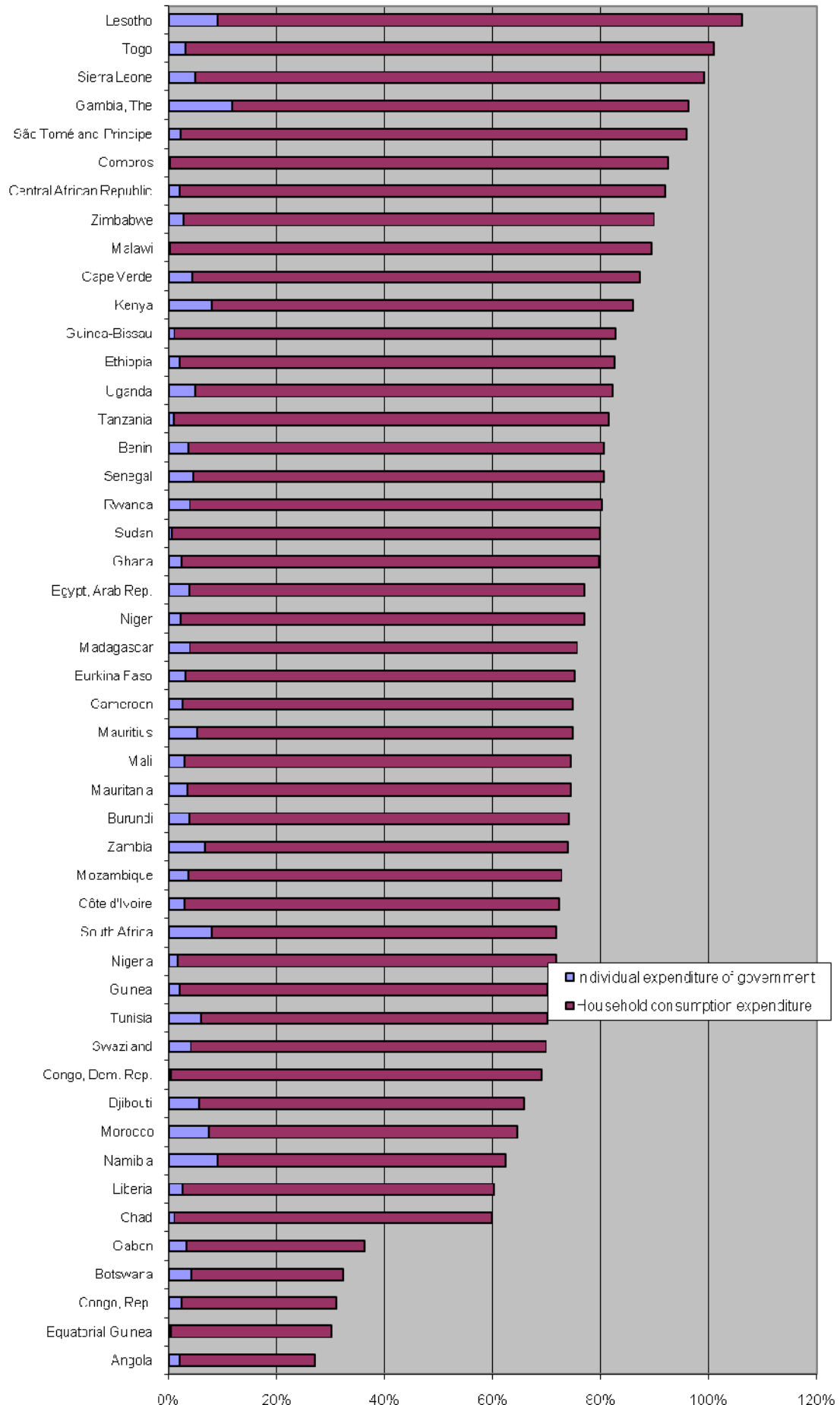
Box 2 : Government consumption expenditure

A. INDIVIDUAL CONSUMPTION EXPENDITURE BY GOVERNMENT	
HOUSING	
13.01.11.1	Housing (IS)
HEALTH	
Health Benefits And Reimbursements	
13.02.11.1	Pharmaceutical products (IS)
13.02.11.2	Other medical products (IS)
13.02.11.3	Therapeutic appliances and equipment (IS)
13.02.12.1	Out-patient medical services (IS)
13.02.12.2	Out-patient dental services (IS)
13.02.12.3	Out-patient paramedical services (IS)
13.02.12.4	Hospital services (IS)
Production Of Health Services	
13.02.21.1	Compensation of employees (IS)
13.02.22.1	Intermediate consumption (IS)
13.02.23.1	Gross operating surplus (IS)
13.02.24.1	Net taxes on production (IS)
13.02.25.1	Receipts from sales (IS)
RECREATION AND CULTURE	
13.03.11.1	Recreation and culture (IS)
EDUCATION	
Education Benefits And Reimbursements	
13.04.11.1	Education benefits and reimbursements (IS)
Production Of Education Services	
13.04.21.1	Compensation of employees (IS)
13.04.22.1	Intermediate consumption (IS)

13.04.23.1	Gross operating surplus (IS)
13.04.24.1	Net taxes on production (IS)
13.04.25.1	Receipt from sales (IS)
SOCIAL PROTECTION	
13.05.11.1	Social protection (IS)
B. COLLECTIVE CONSUMPTION EXPENDITURE BY GOVERNMENT	
14.01.11.1	Compensation of employees (CS)
14.01.12.1	Intermediate consumption (CS)
14.01.13.1	Gross operating surplus (CS)
14.01.14.1	Net taxes on production (CS)
14.01.15.1	Receipts from sales (CS)

316. The chart below shows what difference it makes to look at actual household consumption rather than household consumption expenditure. There are several countries in Africa where governments make relatively high individual expenditures on health and education. These include Lesotho, the Gambia, Kenya, Zambia, Namibia, South Africa, Morocco and Tunisia. In these countries actual consumption of households is significantly higher than household consumption expenditure.
317. There are others where virtually all government expenditure is collective – law and order and defence usually being the main expenditures. These include Congo Democratic Republic, Chad, Malawi, Tanzania, Equatorial Guinea, Comoros, Guinea-Bissau, and Sudan. In these countries government expenditures add little or nothing to household actual consumption.

Actual Household Consumption bin 2005 (% of GDP)



Further reading

Classification of the Functions of Government (COFOG), United Nations, New York
(<http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=4>)

GDP and Actual Individual Consumption, ICP 2011, Global Office, World Bank.
(<http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/ICPEXT/>)

Chapter 13: Classification of Industries and Products and Size of SUTs

318. Once a country decides to compile SUTs for its economy for the first time, two questions come up – what should be the size of the SUTs and how to put together the data that is available from different sources according to different classifications, into the matrix structure of SUTs.
319. The size of SUTs primarily refers to the number of industries and products for which the SUTs present two identities, (i) supply equals uses, for each product, and (ii) total output equals total inputs (sum of intermediate inputs and primary inputs⁴¹), for each industry. As these identities suggest, there is a direct relationship between the size of SUTs and the quality of SUTs, as more industries and products included in the SUTs mean more coherence to the integrated set of product balances achieved in the SUTs.
320. For the 2011 ICP, the 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.
321. In most countries, the primary data is available from the source agencies according to different country specific classifications, which in turn are based on corresponding international classifications, namely, the Central Product Classification (CPC) for products, International Standard Industrial Classification (ISIC) for industries, functional classifications for final consumption, and Standard International Trade Classification (SITC) and the Harmonized Commodity Description and Coding System (HS) for foreign trade. In the SUTs, the integration of these data is achieved through the establishment of concordance tables between these classifications and a standard product classification.
322. This lecture note will deal with the issues on the size of SUT and classifications for industries, products and other supply and final use vectors.

13.1. Classification of Industries for the SUTs

323. The SUTs include a common set of industries in both the supply and use tables. For classifying the industries, SNA recommends the use of International Standard Industrial Classification (ISIC). The latest activity classification of the UNSD⁴² is ISIC Rev. 4 (2008). The previous versions, Rev. 3 (1990) and its update Rev. 3.1 (2002) or the country-specific industrial classifications based on these classifications, however, are mostly adopted by the developing countries at present.

⁴¹ Primary inputs comprise labour and capital; uses of value added at basic prices include primary incomes to labour (compensation of employees), capital (operating surplus/mixed income) and taxes less subsidies on production other than taxes less subsidies on products.

⁴² UN Classifications Registry (<http://unstats.un.org/unsd/class/default.asp>)

324. The ISIC is structured at four levels – Level 1 refers to Sections; Level 2 to Divisions; Level 3 to Groups and Level 4 to Classes. As these terms suggest, Sections are 1-digit; Divisions, 2-digit; Groups, 3-digit; and Classes, 4-digit. The ISIC Rev. 3.1 has 17 Sections (against 21 in Rev. 4), 62 Divisions (88 in Rev. 4), 161 Groups (238 in Rev. 4) and 298 Classes (419 in Rev. 4). Therefore, the most detailed level at which industries are classified is at 4-digits, and theoretically, SUTs can be compiled at 4-digit ISIC.
325. In practice, however, it is very difficult for the countries to collect data from all the enterprises/establishments at 4-digit ISIC. Neither this is required, as several activities listed at 4-digit level in the ISIC may not be relevant to all the countries. The enterprise/establishment surveys and censuses provide information only for those industries which are relevant to the economy. Therefore, identification of industries to be included in the SUTs should be based on the detailed level at which data on industries is available in the countries. Some countries launch focused input-output surveys to collect product-wise data on the intermediate inputs for various industries. In such cases, the level of industries in the SUTs could be determined on the basis of industries included in these specific surveys.
326. It is common for most developing countries which presently have SUTs, to construct SUTs after compiling their annual national accounts, though SNA recommends that SUTs be compiled as part of national accounts, that is before the annual national accounts. Countries follow this practice mainly due to the reason that the preliminary or provisional annual national accounts are based on indicators, extrapolations and aggregated information provided by the source agencies. Also, the time-lines and resources available to the national accountants to compile these provisional estimates do not permit them to use the SUTs framework. Further, in some countries, the situation on primary data does not improve even for the final national accounts estimates since the surveys and censuses are conducted only at periodic intervals. In such situations, it is preferable to compile the benchmark SUTs for the years for which maximum primary data is available from the censuses and surveys, with the industry classification as detailed as the source data permits. For other years, the benchmark SUTs could be updated⁴³, using data available at that time and the coefficients from the benchmark SUTs or past surveys or other sources. The industry classification for the updates of benchmark SUTs could be a 1-digit ISIC or the industries for which the country releases the production GDP data. With this aggregated industry classification, it is possible to integrate SUTs even with the provisional national accounts compilations.
327. The ICP does not make any specific recommendation on the size of industries, as the requirements under ICP are the GDP expenditures in terms of products and purposes. For the ICP, product classification and product balances are more important than the industry classification, though more disaggregated the industry classification in the SUTs is, the more coherence would be the achievement for the national accounts.
328. The industry classification of SUTs can range from three broad groups of activities (agriculture, industry and services) to a larger number of industries based on a combination of Sections, Divisions, Groups and Classes of ISIC. Normally, it is the

⁴³ this topic has been discussed in a separate lecture note.

importance of activity (irrespective of the level at which it is classified in ISIC, even if it is at 4-digit level) to the country that determines the basis for its inclusion in the SUTs.

329. In the background of above discussions, countries may choose an industry classification for SUTs on the basis of their importance to the economy, availability of data from the censuses and surveys and the detailed level at which production GDP data is compiled as part of annual national accounts.

13.2. Classification of Products for the SUTs

330. The SUTs essentially aim to achieve individual product balances. Therefore, product classification becomes the most important aspect in the construction of SUTs. This is in two ways – (i) the number of products to be included in the SUTs determines the quality of SUTs and consequently the national accounts, because more number of products in the SUTs mean increased number of product balances and coherence to the national accounts; (ii) classification scheme to be adopted for the products is equally important, as different components of supply and use tables follow different classifications (for example, the purpose classifications for final consumption expenditures and SITC or HS classifications for imports and exports) and there is a need to have established correspondences between these classifications and the product classification chosen for the SUTs.
331. The SNA recommends use of Central Product Classification (CPC) of the UN for classifying the products. As in the case of ISIC, the CPC is structured in terms of Sections (1-digit), Divisions (2-digit), Groups (3-digit), Classes (4-digit) and Sub-classes (5-digit). The latest version of this classification is CPC Ver 2.0 (2008) and the previous versions were CPC ver. 1.1 (2002) and ver 1.0 (1998), which has 10 Sections, 71 Divisions, 291 Groups, 1036 classes and 1787 Sub-classes.
332. Theoretically, SUTs can be compiled for products at extensively disaggregated levels. Some developed countries compile SUTs for few thousand products, but this is difficult for developing countries. Therefore, these countries may choose the number of products to be included in their SUTs on the basis of their importance to the economy and availability of detailed data at product level in their countries. Generally, the number of products included in the SUTs is more than the number of industries.
333. Some countries choose the characteristic products of industries in the SUTs as the number of products (which makes the SUTs as square tables), thereby the number of products become equal to the number of industries in the SUTs. Further, some countries show only diagonal entries in the supply table implying that the industries are homogenous and produce only the characteristic products and not any secondary or by-products. However, it is common knowledge that industries do produce either or both the secondary products and by-products. Therefore, in SUTs these secondary and by-products need to be shown as off-diagonal entries against the respective products/industries.

334. For the 2011 ICP, the ideal product levels to be included in the SUTs should be the basic headings⁴⁴ (BH), since GDP expenditure values are needed to be provided at this level for the ICP. These values are required both for providing weights to the prices collected in the ICP and for the compilation of real GDP expenditures. However, if the countries find it difficult to compile SUTs at this product level in the first attempt, they may choose a higher level of product classification, but it needs to be ensured at the same time that this classification corresponds to ICP basic headings at some level. This will help the countries achieve robustness of data of GDP expenditures atleast at higher product levels. Further disaggregation from these higher product levels to ICP basic headings could subsequently be achieved by using indicators or information obtained from specific surveys.

Table 14 : Distribution of basic headings, 2005 ICP

Aggregate	Number of basic headings
Individual consumption expenditure	132
by households	110
by NPISHs	1
by government	21
Collective consumption expenditure by government	5
Gross fixed capital formation	12
Change in inventories	2
Net acquisitions of valuables	2
Net international trade	2
Gross domestic product	155

Source: National Accounts Framework in the ICP, Global Office, 2011 ICP

335. While determining the size of SUTs, the key criterion should atleast be to provide quality data for the components of GDP of the economy, with gradual progress to higher level of products and industries.

⁴⁴ There were 155 basic headings in the 2005 ICP.

13.3. Final consumption expenditure vectors

336. The final consumption expenditure vectors in the use matrix refer to the institutional sectors of households, NPISHs and government. For the final consumption expenditure vectors, the main issues here relate to the development and use of concordance tables between the classifications of these vectors and the standard product classification identified for the SUTs.
337. The recording of expenditures of these three institutional sectors follows the classifications of final expenditure by purpose, namely, the classification of individual consumption by purpose (COICOP), classification of the purposes of non-profit institutions serving households (COPNI) and classification of the functions of the government (COFOG). An important point to note is that all these classifications are somewhat linked to each other with the COICOP also including all individual consumption expenditures made by the NPISHs (in division 13) and government (in division 14), in addition to those of households in the divisions 01 to 12.
338. The COICOP is structured into 14 divisions (2-digit), which are further disaggregated into groups and classes. The divisions 01-12 refer to Individual consumption expenditure of households, division 13 refers to Individual consumption expenditure of NPISHs and division 14 refers to Individual consumption expenditure of general government.
339. The structure of COPNI and COFOG are also similar to the COICOP. The COPNI includes at 2-digit level, the final expenditure purposes of *housing, health, recreation, education, social protection, religion, political parties, environmental protection and services, n.e.c.* By convention, all these NPISHs expenditures are considered individual consumption. The COFOG includes under collective expenditure, the purposes of *general public services, defence, public order and safety, economic affairs, environmental protection and housing and community amenities*; and under individual consumption expenditure, the purposes of *housing, health, recreation and culture, education and social protection*.
340. The primary data that is available on consumption expenditures of households, NPISHs and government, according to the above purpose classifications need to be reclassified to the product classification chosen for the SUTs, which preferably should be either CPC or a classification based on CPC. The correspondence tables between COICOP and CPC are available at <http://unstats.un.org/unsd/cr/registry/regot.asp?Lg=1>, and countries can use these concordance tables to convert data based on purpose classifications of expenditures to the products included in the SUTs.

13.4. Import and Export vectors

341. The international classifications for recording imports and exports are the Standard International Trade Classification (SITC) and the Harmonized Commodity Description and Coding System (HS). While the SITC is structured under Sections (2-digit), Divisions (3-digit), Groups (4-digit), Sub-groups (5-digit) and basic headings (6-digit), the HS is organized into 21 sections and 96 chapters followed at 4-digit level by headings and at 6-digit level by divisions. There is scope to add further digits in these classifications to meet specific requirements. As in the case of final consumption vectors, the issue here too is the availability and application of concordance tables to transform the data on imports and exports based on SITC/HS classifications to the products included in the SUTs, based on CPC classification. The web link shown in the previous paragraph provides the necessary concordance tables.

13.5. Concluding Remarks

342. It is difficult to make any specific recommendation on the number of industries and products to be included in the SUTs. However, the guiding factor is that there is a direct relationship between the size of SUTs and the quality of SUTs and the national accounts based on these SUTs. Therefore, countries have to choose the size of SUTs on the basis of a number of factors that include (i) importance of industries/products to the economy, (ii) availability of primary data, (iii) current national accounts compilation practices, especially in respect of production approach GDP, and (iv) resources available for the national accounts compilation work.

343. For the 2011 ICP, the SUT is the recommended framework for compiling and supplying the data on GDP expenditures at basic heading level. Therefore, the guiding factor to meet the ICP requirements for the countries is to construct SUTs at the basic heading level. This may not be difficult for the countries that presently compile SUTs. They may simply need to expand the product list to the 2011 ICP basic heading levels. For other countries which do not presently compile SUTs, the first step should be to gain experience of compiling SUTs. This can be done perhaps by choosing products and industries at fairly aggregated level (industries - may be at 1-digit ISIC or at the level at which the production GDP data is released as part of national accounts; products - slightly more detailed than the industries, but having some correspondence with ICP basic headings). After gaining experience in compiling SUTs, the industry and product dimension could be increased to match with the requirements of 2011 ICP.