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**Experience from Africa, developing Supply and Use Tables
integrated
with the Annual National Accounts.**

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Abstract

Background. *Statistics Norway has a long tradition of compiling national accounts with integrated Supply and Use Tables (SUT) and providing technical assistance to other countries. The goal of these projects are to improve the quality of the individual countries' national accounts by integrating SUT in current and constant prices in the annual national accounts compilation. The projects seek to improve national accounts skills as well as developing a well-documented and efficient national accounts compilation, utilising all available data sources.*

PART I of this paper will give a short introduction to the Norwegian methodology for compiling SUT in all types of valuation in current and constant prices, following SNA 93 and ESA 95 recommendations. The paper will describe required data sources, assumptions made and the methodology for compiling and balancing the product flows and estimate GDP in current and constant prices within the framework of SUT.

PART II will focus on experience from introducing SUT in different African countries with their diverse economies, different economic statistics and incomplete data sources. For IMF and users in the countries, good quality and timeliness of the national accounts system is very important for the economic planning.

The paper will explain the importance of utilising all existing economic statistics and administrative data sources, such as crop estimates, economic surveys, government accounts, tax data, import and export statistics, household expenditure surveys and consumer price indices. Balancing the different data sources in a systematic and well documented framework provide important quality checks. Important for analysing the African economy is the distinction between "Production for own use, Market production, Government accounts and NPISHs and split between Competitive and Non-competitive imports, in addition to specifying custom duties by products. The SUT compilation establishes a database which allows the development of different Satellite accounts such as Tourist satellite account or Environmental accounts.

PART III will describe the National Accounts component of the Institutional Cooperation project between Ministry of Economic Planning, Ministry of Finance, National Statistics Office (NSO) of Malawi and Statistics Norway. The goal of the project is to contribute to poverty reduction by efficient fact-finding policy planning. The ongoing project in Malawi will establish annual National Accounts complying with the UN's SNA 93, including integrated annual SUT from the year 2002. Special conditions and results of the project will be described.

PART IV will describe the institutional co-operation between the National Statistical Office (NSO) in Eritrea and Statistics Norway. The paper will cover the improvement of economic statistics required for the National Accounts/SUT compilation and the development of a new Register of Enterprises based on several existing administrative registers. The ongoing work in Eritrea will result in the first National Accounts for the country complying with UN's SNA 93 including integrated annual SUT from the year 2003. Special conditions and results of the project will be described.

PART I. Introduction

1. The advantages of Supply and Use Tables

Integration of Supply and Use Tables as well as Input-Output Tables in the national accounts work has become a key feature in the international recommendations, *ref. SNA 93 chapter XV and ESA 95*. With incomplete data for some industries, the commodity flow approach gives a clear advantage in identifying many flows, as import for household consumption or for capital formation. The result

should be good estimates for the main national accounts aggregates with a reliable level for the current and constant price Gross Domestic Product.

The goal of Statistic Norway's current projects in Eritrea and Malawi is to develop national accounts according to SNA 1993 with integrated Supply and Use Tables (SUT) in current and constant prices. The projects seek to improve national accounts skills as well as developing a well-documented and efficient national accounts compilation methodology, utilising all available data sources.

Annual Supply and Use Tables (SUT) in current and constant prices will serve both statistical and analytical purposes. For African countries to compile SUT fully integrated in the annual national accounts system will have the following methodological advantages:

- *An efficient confrontation of different data sources*
- *An integral check on the national accounts estimates.*
- *An ideal framework for different value concepts*
- *An important tool for constant price estimates (the double deflation technique) giving balanced SUT at current and constant prices.*
- *Important for analysing the effect of imports, exports, product taxes etc. on the economy.*
- *Database for econometric models and economic planning purposes*
- *Database for converting to Industry format Input-Output tables (IOT) in current and constant prices, based on the assumption of a fixed product sales structure (market share assumption).*

2. The design of the Supply and Use Tables.

2.1. System of National Accounts- New Technology

By the Norwegian methodology and software called "System of National Accounts- New Technology" (SNA-NT), a documented, verifiable and efficient set-up for compiling national accounts with integrated SUT and IOT in current and constant (previous years) prices have been developed.

Annex 1. "Methodology for Supply and Use Tables in current and constant prices", gives a description of the compilation procedure and show the principal equations applied when calculating Supply and Use Tables (SUT) in current and constant prices.

Annex 2 "System of National Accounts, New Technology (SNA-NT)", gives a short description of the software. All data should be stored in an Oracle database. All input data have a fixed format (Excel) and classification codes.

2. 2. The dimension of SUT in current and constant prices

When starting a SUT project, using the SNA-NT methodology, the following classifications have to be established:

Industry codes, aggregates of ISIC, (NACE for EU countries),
Types of final expenditure, based on SNA93, (ESA 95 for EU-countries),
Product codes, aggregates of CPC, (CPA for EU countries).

The SNA-NT software is quite flexible concerning the classification to be used for compiling SUT and gives no restrictions concerning details. An important requirement is that the same industry classification and the same product classification have to be used both in the Supply Table and the Use Table.

For reporting to international organisations (UN, OECD, EU) a minimum format is required with a 60 classification for industries and products, and types of final expenditure as given by SNA93/ESA95.

2.3. Classification of Industries in SUT

For African countries it is very important to distinguish "Producers for own final use" from "Market producers". Other Non-market producers should be subdivided between "Producers of central government services", "Producers of local government services" and "Non profit institutions serving households" (NPISH's).

The industry classification used in the Norwegian National Accounts with SUT is an aggregated version of NACE rev.1, with three-digit codes, specifying 200 industries.

The industry classification used in the Malawian National Accounts with SUT is an aggregated version of ISIC, with three-digit codes, specifying 150 industries. (Including a split between large and small enterprises).

The industry classification used in the Eritrean National Accounts with SUT is an aggregated version of ISIC, with three-digit codes, specifying 80 industries.

2.4. Classification of Products in SUT

Important for a SUT project is to decide the most suitable product classification to be used. One goal is to specify products so detailed that only one rate for product taxes and product subsidies apply to one type of use of the product. The specification of product codes is also important for the trade margin compilation and for the constant price compilation. It is also useful to identify products supplied from "Production for own use" and "Non-market production" as specific products separated from products supplied from "Market production".

In the Norwegian SUT, about 1250 products, specified by six-digit codes, are defined. The products are linked to the CPA-codes or aggregates of the CPA-codes. The 1250 products are divided by 700 for goods, 300 for services and 250 supporting products for aggregation and technical accounts.

In the Malawian SUT, about 500 products, specified by six-digit codes, are defined. The products are linked to the CPC-codes or aggregates of the CPC-codes.

In the Eritrean SUT, about 680 products, specified by six-digit codes, are defined. The products are linked to the CPC-codes or aggregates of the CPC-codes.

2.5. Required input data

The valuation of input data for establishing the SUT in current prices should be registered with a direct link to the economic statistics and external trade statistics.

For the Supply Table:

- Domestic production specified by suppliers and by product codes at producers' value (or basic value).
- Imports specified by suppliers and by product codes at CIF value or basic value.
- Custom duty specified by suppliers and by product codes

For the Use Table:

- Domestic intermediate use, domestic final use and exports specified by users and product codes at purchasers' values.
- A matrix for trade margin rates by products and users

- VAT rates and rules.
- Total figures for product taxes and product subsidies classified by product codes.

The SNA-NT software will establish the Supply Table at producers' value and the Use Table in Purchasers' value; compile the complete SUT in all the different types of valuation, i.e. basic values, producers' values, trade margins, transport margins, product taxes, product subsidies, VAT or sales tax and purchasers' values. The detailed SUT will be balanced and corrected. Calculation and balancing takes place in the Oracle database. The corrections are either batch or interactive. When a variable is changed, all dependent variables are recalculated automatically and instantly. The final stage of the automatic balancing process is simultaneous balancing and correcting SUT in both current and constant prices. An automatic adjustment procedure (simple RAS) is used for final balancing of services where no change in inventories can be accepted.

Absolute figures or value indices for industries or groups of final use are used for updating to the next year.

When SUT have been compiled for two years, SUT can also be compiled in constant previous year's prices. See Annex 1, chapter 2. SUT in constant prices, which gives an overview of the compilation procedure.

Required input data for compiling SUT in constant prices are:

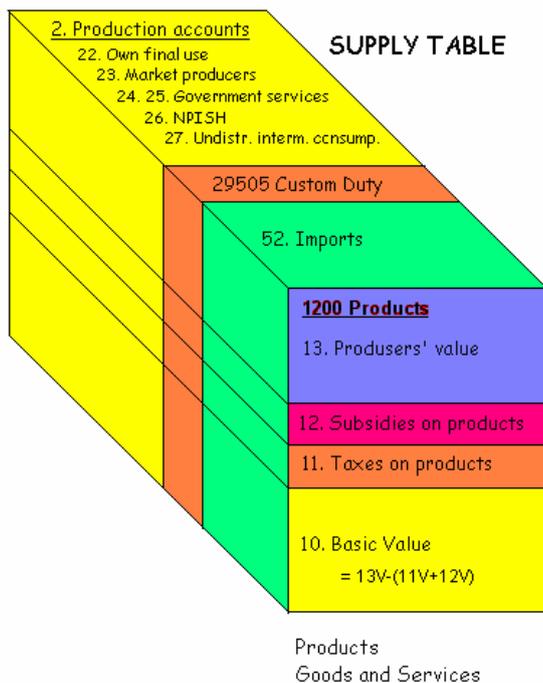
Up to 3 different price indices to deflate the corresponding current price figures for a product.

- Use table: Price indices for products to exports (FOB value), at purchasers' value.
- Supply table: Price indices for products from domestic production, at basic values.
- Supply table: Price indices for products from imports (CIF value), at basic value.

In addition a final correction follows, using consumer price indices to deflate goods (not services) for Household consumption at purchasers' value.

The structure and dimensions showed on the two next pages are the same for the current price and the constant price versions of SUT.

Overview of the Supply Table



The Supply Table gives detailed information about the supply of products (goods and services) from:

2. Production accounts

Account 22. Production accounts, Own final use

Account 23. Production accounts, Market producers

Account 24. Production accounts, Non-market producers, Central government services

Account 25. Production accounts, Non-market producers, Local Government services

Account 26. Production accounts, Non-market producers, NPISHs

Account 27. Aggregation accounts for trade margins & undistributed intermediate consumption (to facilitate the balancing)

Account 28. Aggregation accounts for fixed capital formation by type of asset.

Account 29. Technical accounts for Custom duty, Import tax and VAT

52. Imports

Account 52. Imports, specified by type of imports

The following account types show which value classes are used for the product flows:

Account type 10. Basic value

Account type 11. Taxes on products (paid by the producers)

Account type 12. Subsidies on products (paid to the producers)

Account type 13. Producers' value

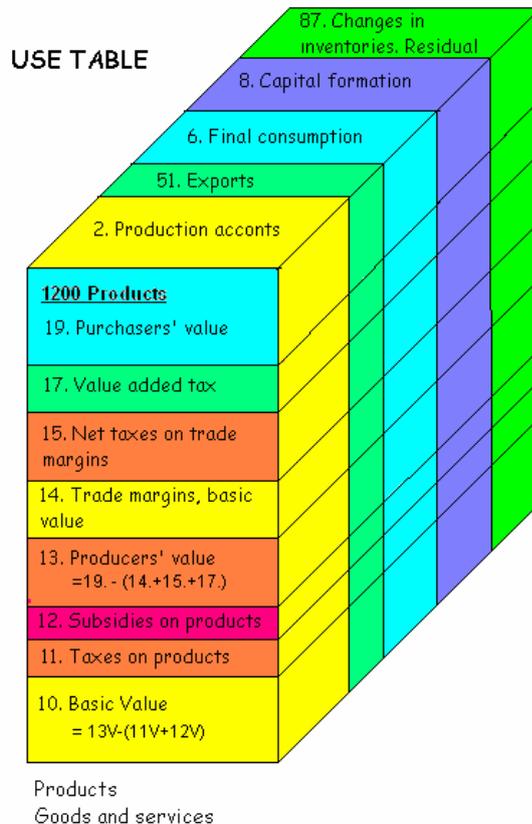
The Supply Table is first established in Producers' value.

By an automatic procedure,

- time adjusted taxes, allocated to products, are distributed between domestic suppliers and imports of the products.
- time adjusted subsidies, allocated to products, are distributed between domestic suppliers of the products.

Finally, the Supply Table is calculated in Basic values

Overview of the Use Table



The Use table in Purchasers' value is automatic decomposed into the different valuation matrices:

- Investment levies (Sales tax) (Account type 18)
- Non-refundable VAT (Account type 17)
- Product subsidies to traders (Account type 16)
- Product taxes paid by traders (Account type 15)
- Retail and wholesale margins, basic value (Account 14 R)
- Transport margins (Account type 14T)
- Producers' value (Account type 13)
- *The producers' value is further decomposed into:*
- Subsidies on products (Account type 12)
- Taxes on products (Account type 11)
- Basic value (Account type 10)

Balancing and correcting changes in inventories:

In the first phase of the balancing of the supply and use of each product at producers' values, the change in inventories is residually determined. The residuals are corrected to an acceptable level by changing the Supply or Use of a product. The corrections are first made manually, based on an evaluation of data and statistical sources and finally by an automatic "RAS" method.

The Use Table gives intermediate use of products by industries domestic final use and exports:

2. Production accounts

Intermediate use of products:

- Account 22. Production accounts, Own final use, specified by industries
- Account 23. Production accounts, Market producers, specified by industries
- Account 24. 25. Production accounts, Non-market producers, Central and Local government, specified by industries
- Account 26. Production accounts, Non-market producers, NPISHs, by industries
- Account 27, 28, 29 Aggregation/technical acc.

Final use of products:

- Account 51. Exports, specified by type of exports
- Account 6. Final consumption expenditure, specified by the COICOP, COFOG and COPNI classifications
- Accounts 82-86. Fixed capital formation accounts, specified by industries
- Account 87. Change in inventories and Residuals, specified by products

The complete Use table shows the different valuation classes with the product flows:

- Account type 10. Basic value
- Account type 11. Taxes on products (paid by the producers)
- Account type 12. Subsidies on products (paid to the producers)
- Account type 13. Producers' value
- Account type 14R Retail and wholesale margins, basic value
- Account type 14T Transport margins
- Account type 15. Taxes on products (collected by retail or wholesale traders).
- Account type 16. Subsidies on products (paid to wholesale or retail traders)
- Account type 17. Value Added Tax (VAT)
- Account type 18. Investment levies (A special Norwegian tax) or Sales tax (As implemented in Malawi)
- Account type 19. Purchasers' value

3. “Industry format” Input-Output Tables.

Statistics Norway has a long tradition compiling annual Input-Output Tables (IOT) based on the assumption of a fixed product sales structure (market share assumption). The IOT are comparable to the current national accounts data for production, value added, capital formation etc. and to basic statistics in general.

The SNA-NT software contains procedures for automatic converting the Supply table (Suppliers x Products) and the Use table (Products x Users), at basic value, to an “Industry format” Input-Output table (IOT) by distributing the supply and use of products. For each product, domestic use of the product (intermediate consumption, final consumption, capital formation, changes in inventories) and exports will be linked directly both to the domestic suppliers (industries) of the product and to import of the product.

With "the market share assumption", the principle is the assumption that export of a product primarily is supplied from domestic industries. Distribution of the exports of a product by supplying industries, are assumed proportional to the different industries supply of the product. Imports, custom duty and the remaining part of the domestic supply of the product is then subsequently distributed proportional to the different domestic users of the product. This means that the same import share applies to all domestic use categories of a product, and that all industries that supply a product, have the same market share for all types of use of that product.

In the SUT, imports are distributed by the NA-CPC (or NA-CPA) product classification and not by an industry classification. In the IOT tables, imports distributed by the product classification will also be allocated to the same NA-ISIC (or NA-NACE) industry classification that is used for domestically produced products.

In the IOT tables, import can also be split into the two main categories:” Imports of competitive products” and” Import of non-competitive products”, and further distributed by the industry classification.

PART II. SUPPLY AND USE TABLES IN DIFFERENT TYPES OF ECONOMIES.

1. The Norwegian tradition

Statistics Norway has a very long tradition using computerised routines for compiling annual National Accounts with integrated Supply and Use Tables (SUT) in current and constant prices and giving technical assistance to other countries.

An important component of a large economic planning project in Jamaica in the early 1980s, was development of Supply and Use (SUT) and Input-output tables (IOT). The first SUT/IOT for Jamaica was published in 1984 and also updated in 1994. During the years 1984-1990 short and long term visits to Zimbabwe for developing national accounts with SUT also gave valuable experience in transferring technical knowledge to other statistical offices. As part of these projects, the SNACZ software (developed for running under DOS on PCs) for compiling SUT and I/O tables for developing countries was developed in the 1980s for Jamaica and adapted for Zimbabwe. The SNACZ software was also used for compiling the updated SUT/IOT for Jamaica in 1994.

When SNA93/ESA 95 was implemented in Norway in 1995, the long tradition using computerised routines for compiling SUT, including the experience from developing and using the SNACZ

software, was taken advantage of when designing the Norwegian SNA-NT application as portable and flexible software.

Experts from Statistics Norway have also given technical assistance in compiling Supply and Use Tables (SUT) in current and constant prices to the statistical offices in Bulgaria, the Czech Republic and Slovenia in their transition period and in 2006 also to Hungary. The experience from introducing SUT in different countries with their diverse economy and different economic statistics gives a useful background for the current projects in Malawi and Eritrea

2. The challenge in Africa

For many African countries, there is a strong demand for statistics to provide a basis for measuring and monitoring the development goals, targets and indicators set out in the countries Poverty Reduction Strategies (PRSs) and in the internationally endorsed Millennium Development Goals (MDGs). Despite stronger demand, resources for statistical development have not been sufficient to meet those increased policy needs.

For IMF and users in the African countries, good quality and timeliness of the national accounts system is very important for the economic planning. Many of the African countries have not yet implemented a national accounts system drawn up according to the international standards adopted in the 1993-SNA. They only compile national accounts from the supply side without independent expenditure estimates. For GDP the levels of distortion can be very high.

The challenge for the Norwegian National Accounts projects is to utilize all available data sources and make estimation based on different incomplete data sources. In a number of statistical offices different economic data are routinely collected by NSO and Government ministries without being utilised for the national accounts compilation. All existing economic statistics and administrative data sources, such as crop estimates, economic surveys, government accounts, tax data, import and export statistics, household expenditure surveys and consumer price indices should be used in a standardized way for the national accounts compilation. Balancing the different data sources in a systematic and well documented Supply and Use framework provide important quality check.

3. Data requirements for the SUT accounts.

Important for analysing the African economy is the distinction between “Production for own use, Market production, Non market production (Government accounts and NPISH’s).

Production for own final use have to be estimated specifying home-grown food at gate prices or producer's value. It is very important to estimate a reasonable and realistic figure for imputed rent of cottages in the rural area etc.

For Market production, output should be registered at producers’ value (or basic value) defined as:

- plus Sales of goods and services, specified by NA-products
- plus Produced for own account (Construction work etc. for own account, also included in gross fixed capital formation), specified by NA-products
- plus Change in stocks, finished goods and work in progress
- plus Income from secondary activities (e.g. Contract work; Trade margins calculated as income from sale of goods, bought for resale, minus use of goods for resale)
- plus Income from rental of buildings, machinery, equipment etc.

Intermediate consumption should be registered at purchasers' value, defined as:

	Cost of used goods and services
	Use of raw materials at purchasers' values by main products.
plus	Other main inputs as electricity, water, fuel, telephone etc.,
plus	Rental of buildings, machinery, equipment etc.
plus	Cost of operating transport vehicles
plus	Repairs and maintenance

For many enterprises, the available data will only be Sales of goods without a correction for change in stocks. Sales of goods and Cost of goods and services can also be recorded for an accounting period which can be different from the calendar year.

For the national accounts, Supply and Use table, the statistical unit should have been the establishment, but for small companies in Africa, the enterprise is an acceptable statistical unit when the enterprise only have one main activity,

Value added at producer's value for the different industries are calculated as residuals, defined as:

Total output at producer's value or Total sale

minus Total intermediate input or Total cost at purchaser's value.

Wages and salaries in cash and kind and product taxes and product subsidies, paid by the different industries, should also to be registered for the calculation of Gross operating surplus.

For Non-market production, government accounts the value of the output of services from general government should be calculated as the sum of the expenditure components: intermediate consumption, consumption of fixed capital and compensation of employees.

On the output side, gross output is equal to the sum of the government fees (sales of goods and services) and government final consumption expenditure (the residual). Final consumption expenditure is specified by the COFOG groups.

Figures for consumption of fixed capital are not calculated for Eritrea and Malawi as for many other African countries, which give an underestimation of government final consumption expenditure and GDP.

For Malawi, the accounting year for the government accounts and budget is from 1st. July to 30. June the following year. The calendar year is estimated as half of the first year and half of second year.

For non-market production, NPISH's the production account should be calculated as for government accounts. Complete data for all the different religious and voluntary organisations are difficult to get.

Gross fixed capital formation has to be registered at purchasers' value specified by type and industry and defined as:

	Purchases of new and second hand assets, specified by type of assets
minus	Value of sold assets (Most important for cars)

Imports specified by products have to be registered, specified by products at c.i.f values for external trade and for other imports as basic values. Imports of services are co-ordinated with BOP.

Food aid given by private organisations may not be recorded, even if it for some years can be an important source of food for a major part of the population. For Eritrea and Malawi, import of products as food aid, recorded in the import statistics, has been given special product codes.

Exports specified by products have to be registered at f.o.b. values for external trade and for other exports as purchasers' values.

Custom duties from the External trade statistics should be registered, specified by products.

Household consumption, preliminary estimate from Household surveys has to be registered at purchasers' values. Experience has showed that household surveys can overestimate figures, such as rent in the rural area. This will overestimate the imputed services of owner-occupied dwellings and the Household consumption. The traditionally built cottages in Malawi with a straw roof (which has to be changed each year) will very seldom be rented out.

“**Aggregation accounts**” have been introduced to be able to combine detailed product information on the supply side as from imports with less detailed or incomplete information on the use side. An aggregation account will receive the detailed NA-products, but supply only one “Aggregation product” which is allocated to users.

Simplified example.

27020. Undistributed intermediate consumption Office equipment, cleaning material etc.

19. Input at purchasers' values:	13. Output at producers' values:
222212 Trade advertising material	000020 Office equipment, cleaning material etc.
245132 Detergents and washing products	
252428 Other plastic products	
401000 Electricity , water	
641000 Post , Telephone etc	
<i>19. "Total intermediate expenditure at purchasers' value" is identical to " Output at producers' value"</i>	
<i>Value added equal to zero!</i>	
Output at producers' value (Calculated automatic)	Output at producers' value (Calculated automatic)

PART III. Institutional co-operation project between the National Statistical Office (NSO), Malawi and Statistics Norway

1. The co-operation project

The goal of the Institutional Cooperation project between Ministry of Economic Planning, Ministry of Finance, National Statistics Office (NSO) of Malawi and Statistics Norway is to contribute to poverty reduction by efficient fact-finding policy planning in order to implement the Malawi Poverty Reduction Strategy Paper (MPRSP) and Malawi Growth Strategy (MGS).

Within the Institutional co-operation project between NSO, Malawi and Statistics Norway, the objective of the National Accounts project is to develop an improved methodology for the compilation of the National Accounts for Malawi, following UN's SNA93. Improved quality, coverage and timeliness of the national accounts system should also give a much better basis for the economic and social policy planning in the Ministry of Finance and the Ministry of Economic Planning and Development.

An aggregated Input-Output Table for Malawi was produced for the year 1994. The present national accounts system is mainly following the old UN's SNA 68. The figures are based on 1994 prices. The national accounts figures are annually updated in constant prices by different indicators and with household consumption as a residual. The consumer price index is used for the conversion of value added from constant 1994 prices to current prices.

Production for own use and production in small enterprises have been underestimated or are not included.

Long term and short term experts from statistics Norway have given training to explain how to use available economic statistics in Malawi for the SUT compilation.

2. The framework and data sources for the SUT

The first milestone for the National Accounts project in Malawi has been to develop Supply and Use Table (SUT) for the year 2002, following the SNA93.

The background for the decision to establish the first detailed national accounts, following SNA 93 for Malawi with Supply and Use table for the year 2002, was to use the detailed annual Import and Export statistics, the Annual Economic Survey for 2002, the planned Integrated Household Survey (IHS2) for the year 2002 and the planned Agriculture census for the year 2002.

The Integrated Household Survey (IHS2) was delayed to 2004 and the Agriculture census is delayed to 2007.

The frame for the benchmark SUT for 2002 has been considered carefully and in cooperation with important users in the <government Ministries. Different actions which have been carried through are:

- Establishing an industry classification based on ISIC 3.1 which is relevant for Malawi's economy with a split between Production for own use, Market production, Non market production with subgroups for Government production and NPISH, specifying 150 industries.
- Creating a product classification based on CPC, specifying 500 products and established a link between the product classification and the HS used in the import and export statistics.
-

The Malawi product version of the CPC classification to be used for the SUT has been decided to specify important food products in the Malawian economy and also to split between products sold to the market and products for own use. Goods received as food aid has also been given special product codes.

Available data sources for the year 2002 have been:

The Annual Economic Survey (AES 2002) for 330 large enterprises,

Crop estimate survey,

Data from the Tobacco Control Commission,

Detailed data from the EUROTRACE system for 2002 (Imports, Exports, Custom duties and Surtax) specified by HS product codes, encoded and aggregated to the NA-product codes,

Data from imports and exports of services from Balance of Payments,

Government budgets and accounts for the budget year 2001/2002 and the budget year 2002/2003,

Integrated Household Survey (IHS1) from 1998/99 and Integrated Household Survey (IHSII) from 2004/05.

The estimated household consumption figures from the balancing of SUT have been compared with the two surveys (IHSI) and (IHSII), both corrected with the change in population and the consumer price index. .

A main problem has been weak data sources for medium and small scale companies which are important in the Malawian economy. The last survey for Medium size business enterprises (representing 22361 enterprises) for the year 1998 has been used as a basis for estimating figures for the year 2002.

The NSO had long experience using worksheets. The introduction of the SNA93 with detailed compilation of SUT using new data sources and detailed classifications for industries and products, also required an efficient and partly automatic compilation methodology.

3. Current status

Excel worksheets are used in the Norwegian project to prepare the interlinked input tables and also for preparing ready made reports and tables. The computation of the complete Supply and Use tables, the automatic product balancing, the constant price compilation and updating are conducted by the Norwegian SNA-NT software. Preliminary results are taken out in different prepared Excel tables.

During the first half of 2006, the national accounts division has utilized all available economic statistics and other data sources to prepare the required input data for the first Supply and Use table for the year 2002. Incomplete data in several areas has required time consuming estimation based on different indicators. The National Accounts branch is preparing a detailed documentation of the statistical data sources used and the estimation methods used for the evaluation of the revision of the National Accounts based on the results for SUT 2002.

Preliminary results have showed a large upwards revision of GDP. The present status is a plan for finalizing a preliminary SUT for the year 2002 and to start the updating to the year 2003 in current prices during the autumn 2006.

The final goal during the year of 2006 is a reliable and well-documented SUT-based national accounts system for Malawi, giving acceptable national accounts figures for the year 2002 and 2003 in current prices and 2003 in constant 2002 prices.

Constant price figures will be calculated in the prices of the previous year by calculating SUT for 2003 in 2002 prices. The methodology with constant price compilation in previous year's prices and chain price indices is new for the Malawi government, but has been accepted since it is the recommended methodology in SNA93 and also for the European countries.

Price indices for 2003 with 2002 as basis for the constant price compilation have to be prepared to be ready when the Malawian SUT has been compiled in current prices for the year 2003. The following set of price indices specified by products have to be prepared from the year 2003 (with previous year =100):

- Unit value indices for imports and exports calculated at a detailed product level from the external trade statistics.
- Consumer price indices for detailed products (average for the whole country).
- Price indices for agriculture products (farm gate/producer prices)
-

The revised national accounts with a possible large upward revision of GDP should not be released to any users before the national accounts with the time series for at least the two years 2002 and 2003 have been analysed and approved by NSO. When releasing the data, the production and capital formation accounts for the national accounts industries have to be aggregated to groups of industries with at least 3 enterprises in each group to secure confidentiality.

Improved methodology based on new data sources will probably require backwards revision at an aggregated level of the time series for some years before 2002. Comparable time series in constant prices are very important for analysing the economic development but difficult to compile for a country such as Malawi.

PART IV. Technical cooperation between the National Statistical Office in Eritrea and Statistics Norway.

1. The co-operation project

One of the main objectives/goals for co-operation project is to develop and consolidate National Accounts calculations based on Supply and Use Tables (SUT). The ongoing work will result in the first National Accounts for Eritrea, complying with UN's SNA 93 including integrated annual SUT from the year 2003. The co-operation project also covers the development of economic statistics which is required for the National Accounts/SUT compilation and the development of a new Register of Enterprises based on several existing administrative registers.

The Statistical co-operation between NSO in Eritrea and Statistics Norway started in the end of 2004. Two long term consultants in economic statistics and National Accounts moved to Asmara, the capital of Eritrea to start the long and difficult process of building up economic statistics and National Accounts in the National Statistic Office of the country. The long term and short term experts from Statistics Norway have given training to develop economic statistics and to use the statistics in Eritrea for the SUT compilation.

Starting from scratch developing a national accounts system is a big task. Building up institutional capacity as well as knowledge in the different subject fields is time-consuming and very difficult work. Finding and getting into agreement with different data suppliers in the country is also taking a lot of time. Still, the advantage to be able to plan everything, the whole system, is very valuable. It is also easier to get a more consistent statistical system this way.

2. The framework and data sources for the SUT

Important for the decision to establish the first detailed national accounts for Eritrea as a Supply and Use table for the year 2003, was to use the detailed annual import and export statistics, the detailed Manufacturing statistics from Ministry of Trade and Industry and the large Household income and expenditure survey for 2002.

In the Eritrean National Accounts/ SUT, the industry and product classifications are based on the international standards of ISIC and CPC respectively. The SUT have about 80 NA-ISIC industries and 680 NA-CPC products (including capital by type and technical products). Further split is made for many of the products. This has been important, especially for goods that are produced for own consumption, and also for goods that are imported directly as aid. For some CPC goods we have introduced three sub products. This is both for technical purpose, since the same good is treated differently in the system, and also for analytical purpose. The COICOP and COFOG classifications are following the minimum requirement for UN and IMF reporting.

The Eritrean aggregated NA-CPC-codes are mainly decided based on three sources: 1) domestic manufacturing output and intermediate consumption, 2) primary industry output and intermediate consumption and 3) foreign trade statistics (imports/exports of goods). Services are aggregated to the level where information is available.

During the project period, NSO has received the following data from different Government Ministries for the year 2003 and 2004:

- Agriculture; livestock, crops; sales of wood from Ministry of Agriculture,

- Fishing; from the Ministry of Fishery (database with detailed data),
- Mining and quarrying, from the Ministry of Energy and Mines,
- Manufacturing (census of large scale manufacturing); from the Ministry of Trade and Industry
- Water purification and distribution from the water departments in the administrative villages in the regions
- Electricity, Production and distribution, Financial report and statistical data from the Eritrean Electricity Company (EEC) owned by the Eritrean Electricity Authority (EEA).
- Transport and Communication data for 2003 and 2004 is available from the Ministry of Transport and Communication (MOTC). The data do not cover all the activities under the Ministry of Transport and Communication. Due to under coverage the IRD project data is used to correct the figures.
- Hotels and restaurants supply important information on volume, but price information is still lacking. Cooperation with the Ministry of Tourism is established to conduct a comprehensive survey for hotels and restaurants.
- For construction and civil engineering, a special survey has been conducted by NSO, in cooperation with the Ministry of Construction, giving data for the SUT.
- Ministry of Finance has only been able to provide aggregated data for the government accounts. The information received has made it possible to compile Sales tax and product taxes in the SUT, following the definitions given in SNA1993, chapter VII C Taxes on production and imports.
- Financial data have been collected from the National Bank of Eritrea and the other main financial institutions.

The Integrated Household Survey from 2002 gives information on household consumption by COICOP and National Accounts products. Since the information is from 2002, certain assumptions have to be made to adjust the figures to 2003 price level.

From January 2005, the Inland Revenue Department (IRD) started a new data collection system. There was a need for capturing main figures for all enterprises for the years 2001 to 2004. Tax information was converted into electronic form from paper archives via a data conversion form developed by IRD. All enterprises (around 70 000) were included. NSO supported the IRD with this project and made an attachment to this conversion form with a number of important variables for a business register, and for the National Accounts. In addition to legal units, industrial code (ISIC) for the legal unit, the enterprise, tax identification number, address etc, at least output is reported for all the units or TIN's (tax identification numbers). This will be used for sampling purpose later. For the SUT 2003 this source is also used extensively for areas where there are no other data.

Of the 70000 TIN's, there are a number of very small or "dead" TIN's. Only a few thousands of the TIN's count for more than 90% of the output and value added in the market oriented part of the economy. Most of these large TIN's are keeping financial accounts, the biggest both financial statements and balance sheets. For all these TIN's the most important input data for the SUT compilation is available. For some TIN's, there will be an enterprise unit with several LKAU's, but the TIN is mainly equal to the Local kind of activity unit..

NSO Questionnaire to IRD project

TIN	
Tax Identification Numbers	<input type="text"/>
Full Name of tax payer	

Category A

Q#	Description	2001	2002	2003	2004
1	1.0 Total Gross Income:				
2	2.0 Cost of Sales (goods sold):				
3	3.0 Manufacturing Costs:				
	3.1 Purchase of direct materials				
	3.2 Direct wages, salaries and benefits etc. (Direct labour)				
	3.3 Depreciation related to direct costs (manufacturing)				
	3.4 Other direct costs				
4	4.0 Total general and administrative expenses:				
	4.1 Administrative wages, Salaries and benefits				
	4.2 Depreciation related to Indirect costs				
	4.3 Other expenses				

If the tax payer has balance sheet, please fill the following Q5 and Q6

Q #	Description (End-2001 equals beginning-2002, etc)	End-2001	End-2002	End-2003	End-2004
5	5.0 Total Fixed Assets:				
	Of which: 5.1 Machinery and Equipment				
	5.2 Vehicles				
	5.3 Buildings				
6	6 Stock balance:				
	6.1 Direct materials				
	6.2 Work in process				

The Inland Revenue Data (IRD) is arranged by main ISIC (letter). Substantial effort has been put into allocating the data to 3-digit ISIC. This is time-consuming and is done by the responsible staff in each main ISIC area. They sort the data by gross income and start with the biggest TIN. This information is very important both for the National Accounts and for the Business Register.

3. Current status

NSO has finished the preparation of input data for the National Accounts system with Supply and Use Tables (SUT) for the year 2003. The balancing of the different input data by the SNA-NT software shows unbalance for product data, which are being corrected. Different analytical tables in Excel are analysed for the year during the correction phase.

Price information is collected from different sources. The import and export data are giving information on prices and quantities of the goods imported and exported. This makes it possible to develop unit price indices from this source (this is very important in Eritrea since the import and export counts for such big part of the flow of goods). Secondly, for the manufacturing production and intermediate consumption it is possible to develop the same kind of unit price indices by using the manufacturing large scale census covering about 80% of the total production of the sector. Thirdly, price information from the Eritrean Grain Board (EGB) is available for all kind of agricultural production. These are prices used by the government to buy surplus production in the agriculture. The prices are regulated by the government, aiming to cover the production costs for the farmers. Finally the CPI will be used for personal services and household consumption in purchaser's prices.

The goal during the year of 2006 is to establish a reliable national accounts with SUT for Eritrea for the year 2003 and to update the SUT to the year 2004 in current and constant (previous year's prices). A reliable and timely national accounts system is a necessary database for the monitoring of Eritrea's economy. The revised national accounts with a possible upward revision of GDP should not be released to any users before the national accounts with the time series for at least the two years 2003 and 2004 have been analysed and approved by NSO.

ANNEX 1. METHODOLOGY FOR SUPPLY AND USE TABLES IN CURRENT AND CONSTANT PRICES

1. SUT IN CURRENT PRICES, PRINCIPAL EQUATIONS

This annex gives an introduction to the Norwegian methodology for compiling SUT in all types of valuation in current and constant prices, Required input data, assumptions made and methodology for compiling and balancing the product flows and estimate GDP in current and constant prices within the framework of SUT will be described.

Annex 3 gives references to the more complete documentation from Statistics Norway:
"SNA-NT SUT/STARTER" with the complete set of Equations for the current price compilation.
"SNA-NT SUT/CONSTANT" with the complete set of Equations for the current price compilation..
"SNA-NT User's guide for Supply and Use tables in Current and Constant Prices".

A "SNA-NT User's guide for Supply and Use tables in Africa" is being prepared.

1.1. Establishing the Supply Table at producers' value.

The Supply table (T1) can be illustrated by matrix H, defined by: $H = \begin{bmatrix} h_{ip}^v \end{bmatrix}$

v represents Value Classes (Account type 10=Basic value:11=Product taxes:12=Product subsidies, 13=Producers value)
i represents Suppliers (*i*= *d+z*)
⇒ *d* Domestic production and Aggregation accounts (Accounts from 22010 to 29990)
⇒ *z* Import accounts (Accounts from 52110 to 52900).
p represents Products (Accounts from 000001-999999).

Data have to be loaded into the Oracle database with a set format. The Document “SNA-NT User's guide” describes how input data are converted from Excel worksheets to the required ASCII (text) files as "CORRT1-file" and "CORRT2-file”.

A “CORRT1-file” is the file format for registering data for production and imports, specified by product at producers’ values (13-values):

CORRT1	SUPP CODE	VALUE/PRODUCT CODE	VALUE
Position	Position	Pos.Position	Position
1 - 6	21-25	29/3031- 36	41 - 51
CORRT1	23211	13XXXXXX	2000
CORRT1	23211	13XXXXXX	4000
CORRT1	23211	13XXXXXX	4000

Position 1- 6: “CORRT1” is a technical name for all records in a CORRT1-file.
Position 21- 25: shows 5-digit codes for the Supplying industries ((as 23 for Market production and 211 for Manufacture of pulp)
Position 29-30 plus 31-36: show 8 digit codes where the first 2-digit codes give type of valuation (13 for producers’ value) and the next 6-digits codes show the product codes.

1.2. Establishing the Use Table at purchasers' value.

M is Use table (T2), without the accounts for “Change in inventories and Residuals”, defined by:

$$M = \left[m_{pj}^v \right]$$

v represents Value classes,
p represents Products,
j represents Users, but not Change in inventory/Residuals

A CORRT2-file is the file format used for registering absolute values for intermediate use, domestic final consumption and exports of products at purchasers’ values (19 values).

CORRT2	VALUE/PR.	CODE USE	CODE VALUE
Position	Position	Position	Position
1 - 6	19/20 21 -26	31-35	41 - 51
CORRT2	19XXXXXX	23211	400
CORRT2	19XXXXXX	23211	500
CORRT2	19XXXXXX	23211	-8

Position 1- 6: CORRT2 is a technical name for all records in a CORRT2-file.
Position 19-20 plus 21-26 shows 2-digit codes for type of valuation (19 for purchasers’ value) and 6-digits product codes (together 8 digit code).
Position 31- 35 shows 5-digit codes for the Users (as 23 for Market production and 211 for Manufacture of pulp).

1.3. Compiling the other valuation components of the Use table.

From the initial Use Table (T2) with the product flows recorded in Purchasers' values, the other valuation components are calculated automatic in the following stages:

Calculating the matrix for Value Added Tax VAT (17-Values)

The SNA-NT methodology follows the SNA93 recommendation with "net system of value added tax". Only non-deductible VAT is recorded as theoretical VAT.

Calculated VAT (17-Values), by Products and Users:

$$M^{17} = [m_{pj}^{17}] = \begin{bmatrix} \frac{K_{11}}{1+K_{11}} m_{11}^{19} & \dots & \frac{K_{1j}}{1+K_{1j}} m_{1j}^{19} \\ \dots & \dots & \dots \\ \frac{K_{p1}}{1+K_{p1}} m_{p1}^{19} & \dots & \frac{K_{pj}}{1+K_{pj}} m_{pj}^{19} \end{bmatrix}$$

where \mathbf{K} gives rates of VAT and is of the same order as the matrix \mathbf{M}^{19} , each element of matrix \mathbf{M}^{19} is multiplied by the corresponding element of matrix \mathbf{K} .

Information about the current VAT rates for a year (specified by product and users) has to be recorded from the government's accounts and been expressed as a fixed per cent of the purchasers' value minus VAT: The matrix \mathbf{K} is compiled from information stored in tables showing the following alternative:

- ⇒ Certain products might not to be levied with VAT, regardless of use.
- ⇒ Certain products might have a rate of VAT that differs from the general rate.

In the Norwegian case we find about 400 products on the list of products with non-standard VAT tax rate. Among these are products from Central and Local government. For other products, the VAT rate is zero. For some products, as electricity for domestic use, an alternative rate is used in the northern regions of Norway and an average rate has to be estimated.

Calculating matrix for Retail and wholesale trade margins at basic values (14R-Values).

\mathbf{M}^{KT} is an auxiliary matrix, defined as Purchasers' value (19) less VAT (17):

$$\mathbf{M}^{KT} = \mathbf{M}^{19} - \mathbf{M}^{17} = \mathbf{M}^{13} + \mathbf{M}^{14R} + \mathbf{M}^{14T}$$

Retail and wholesale trade margins are defined as $TRM = \frac{M^{14R}}{M^{13}}$

TRM: The Trade Margin rates is "the total absolute value of retail and wholesale margins (\mathbf{M}^{14R}) as a percentage of Producers' values (\mathbf{M}^{13}) and is of the same order as \mathbf{M}^{KT} .

Input file with (14R) FOR TRADE MARGIN RATES (TRM) has to be specified with 4 decimals:

PRODUCT	USER	MARGIN RATE
Position	Position	Position
1 - 6	8 - 12	15 - 20
(6 digits)	(2+3 digits)	0,2600 (Example of presentation of 26,00 %)

The trade margin rate is entered only when the rate is different from zero. The trade margin rates have to be estimated by products and users.

\mathbf{M}^{14R} is the calculated Retail and wholesale trade margins at Basic Value:

$$M^{14R} = [m_{pj}^{14R}] = \begin{bmatrix} \frac{trm_{11}}{1+trm_{11}+itm_{11}} m_{11}^{KT} & \dots & \frac{trm_{1j}}{1+trm_{1j}+itm_{1j}} m_{1j}^{KT} \\ \dots & \dots & \dots \\ \frac{trm_{p1}}{1+trm_{p1}+itm_{p1}} m_{p1}^{KT} & \dots & \frac{trm_{pj}}{1+trm_{pj}+itm_{pj}} m_{pj}^{KT} \end{bmatrix}$$

A similar set of equations are used for compiling the matrix for the Transport margins.

Total use of products (excl. change in inventories) at producers' values (13-values) are compiled in the Use Table (T2) as : $M^{13} = M^{19} - M^{17} - M^{14R} - M^{14I}$

1.4 Balancing the Supply Table and the Use Table at producers' values.

Total supply of a product at producers' value: S_p^{13} is calculated in the Supply Table (T1) as column sums (row vector).

Change in inventories/residual is calculated in the Use Table (T2) from the balancing of the Supply

and Use of each product in producers' values R^{13} , : $r_{p,87XXX}^{13} = S_p^{13} - \sum_{j=1}^g m_{pj}^{13}$

87XXX represents the residual accounts 87000, 87400, 87900:

87000 Residual - Balancing account for the balancing, in 13-Values, of Supply and Use of goods (products that can be stored)

87400 Residual - Balancing account for the balancing, in 13-Values, of Supply and Use of services (products that can not be stored).(Will be removed during the balancing process)

879XX Residual - Balancing account for the balancing, in 13-Values, of Supply and Use of special specified products, like change in livestock (products that can be stored).

By the automatic balancing process of products at producers' values, the integrated Product catalogue will give information for an automatic allocation of products to the different 87 accounts.

Changes in inventories (87-accounts) at basic values (10-Values) and at purchasers' values (19-Values) is decided equal to change in inventories at producers' values (13 values).

1.5. Calculating Use Table with subsidies and taxes on products and basic value.

M^{13} gives Use of products at producers' values (13-Values) classified by users,

File for S12 Product subsidies, classified by products, (registered as negative values):

PRODUCT	VALUE
Position	Position
1 - 6	8 - 14
(6 digits)	Absolute value

File with Rates U12 for reducing the calculation of Product subsidies for some users:

PRODUCT	USER	VALUE
Position	Position	Position
1 - 6	8 - 12	15 - 17
(6 digits)	(2+3 digits)	(3 digits)

Combinations of Product (p) x User (j) where subsidies are not to be calculated, are registered with 0. Combinations of Product (p) x User (j) where subsidies are to be calculated with a reduced rate, are registered with values from 1 to 999. All other combinations of Product (p) x User (j) where no value is registered, will by the SNA-NT software automatic be given a value = 1000.

M^{12} is of dimensions (c x g), gives subsidies levied on products (only negative values):

$$M^{12} = [m_{pj}^{12}] = m_{pj}^{13u12} \times \frac{S_p^{12}}{\sum_{j=1}^g m_{pj}^{13U12}}$$

where S^{12} is a column vector ($c \times 1$), giving Total absolute values for subsidies, classified by products.

$$M^{13U12} = [m_{pj}^{13U12}] = \begin{bmatrix} u_{i1}^{12} m_{i1}^{13} & \cdot & \cdot & u_{ij}^{12} m_{ij}^{13} \\ & \cdot & \cdot & \cdot \\ & \cdot & \cdot & \cdot \\ u_{p1}^{12} m_{p1}^{13} & \cdot & \cdot & u_{pj}^{12} m_{pj}^{13} \end{bmatrix}$$

where U^{12} has the same dimension as M^{13} and the possible values are between 0 and 1000. Every element in matrix U^{12} is multiplied by the corresponding element in matrix M^{13} .

The procedure for compiling taxes on products (11-values) is equal to the methodology described for subsidies.

The Use Table in basic value (10-value), by product and aggregated over all users, is calculated as

$$\sum_{j=1}^g m_{pj}^{10} = \sum_{j=1}^g m_{pj}^{13} + \sum_{j=1}^g m_{pj}^{12} - \sum_{j=1}^g m_{pj}^{11}$$

1.6. Correction runs.

During the process of balancing and correcting the SUT-tables, the economists responsible for the various industries or types of final use, have to check and correct their data. Corrections can take place in different ways, either by loading an Excel file in the "CORR-file" format or by interactive corrections.

Note: Each round of corrections that are carried out results in a new automatic total balancing of the Supply Table and the Use Table in all types of valuation, giving new figures for change in inventories, specified by products.

1.7. A simplified "RAS" methodology for automatic balancing of residuals for services.

The starting point is a Use table where the Total for each User (e.g. intermediate consumption by industries) is assumed to be correct. The adjustment takes place in several automatic steps.

The result is that the first automatic computed residuals for services will be redistributed and balanced. The final result will be revised figures for changes in inventories for goods.

1.8. Value added

Total intermediate consumption of products (p) at purchasers' value (19-value) to a Production account

(d), can be expressed by: $\sum_{p=1}^c n_{pd}^{19}$,

Value added (B_d), for a Production account at producers' value (13-value), is defined by:

$$B_d = [b_d^{13}] = T_d - \sum_{p=1}^c n_{pd}^{19}$$

GDP = Total Value added:
$$B = \sum_{d=1}^e B_d$$

Operating surplus, D_d , for a Production account d , is given by:
$$D_d = B_d - \sum_{k=1}^f i_{kd}, d \in (1, 2, \dots, e)$$

k represents Income Components

d represents Production and Aggregation accounts

1.9. Update to a new year

After having finalised the SUT in current prices and constant prices for the first year, the updating of SUT to the next year can commence. The SUT will first be updated in current prices. The updating can take place either by using CORR-files with absolute and detailed figures for products or by using TIND-files with value indices for industries and types of final use.

A TIND1-file is used to register value indices for the Supplier industry, without product specification.

TINDT1	Supply code	VALUE/PRODUCT CODE	VALUE
Position	Position	Pos. Position	Position
1 - 6	21-25	29/3031 - 35	41 - 48
TINDT1	23211	13TOTAL	1,1600

The TIND1-file will automatic generate a CORRT1-file where the supply from an industry of all products in the version under compilation are compiled proportionally to the supply from that industry in the previous version.

A TIND2-file is used to register value indices for the Users, without product specification.

TINDT2	VALUE/PRODUCT.CODE	USE.CODE	VALUE
Position	Position	Position	Position
1 - 6	19/2021 - 25	31-35	41 - 51
TINDT2	19TOTAL	23211	1,1000

The TIND2-file will automatic generate a CORRT2-file where the use of all products by an industry or a final user in the version under compilation will be compiled proportionally to the use of the products in the previous version.

2. SUT IN CONSTANT PRICES

2.1 International recommendations

The "Handbook on price and volume measurement in national accounts" from Eurostat, December 2001 describes the importance of constant price compilation within the framework of balanced Supply and Use Tables, and states in chapter 2.1.1 the following:

"A simple rule is that total supply (domestic production and imports) and total use (domestic uses and exports) should be equal for each product. Another rule is that total output of an industry should equal its inputs (intermediate consumption plus value added). Compiling one unique measure of GDP volume growth requires full consistency between the concepts of price and volume used within the

output approach and the expenditure approach. This should be achieved by using the same accounting framework as used in current prices".

2.2. Introduction to the constant price methodology

Annex 3 gives references to the Document from Statistics Norway "SNA-NT SUT/Constant prices" where the complete set of Equations for the constant price compilation are specified and explained.

The SNA-NT methodology for constant price compilation of Supply and Use Tables (SUT) is based on the following:

- Annual, balanced SUT (complete valuation matrices) in constant, previous years prices
- Detailed distribution by products (detailed flows of goods and services) in constant prices.
- Value added for the different industries in constant prices, calculated as balancing items (double deflation).

SUT has to be compiled for two years before the constant price compilation converting the current year to the previous years prices can take place.

The constant price figures are compiled by deflating the balanced SUT in current prices at basic value, by price indices, at the product level.

VAT, trade and transport margins and product taxes and product subsidies are compiled in constant prices for the detailed products by user categories, by applying tax rates and trade margins from the previous year.

The level of details in the balanced SUT at constant prices is similar to the level of details at current prices, and the definitional relationships inherent in the current price SUT are also maintained in the constant price SUT. An integrated set of value, price and volume measures are compiled within the framework of detailed, annual SUT in current and constant, previous year's prices.

Corrections of the SUT can only be carried through by correcting current price values or by selecting other price indices to be used, not by correcting the constant price figures directly. A detailed record of the price indices used will be kept currently updated.

Corrections of the price indices to be used, will lead to additional adjustments in constant prices SUT until the final SUT in both current and constant prices are acceptable. With the established compilation procedure and the efficiency of the SNA-NT software, a complete correction of SUT in constant prices, using new price indices, and the successive correction of SUT in current prices, only takes 5-10 minutes. During the checking and revision stage, several versions of the balanced SUT with corrected price indices should therefore be compiled.

The volume and price developments should be reviewed for both production and intermediate consumption. Particular emphasis has to be placed on industries where value added is small compared to output and intermediate consumption. In such cases relatively small errors in the constant price estimates of output and intermediate consumption may result in an obviously incorrect value added at constant prices. Errors may be due to incorrect current values as well as incorrect price indices.

2.3. Price indices and other data input

Price indices for all products and wage indices are registered in an "assembling file", called the "SAM catalogue". The price indices can be proper price indices or implicit price indices compiled from value and volume indices, unit value price indices and as a result of each constant price compilation run, the automatic calculated input price indices. When all the alternative price indices, specified by products,

have been systematised and registered in the "SAM catalogue", the price indices will be drawn from the file according to programmed selection criteria.

Up to 9 different price indices can be registered for each product.

All indices have to be recorded with year t-1=1000 and without **decimal**.

EXAMPLES FROM THE NORWEGIAN "SAM catalogue"

Category 1. Price indices used for import of commodities and custom duties at basic value (10-values):

IM_I Import price indices (unit value indices) based on the external trade statistics at CIF/basic value (10-value)

IM_U Imports price indices, other price indices for commodities and services at basic value (10-value)

Category 2. Price indices used for domestic production to the domestic market at basic value (10-value) or at producers' value (13-value)

PRLO Price indices for products at basic value (10-value) compiled as "Input price indices" for the main industry producing the products (automatic compilation based on compensation of employees per hour worked and price indices for intermediate consumption compiled during the constant price compilation process.

PR10 Price indices for products from domestic production to domestic market at basic value (10-value).

PR13 Price indices for products from domestic production to the domestic market at producers' value (13-value).

KP13 Consumer price indices at producers' value (13-value). For some services, the relevant consumer price index is used as a price index for production. If the VAT rate has been changed from the previous year, the price index has to be corrected for this change to be used as price index for the service.

Category 3. Price indices for exports (19-value):

EX_I Export price indices (unit value indices) according to the external trade statistics (19-value, FOB-value, Purchasers' value)

EX_U Export price indices, other price indices for commodities and services. Purchasers' value (19-value)

Category 4. Price indices for household consumption (19-value):

KP19 Consumer price index at purchasers' value (19-value.).

Consumer price indices are used after the first stages of the deflation for correcting the constant price figures for household consumption of goods at purchasers' values (19-values).

Up to 3 different price indices will be selected to deflate the corresponding current price figures for a product.

- Use table: Products to exports (FOB value), at purchasers' value.
- Supply table: Products from domestic production, at basic or producers' values.
- Supply table: Products from imports (CIF value), at basic value.

In addition follows a final correction using consumer price indices to deflate goods (not services) for Household consumption at purchasers' value.

The file with "SAM catalogue" with all the available price indices specifies by products will be currently updated showing which price indices are selected for the different versions of the constant price compilation. The final file for each year should be kept to give a complete documentation of all alternative price indices and the price indices used.

Statistics Norway has after having completed the SNA93, ESA95 main revision, "SAM-catalogues" for all years back to 1971. This gives a very good overview of the availability of price indices for the different types of products. This also gives a good data source for evaluation of the time series for all the available price indices for one product and also for a group of products.

Constant prices compilation

THE COMPILATION STAGES FOR THE USE TABLE (T2):

Stage 1. EXPORTS, fob /purchasers' value are compiled at constant, previous years prices
Stage 2-4. From EXPORTS, trade margins and other valuation matrices are deducted and Exports are compiled in basic values, at constant prices.

Stage 5-6 The Supply table, Domestic production and Imports at basic values, compiled at constant prices.

Stage 7. TOTAL USE BY PRODUCTS at basic values are fixed, identical with the compiled TOTAL SUPPLY BY PRODUCTS at basic values (Totals compiled in Supply table are transferred to Use table)

Stage 8. For each of the detailed products, the same price index is used for all domestic use of that product at basic value.

Stage 9. For domestic use by products, constant price figures are compiled for the different valuation matrices and added up to domestic use by products in purchasers' value at constant prices.

Stage 13. Finally: Consumer price indices are used to compile revised constant price figures for household final consumption of goods in purchasers' values.

Stage 14. After the constant price figure for household consumption in purchasers' values has been revised, follows revision of the valuation matrices and the constant price figures for household consumption in basic values.

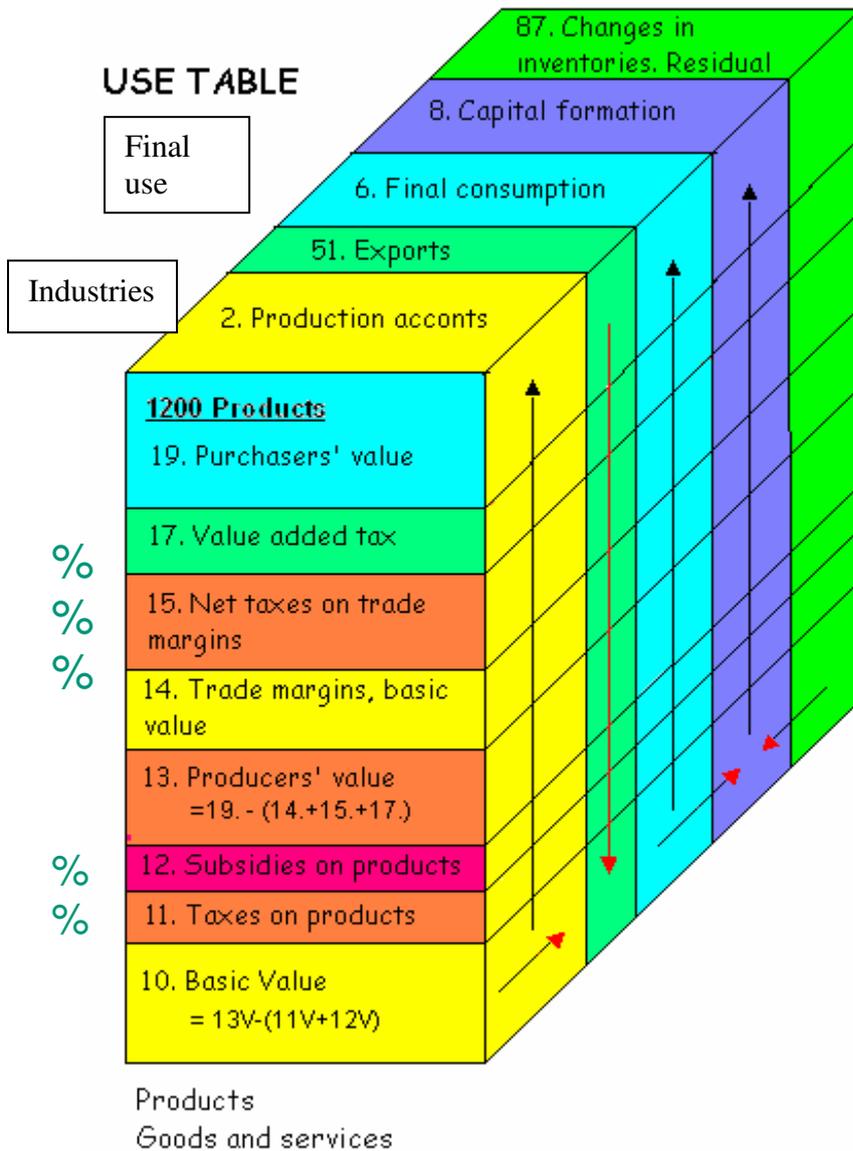
Stage 15. An interactive connection between the constant price SUT and the current price SUT, change the estimated trade margins so the current price figure for household consumption in purchasers' values is kept unchanged.

Stage 16. The change of the trade margin matrix in current prices for products to household consumption leads to a new interactive balancing of the Supply and Use table in current prices.

Stage 17. The revision of the Trade margins in current prices, results in a revision of the production in the Retail and Wholesale industries. The SUT will be balanced with adjusted figures for change in inventories in both current and constant prices.

Stage 18. Value added for all industries are calculated by double deflation,

Stage 19. Gross domestic product at constant prices is calculated by adding net product taxes to gross value added at basic values minus correction for



NA-CPA products

2.4. Use table. Export in constant prices

2.4.1. Use Table. Deflation of Exports at fob/purchasers' value [STAGE 1].

Constant price figures for exports at purchasers' values by the detailed product level are calculated by deflating with the corresponding price indices.

The constant price figures for exports of goods and services, $Nf_{p,y}^{19}$ are calculated by dividing the current price figures in purchasers' prices with a set of price indices (YP_p^{19}).

Constant price calculation is expressed by: $Nf_{p,y}^{19} = [nf_{p,y}^{19}] =$

$$\begin{bmatrix} \frac{1}{YP_I^{19}} n_{1,1}^{19} & \dots & \frac{1}{YP_I^{19}} n_{1,b}^{19} \\ \dots & \dots & \dots \\ \frac{1}{YP_c^{19}} n_{c,1}^{19} & \dots & \frac{1}{YP_c^{19}} n_{c,b}^{19} \end{bmatrix}$$

p represents Products,
y represents Exports

2.4.2. Use Table, Deflation of Trade margins and Transport margins on exports [STAGE 2-4].

VAT, trade and transport margins and product taxes and product subsidies are compiled in constant prices at detailed product level by applying tax rates and trade and transport margins from the previous year. If there are empty cells in the tax or margin matrices for the previous year, the values for the current year are used as substitutes.

Trade margins at basic values (14T-values), are calculated in constant prices for the year t by using the trade margin percentage, the "basic trade margin rates" ($V^{14R/19}$) from year t-1 in current prices. The "basic trade margin rates" are calculated in details for goods specified by the different categories of export. The matrix for the transport margins (14T-values) is calculated as for the trade margins.

Exports, producers' value in constant prices is calculated as : $Nf_y^{13} = Nf_y^{19} - Nf_y^{14R} - Nf_y^{14T}$

Exports, basic value in constant prices is calculated as: $Nf_y^{10} = Nf_y^{13} - Nf_y^{11} - Nf_y^{12}$

2.5. Supply Table. Domestic production and imports in constant prices

2.5.1. Deflation of Imports and Custom duty in basic value [STAGE 5]

Imports of products at basic values are deflated with the corresponding import price indices.

For imports $Hf_{z,p}^{10}$, the constant price figures are calculated by dividing with price indices (ZP_p^{10}) for products from imports. ZP_p^{10} is the price indices for imports of goods and services and of the same dimension as H.

p = products.
Z = imports

2.5.2. Deflation of Domestic production in basic value [STAGE 6]

Domestic production in constant prices in basic value, expressed by Hf_{dp}^{10} is calculated by dividing the figures in current value in basic value (10-value), with a set of price indices, marked with DP_p^{10} .

The price index for a product from domestic production in basic value (10-values) (DP_p^{10}) is automatic calculated as a weighted average of the price index for the product from domestic production to domestic use DIP_p^{10} and the price index for the product to exports, all in basic value YP_p^{10} .

NOTE: To calculate the weighted price index DP_p^{10} , the domestic production of each product, in current prices, is by an automatic compilation split between:

Domestic production of the product in basic value delivered to exports (without re-exports): N_{py}^{10}

Domestic production of the product in basic value delivered to the domestic market: $(H_{dp}^{10} - N_{py}^{10})$

The automatic compilation is based on the following assumptions:

All exports are preliminary supplied from domestic producers.

If the export of a product is larger than total domestic production, the rest of the export must have been supplied from other sources (reduction of inventories or imports). In these cases, the assumption is that all domestic production of the products is for exports.

2.6. Balancing supply and use of products at basic values and compiling constant price figures for domestic use of products at basic values.

The balancing between the Supply table and the Use tables in constant prices is carried out at the detailed product level at basic values (10-values)

In the Use Table (T2), total domestic use of a product in constant prices in basic value (10-values) is calculated as the difference between total supply of the product in constant prices and exports of the product in constant prices.

For every product, this can be expressed by:

$$\sum_{d+s=1}^{e+\bar{U}} df_{p,d+s}^{10} = Sf_p^{10} - \sum_{y=1}^b nf_{py}^{10}$$

To decide the constant price figures for the different domestic use of a product, the total domestic use of the product calculated in constant prices Df_p^{10} , is distributed between the different domestic users in the same proportion as the domestic use of the product in current prices.

Constant price figures for the domestic use of the product p to the Users d+s, in basic values

is calculated as :

$$df_{p,d+s}^{10} = d_{p,d+s}^{10} \times \frac{\sum_{d+s=1}^{e+\bar{U}} df_{p,d+s}^{10}}{\sum_{d+s=1}^{e+\bar{U}} d_{p,d+s}^{10}}$$

p represents products,

d+s represents domestic users (account 22000 to 26999 and 61000 to 87999)

This implies that in basic value (10-value), the same price index is used to deflate all domestic use of a product, inclusive change in inventories of that product !

2.7. Compiling the complete Domestic Use Table in all types of valuation in constant prices. [STAGE 8-10]

For domestic use, taxes on products, subsidies on products, trade margins, transport margins and VAT at constant prices have to be calculated, specified by products and users, as a supplement to the basic values in order to arrive at the purchaser's values in constant prices. Tax rates and trade margins from the previous year are used. If there are empty cells in the tax or margin matrices, the values from the current year are used as substitutes.

Domestic use at purchasers' value, in constant prices, Df^{19} is compiled as:

$$Df^{19} = Df^{13} + Df^{14R} + Df^{14T} + Df^{17}$$

Sf_p^{11} , Sf_p^{12} , Sf_p^{14R} , Sf_p^{14T} , Sf_p^{17} are decided as the row totals in T2, The row totals in T2 are transferred to T1 to decide the column totals in T1.

2.8. Compiling the complete Supply Table in constant prices

2.8.1. Supply Table, Constant price figures for Product taxes, Product subsidies and for Purchasers' value. [STAGE 11.1]

The product taxes (11-values) and the product subsidies (12-values) in constant prices are calculated in the Supply Table (T1) by using the "basic rates" from year t-1. The "basic rates" for Product taxes ($A^{11/10}$) and for product subsidies ($A^{12/10}$), are multiplied with the constant price figures for the matrix for suppliers by products in basic values (10-values).

2.8.2. Supply Table, Constant price figures for Import taxes [STAGE 11.2]

Constant price figures for taxes on imports is calculated in T1 by multiplying "basic rates" from year t-1 for import taxes ($A_{29506,p}^{11/10}$), with the Constant price figures for Imports ($Hf_{z,p}^{10}$) plus Custom duty ($Hf_{29505,p}^{10}$) in basic value (10-values).

Calculation of "basic rates" for import taxes $A_{29506,p}^{11/10}$, based on T1 in current prices from year t-1,

can be expressed by:
$$[A_{29506,p}^{11/10}] = \frac{I}{\sum_{z=1}^b h_{z,p}^{10} + h_{29505,p}^{10}} h_{29506,p}^{11}$$

where $A_{29506,p}^{11/10}$, calculated for t-1 in current prices, is identical with $A_{29506,p}^{11/10}$, which is the "basic rates" to be used for the calculation of constant price figures for taxes on imports in year t.

29506 represents supplier of import tax

p represents Products,

Calculation of import tax in constant prices can expressed by $Hf_{29506,p}^{11/10}$ as:

$$Hf_{29506,p}^{11} = [\sum_{z=1}^b hf_{z,p}^{10} + hf_{29505,p}^{10}] af_{29506,p}^{11/10}$$

where $A_{29506,p}^{11/10}$ is import tax and of the same dimension as $Hf_{29506,p}^{11}$

2.8.3. Balancing constant price figures for product taxes (11-values) and product subsidies 12-values) as calculated in the Supply Table and the Use Table [STAGE 12.1].

Taxes or subsidies on products, which are differentiated according to users, are imposed on a number of products. For these products, the effect of the shift related to the different rates for product taxes (11-values) and product subsidies (12-values) are calculated. To balance the Supply Table and the Use Table in constant prices in all types of valuation, the differences between the constant price figure for product taxes and subsidies related to products in the Supply table and in the Use table are calculated as correction figures on the Supply side, entered as supply from Account 29900 "Imputed net gain at constant prices because of change in "basic rates".

The constant price figures for Sf_p^{11} and Sf_p^{12} distributed by products in T2, can be different from Sf_p^{11} , Sf_p^{12} distributed by products) in T1.

The differences compiled between the constant price figure for product subsidies (Sf_p^{12}) distributed by products in the Supply table and in the Use table are calculated as correction figures on the Supply side allocated to Account 29900 "Imputed net gain at constant prices because of change in "basic rates".

The supply in T1 from account 29900 to the 11-values (taxes on products) and 12- values (subsidies on products) expressed by $H_{29900,p}^v$, is calculated as: $hf_{29900,p}^v \equiv Sf(T2)_p^v - Sf(T1)_p^v$

(T2) represents the row total S, calculated in the Use Table (T2)

(T1) represents the column total S, calculated in the Supply Table (T1)

v represents 11- and 12- values

p represents Products

2.8.4. Transferring constant price figures for trade and transport margins and related taxes and VAT calculated in the Use Table to the Supply Table [STAGE 12.2].

The constant price figures for Sf_p^{14R} , Sf_p^{14T} , Sf_p^{17} , decided as row totals (distributed by products) in the Use Table (T2), are transferred to column totals (also distributed by products) in the Supply Table (T1).

Sf_p^{14R} , Sf_p^{14T} , Sf_p^{17} decided as the column totals in the Supply Table (T1), decides the constant price figures for the 14R-values, 14T-values, 17-values distributed by products in the Supply Table (T1).

2.9. Correction of household consumption with the consumer price indices

2.9.1 Correction in constant prices (STAGE 13 - 17)

When the Use table (T2) has been compiled in all types of valuation, inclusive purchasers' values, an automatic correction is carried through for the constant price figures for Household consumption to use the change in CPI for goods compared with change in the already used price indices.

Constant price figures for products (goods) supplied to Household consumption, calculated in purchasers' values (19-values), $Nf^{(19x61)}$ is revised by deflating the values in current prices with price indices from the consumer price index series (KP_p).

The revised constant price figures $Nf^{(19x61)*}$ are calculated by dividing with a set of price indices (KP_p), specified for certain products (goods) supplied to Household consumption. The change of household consumption at purchasers values (19-values) in constant prices $Nf^{(19x61)}$ for Household consumption, results in the percentage same correction of the constant price figures for VAT, trade margins and product subsidies: $Nf^{(0x61)}$

2.9.2. Automatic correction in current prices

The figures for household consumption in constant prices in basic values (10-values) have been revised. To retain the price indices used for the constant price compilation, the figures for household consumption in current prices in basic values (10-values) are revised as follows:

$$N^{10*} = [n_{p,y}^{10*}] = \left(\frac{nf_{p,y}^{10*}}{nf_{p,y}^{10}} \right) \times n_{p,y}^{10}$$

The total figures for product taxes (11-values) and product subsidies (12- values) in current prices are kept constant. To avoid correcting other figures than household consumption, the distribution of 11- and 12- values are kept unchanged. Revised household consumption in current prices in basic values (10-values) $N^{(10x61)}$ will result in the same revision of household consumption in producers' values (13-value) $N^{(13x61)}$.

$$N^{13*} = N^{10*} + N^{11} + N^{12}$$

Revised figures for household consumption in current prices in 13-values, will by the new balancing in current prices, give new figures for change in inventories in 13-values, and in 10- and 19-values. This revision of change in inventories will only occur for goods and should be acceptable.

To keep the purchaser's value (19-value) constant in current prices, the corrections of 13-values in current prices results in the opposite revision of the trade margins (14R-values)!

The corrected trade margins (14R-value) have to be balanced with the supply from retail and wholesale trade, which have to be corrected. To avoid a complete new balancing process for all the valuation matrices, the VAT (17- values) in current prices is not changed.

The earlier accepted figures for Final household consumption in current prices in 19-values $N^{(19 \times 61)}$, have not been changed !

ANNEX 2. System of National Accounts, New Technology (SNA-NT)

SNA-NT is a client-server application developed for compiling National Accounts.

The main functionality of SNA-NT application was developed between 1994 and 1997, using Microsoft Visual C++. For Data Management, SNA-NT uses the Oracle Relational Data Base Management System. During 1998 to 2000 SNA-NT was updated as needed for new Oracle versions, changed user requirements and with an improved graphical user interface.

The SNA-NT is developed as a Multi-User system consisting of one central Database Server and one or multiple SNA-NT Application clients connected to the Database Server. Each user of SNA-NT is connected via a client PC. The client PC requires Windows 2000 or Windows XP with Oracle Client software installed. (The installation in NSO, Eritrea).

Both the Database Server and the SNA-NT Application can be installed on a stand alone PC as a Single User system. (Installed on 3 stand alone PCs in NSO, Malawi). For training and demonstration of the SNA-NT methodology, it is also useful to have both the Database Server and the SNA-NT Application on a stand alone PC.

The user interface consists of a number of dialog boxes. The calculations that take place are described in detail in the SNA-NT Handbooks: SNA-NT "SUT/Starter" and SNA-NT "SUT/Constant Prices". The "SNA-NT User Guide" describes the operation. Microsoft Excel is used to prepare input tables and SUT and IOT tables at different levels of aggregation. Several versions of the Supply and Use tables and Input-Output tables are stored in the same database, identified by different Oracle data accounts. For each year there will be a set of at least four accounts:

- Supply and Use Tables in current prices,
- Supply and Use Tables in constant prices
- Input-Output Tables in current prices,
- Input-Output Tables in constant prices

ANNEX 3. References

Statistics Norway. Documents 2005/5 National Accounts Supply and Use tables in Current Prices "SNA-NT SUT/STARTER".

Statistics Norway. Documents 2005/4 National Accounts Supply and Use tables in Constant Prices "SNA-NT SUT/CONSTANT".

Statistics Norway. Documents 2005/6 "SNA-NT User's guide for Supply and Use tables in Current and Constant Prices".

NOS National Accounts 1995-2002. Production, Uses and Employment with Input-output table 2000 at basic values and Inverse matrix 2000 at basic value.-

Annually input-output tables for Norway at the Website: <http://www.ssb.no/emner/09/01/nr/>