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Chapter 29: Satellite accounts and other extensions

A. Introduction

29.1 The sequence of accounts is fully integrated in large part because of the underlying rigour of the accounting system. However, the guidelines given in earlier chapters are not necessarily to be followed without variation. A great strength of the SNA is that its articulation is sufficiently robust that a great deal of flexibility can be applied in its implementation while still remaining integrated, economically complete and internally consistent. The purpose of this chapter is to illustrate some of the ways in which this flexibility can be applied.

1. Functional classifications

29.2 As noted in several earlier chapters, moving away from what is purchased to answer the question of why outlays are incurred adds considerably to the analytical power of the system. One approach to this question is the use of functional classifications of expenditure and outlays. A description of these classifications is given in section B. These functional classifications are central to the SNA and also provide a useful starting point for some types of satellite accounts.

2. Key sector accounts

29.3 Instead of using the product and industry classifications (CPC and ISIC) in their standard order and at the same level of their hierarchies, it can be very instructive to select a group of products or industries of particular importance to the economy, designated here as a key sector. The choice might be very specific, for example concentrating on a single agricultural crop or mineral output, or may be more general such as all the goods and services primarily serving tourism. In either case, a set of supply and use tables may be compiled concentrating on the key sector and aggregating other products and industries. In some cases, where the activity is undertaken by relatively few, relatively large enterprises, it may be possible to go further and compile a complete sequence of accounts for the key sector also. These approaches are described in section C.

3. Satellite accounts

29.4 A further and more extensive form of flexibility is that of a satellite account. As its name indicates, it is linked to, but distinct from, the central system. Many satellite accounts are possible but, though each is consistent with the central system, they may not always be consistent with each other.

29.5 Broadly speaking, there are two types of satellite accounts. One type involves some rearrangement of central classifications and the possible introduction of complementary elements. Such satellite accounts mostly cover accounts specific to given fields such as education, tourism and environmental protection expenditures and may be seen as an extension of the key sector accounts just referred to. They may involve some differences from the central system, such as an alternative treatment of ancillary activities, but they do not change the underlying concepts of the SNA in a fundamental way. The main reason for developing such a satellite account is that to encompass all the detail for all sectors of interest as part of the standard system would simply overburden it and possibly distract attention from the main features of the accounts as a whole. Many elements shown in a satellite account are invisible in the central accounts. Either they are explicitly estimated in the making of the central accounts, but they are merged for presentation in more aggregated figures, or they are only implicit components of transactions which are estimated globally.

29.6 The second type of satellite analysis is mainly based on concepts that are alternatives to those of the SNA. The sorts of variations in the basic concepts that may be considered are discussed in section D. These include a different production boundary, an enlarged concept of consumption or capital formation, an extension of the scope of assets, and so on. Often a number of alternative concepts may be used at the same time. This second type of analysis may involve, like the first, changes in classifications, but in the second type the main emphasis is on the alternative concepts. Using those alternative concepts may give rise to partial complementary aggregates, the purpose of which is to supplement the central system.

29.7 Section E suggests some sorts of tables that might be useful in the context of a satellite account. Again, flexibility in the presentation of tables is recommended but the subjects of the tables given in section E have proved to be useful in a number of cases.

29.8 The emphasis on the flexibility of the SNA extends to allowing complete flexibility about how many and what sort of satellite or other extended accounts may be developed. Satellite accounts, especially of the second sort, allow experimentation with new concepts and methodologies, with a much wider degree of freedom than is possible within the central system. When a number of countries develop similar satellites, exchanging experience can lead to beneficial refinements and the establishment of

international guidelines in a particular topic and ultimately the possibility of changes in the central system itself. Some

examples of this sort of research are reported in section F of this chapter.

B. Functional classifications

29.9 The SNA uses special classifications to analyse consumption, or more generally outlays, by different sectors according to the purpose for which the expenditure is undertaken. Such classifications are referred to as functional classifications. The classifications concerned are:

- a. Classification Of Individual CONsumption by Purpose (COICOP);
- b. Classification Of the Functions Of Government (COFOG);
- c. Classification Of the Purposes of Non-profit Institutions serving households (COPNI);
- d. Classification of Outlays of Producers by Purpose (COPP).

29.10 Full details of all the classifications can be found in the UN publication *Classification of expenditure according to purpose* (2000).

29.11 The main purpose of these classifications is to provide statistics which experience has shown to be of general interest for a wide variety of analytical uses. For example, classification of COICOP shows items such as household expenditure on food, health and education services all of which are important indicators of national welfare; COFOG shows government expenditure on health, education, defence and so on and is also used to distinguish between collective services and individual consumption goods and services provided by government; COPP may provide information on the “out-sourcing” of business services, that is, on the extent to which producers buy-in catering, cleaning, transport, auditing and other services that were previously carried out as ancillary activities within the enterprise.

29.12 Functional classifications also provide the means to recast key aggregates of the SNA for particular kinds of analyses, some of which are described in later sections of the chapter. For example:

- a. It can be argued that, for several analytical purposes, the SNA definition of gross capital formation is too narrow. In studies of the causes of labour productivity, researchers would often like to have a measure of “human capital” which is normally derived from information on past expenditures on education. The four functional classifications each identify expenditures on education and thus it is possible to derive education expenditure incurred by households, government, non-profit institutions and producers;

b. In studies of household expenditure and saving, some researchers have considered expenditures on consumer durables as capital rather than current expenses. COICOP facilitates this by identifying expenditures on durable goods;

c. In studies of the impact of economic growth on the environment, researchers often wish to identify environmental protection expenditure. COFOG and COPP both include this as one of their first level categories.

1. COICOP

29.13 There are 14 main categories in COICOP. The first 12 sum to total individual consumption expenditure of households. The last two identify those parts of consumption expenditure by NPISHs and general government that are treated as social transfers in kind. Together all 14 items represent actual final consumption by households. The 14 categories are as follows:

1. Food and non-alcoholic beverages,
2. Alcoholic beverages, tobacco and narcotics,
3. Clothing and footwear,
4. Housing, water, electricity, gas and other fuels,
5. Furnishings, household equipment and routine household maintenance,
6. Health,
7. Transport,
8. Communication,
9. Recreation and culture,
10. Education,
11. Restaurants and hotels,
12. Miscellaneous goods and services,
13. Individual consumption expenditure of NPISHs,
14. Individual consumption expenditure of general government.

29.14 Household budget surveys frequently use a classification scheme based on COICOP to collect household expenditure information. This then has to be reallocated to products for use in a supply and use table as discussed in chapters 14 and 28.

2. COFOG

29.15 There are ten main categories of COFOG as follows:

1. General public services,
2. Defence,
3. Public order and safety,
4. Economic affairs,
5. Environmental protection,
6. Housing and community amenities,
7. Health,
8. Recreation, culture and religion,
9. Education,
10. Social protection.

29.16 As noted in chapter 22, COFOG is used in the analysis and presentation of government finance presentation of statistics.

3. COPNI

29.17 There are seven main categories in COPNI as follows:

1. Housing,

2. Health,
3. Recreation and culture,
4. Education,
5. Social protection,
6. Religion,
7. Political parties, labour and professional organisations.

29.18 This classification is a somewhat reduced version of the classification for all non-profit institutions given in chapter 23.

4. COPP

29.19 There are six main categories in COPP as follows:

1. Outlays on infrastructure,
2. Outlays on research and development,
3. Outlays on environmental protection,
4. Outlays on marketing,
5. Outlays on human resource development,
6. Outlays on current production programmes, administration and management.

29.20 In principle, COPP applies to all producers, whether market or non-market, although not all categories are of equal interest for both kinds of producers. It is probable that, in practice, classification of outlays of producers by purpose will mainly be of interest for classifying transactions of market producers.

C. Satellite accounts for key sector and other special sector accounts

29.21 The sequence of accounts is normally compiled for the whole economy or for all institutional units belonging to the same institutional sector or sub-sector. Within the supply and use tables, production units may be grouped to show the elements of the production account and generation of income account, even if the production units are not complete institutional units. Although the rows and columns of the supply and use tables often follow CPC and ISIC, at similar levels of their respective hierarchies, it is quite possible to select a number of industries that are of special interest in a given country. It is common practice to refer to such groupings of industries as “sectors” even though they do not constitute institutional sectors as the term is used in the SNA.

29.22 It can be very useful for economic analysis to identify particular activities that play a key role in the economy’s external transactions. These key activities may include the petroleum sector, mining activities or crops (coffee, for example), when they account for an important part of exports, foreign exchange assets and, very often, government resources.

29.23 The SNA does not try to provide specific and precise criteria for the definition of what identifies a key sector or activity. It is a matter of judgement in a given country, based on economic analysis and economic and social policy requirements. For instance, even a small industry at an infant stage might deserve to be treated as a key activity.

- 29.24 The first step in drawing up key sector accounts is to identify the key activities and their corresponding products. This may involve grouping together items shown in different parts of ISIC or CPC. For example, accounting for oil and natural gas may cover extraction of crude petroleum and natural gas (ISIC division 06), manufacture of refined petroleum products (ISIC class 1920), transport via pipelines (ISIC class 4930), wholesale of solid, liquid and gaseous fuels and related products (ISIC class 4661) and retail sale of automobile fuel (ISIC class 4730). The extension of the key sector(s) depends on local circumstances; for example, it may be useful for the energy sector to cover petro-chemical processing.
- 29.25 The key products and key industries accounts may be analysed in the context of a supply and use table. Key industries are shown in detail in columns and other industries may be aggregated. In the rows, key products are similarly shown in detail and other products aggregated. Below the supply and use table, extra rows may show labour inputs, gross fixed capital formation and stocks of fixed assets. In the use part of the table, columns for gross fixed capital formation and changes in inventories respectively may be broken down between one or more key sectors or industries and other sectors or industries. In a country where the key activity is carried out by very heterogeneous types of producers, such as small farmers and large plantations owned and operated by corporations, it may be useful to show the two groups of producers separately, as they have wholly different cost structures and behave differently.
- 29.26 Thereafter, a set of accounts, following the sequence of accounts as far as possible, may be compiled for the key sector. In the case of energy and mining activities, the key sector generally consists of a limited number of large corporations where access to the commercial accounts of the corporations is usually possible. All transactions of the corporations are covered, even when they carry out secondary activities. It is useful to know the nature of the secondary products, but not necessarily their destination.
- 29.27 When the key sector relates to an agricultural industry or product, such as coffee in certain countries, the situation is more complex. Many producers may be unincorporated enterprises that do not qualify as quasi-corporations. Ideally, the key sector accounts would include a complete set of accounts for the households that carry out these productive activities. Because this may be difficult to do in practice, it may be necessary to show only the accounts and transactions which are most closely linked with the key activity such as the production and generation of income accounts from the one side and main transactions of the capital and financial accounts from the other.
- 29.28 In many cases, government plays an important role in connection with key activities, either via taxes and property income receipts, regulatory activity or subsidies. Accordingly, the detailed study of transactions between the key sector and general government is very important. The classification of transactions may be extended to identify those flows connected with the key activity, including the relevant taxes on products. These flows may be received by various government agencies, such as ministries for special purposes, universities, funds or special accounts. Similarly, it is very useful for economic analysis to indicate what uses are made by government of these resources, especially in the case when they are routed via a government agency. This calls for a specific analysis by purpose of this part of government expenditure.
- 29.29 The distinction between public, foreign controlled or national private corporations is fundamental when dealing with a key sector.
- 29.30 One more step may consist in showing in additional tables the “from whom to whom?” relationship between the key sector and each other sector and the rest of the world.

D. Satellite accounts; options for conceptual variations

- 29.31 This section looks at some of the options that might be adopted in developing a satellite account of the second type, where some of the basic concepts of the central system are intentionally varied. It is deliberately illustrative rather than exhaustive.
- 1. Production and products**
- 29.32 Within the production boundary of the central framework of the SNA, producer units are establishments, classified according to their principal economic activity. Such units are classified according to ISIC.
- 29.33 When establishments, and consequently industries, are not homogeneous at a given level of the ISIC, they undertake both a principal activity and one or more secondary activities. The output of these secondary activities is identified according to its nature, following a product classification, but the inputs of secondary activities are not separated from those of the principal activities. Ancillary activities, on the other hand, are not analysed and classified according to their own nature and the related products do not appear as autonomous products.
- 29.34 When examining certain kinds of activity and products, it may be useful not only to separate secondary from principal activity, but also to identify and recognise the ancillary activities in order to obtain a full picture of the inputs corresponding to the activity being examined.
- 29.35 Consider the example of transportation. The output of transportation activities in the central framework covers only transport services rendered to third parties, whether as a principal or secondary product. Own-account transportation is treated as an ancillary activity; its inputs are unidentified components of the costs of the producing units it serves. To obtain a broader picture of transportation

activity, own-account transportation of producing units may be identified and measured.

29.36 In some instances, it may be useful to consider enlarging the production boundary. For instance, to make an overall estimate of the transportation function in an economy, it might be useful to cover transport services rendered by households using their own cars and to try to value the time people spend using transport facilities. Generally speaking, the scope of non-market activities may be extended considerably.

29.37 The process of identifying principal, secondary and ancillary activities works well when the activity in question is identified in one of the standard classifications and so appears in the central framework. However, in some important cases, such as tourism and environmental protection activities, the process of identification is complex because not all the relevant activities and products appear in the central framework classifications. In this case, the use of the word “industry” is not in strict accordance with the normal usage just as “sector” is used in a special sense in the context of key sector accounts.

2. Income

Primary incomes

29.38 When the production boundary is extended, as suggested above, the magnitude of primary incomes is increased, income being imputed for the additional activities which are inserted within the boundary of production.

29.39 In conditions of high inflation, nominal interest may be judged not to be an appropriate measure of the return to lent funds. Nominal interest includes an implicit or explicit component as compensation for the change inflation causes in the real value of monetary assets and liabilities. This component may be analysed as a holding gain for the borrower and a holding loss for the lender, rather than as an element of property income.

Transfers and disposable income

29.40 Several kinds of transfers in addition to those in the central framework may be delineated, if meaningful. Some examples follow.

29.41 Implicit transfers may be made explicit. Implicit transfers change the situation between units without any flow being treated as an imputed transfer in the central framework. For instance, tax benefits refer to the advantages or disadvantages economic units incur as a consequence of tax legislation by reference to an average situation. Another example is the case of non-market services provided free of charge by government units to market producers. In the central framework these services are treated as collective consumption of government. If a further analysis were to treat them as an addition to intermediate consumption of market producers, a counterpart should be introduced, preferably in subsidies on production. This approach may be undertaken systematically to measure all types of transfers between government and particular sectors, such as agriculture. The implicit benefits resulting from tax

concessions, equity participation, soft loans, differential exchange rates, differential domestic prices, etc., may then be added to subsidies, other current transfers, or capital transfers embodied in the central framework data.

29.42 Externalities are impacts on third parties that are not accounted for in the value of monetary transactions between two economic units or that result from actions of these units in the absence of any monetary transaction. As such, externalities may give rise to a wide range of implicit transfers. For example, pollution and nuisance created by producers may have negative effects on final consumers. These negative effects might (with difficulty) be estimated and recorded as negative transfers from producers to households. In order to balance these negative transfers, one possibility might be to introduce a concept of production of externalities which would result in an output of negative or positive services and the corresponding final consumption.

29.43 Flows in the other changes in volume of assets account and the revaluation account of the central framework are candidates for enlarged concepts of transfers and disposable income. Uncompensated seizures, for example, could be recorded as a transfer (albeit unwillingly on the part of the former owner). In countries where holding gains or losses on financial assets/liabilities are significant, real holding gains and losses on financial assets and liabilities could be added to disposable income in order to derive a broader measure of income.

3. Uses of goods and services

29.44 The coverage of uses of goods and services, either for intermediate or final consumption or capital formation, obviously changes as a result of enlarging the concept of production. For example, if services rendered to each other by members of the same household were included in production, they would have to be also included in final consumption.

29.45 The borderline between intermediate consumption, final consumption and capital formation may also be modified in various ways. Two often mentioned cases refer to human capital and consumer durables. If at least part of final consumption on education and health were treated as fixed capital formation, the corresponding central framework transactions would be reclassified from consumption to fixed capital formation resulting in human capital assets. As an immediate consequence, the concept of consumption of fixed capital would be extended.

29.46 An alternative to the inclusion of expenditures on consumer durables such as cars and furniture in household final consumption would be to treat them as fixed capital formation. Only that part of the resulting fixed asset estimated as the capital services provided by the durable would then enter final consumption. Strictly speaking, this procedure implies enlarging the concept of production to include household services. (This is one subject discussed further in section E.)

29.47 As a consequence of the changes just considered, the concept of saving would be extended.

4. Assets and liabilities

29.48 The scope of non-financial assets could be modified as a consequence of extending the concept of production or modifying the borderline between consumption and capital formation, as indicated in the previous paragraphs.

29.49 The scope of financial assets and liabilities could also be broadened by including contingent assets and liabilities in the classification of financial instruments. Further, alternative rules about the valuation of financial assets may be used, for example using fair value estimates instead of market value.

5. Purposes

29.50 Section B describes the functional classifications. In the standard version, headings at a given level are mutually exclusive. For example, teaching in hospitals must be classified as either education or health expenditure but not both. Consequently, for an education or health account, it might be desirable to reclassify a number of transactions. In order to preserve as great a degree of consistency with the central system as possible, any reclassifications should be treated as removing an item from one heading and placing it in another rather than allowing double counting. Double counting would mean that transactions classified by purpose were no longer additive since some of them would

appear under two or more headings. However, even without double counting, it should be noted that different satellite accounts, each with a different focus, may not be consistent with respect to other headings. For example, if an education satellite account treats some teaching done in hospitals as education rather than health, the measure of health in that satellite will differ from that in any other satellite where such a displacement has not been made.

6. Aggregates

29.51 A number of the complementary or alternative analyses mentioned above may modify the main aggregates as shown in the central framework either directly or indirectly. Examples of direct modifications are the increase in output and value added when final consumption of household services for own use is included within the boundary of production, or the increase in fixed capital formation if human capital is considered an economic asset. Other aggregates are indirectly modified; saving in the latter case, disposable income in the former.

29.52 In some types of analysis the objective is to focus on one specific field of concern, such as education or tourism. Changes in some concepts and aggregates of the central framework may be introduced, but this is not the primary intention, nor is it intended to give a different picture of the overall economic process.

E. Possible tables for a satellite account

29.53 The previous section described what variations in the basic concepts, accounting rules and classifications of the SNA could be applied in a satellite account. This section suggests some sorts of tables that it might be useful to compile for a satellite account.

1. Scoping a functionally orientated account

29.54 The starting point is to decide which products are of interest and which are the industries involved in their production. The resources devoted to the production of the items include not only current costs but also fixed capital used in production. Once the items are produced, the question arises of how they are used. This leads to requiring information on the following topics:

- a. A detailed analysis of the supply and use of the products in question;
- b. Information on the fixed capital used in the production process.

29.55 For many items, the units using the products are responsible for bearing the expense of acquiring the product but satellite accounts may frequently be compiled for areas, such as health or education, where there may be an important distinction between who pays for the product and who consumes it.

29.56 In addition, for many products of special interest, there may be particular taxes or subsidies associated with their production or use. Taking these two factors together, therefore, in addition to the items above, the following is required:

- c. An analysis of any transfers associated with either production or use.

29.57 It is also useful in many cases to associate non-monetary figures with the monetary ones. This means assembling the following information:

- d. Information on employment and the availability of assets.

29.58 Once these four sets of data are assembled, it should be possible to develop a satellite account that covers the analysis of uses of, or benefits from, the expenditure on the items, production including the labour and capital employed, transfers and other ways of financing the uses. All of this can be expressed in value terms and, when relevant, in physical quantities.

2. Determining the products of interest

29.59 For any field of interest, the starting point is to identify the products specific to this field. It is customary, in the context

of a satellite account, to identify these as characteristic products and connected products. Characteristic products are those that are typical of the field; for instance, for health, characteristic products are health services, public administration services, education and R&D services in health.

- 29.60 The second category, connected goods and services, includes products whose uses are interesting because they are clearly covered by the concept of expenditure in a given field, without being typical, either by nature or because they are classified in broader categories of products. In health, for example, transportation of patients may be considered connected services; also pharmaceutical products and other medical goods, such as spectacles, are very often treated as connected goods and services.
- 29.61 Together characteristic products and connected products are referred to as specific products.

3. Measuring production

- 29.62 For characteristic products, the satellite account should show the way these goods and services are produced, what kinds of producers are involved, what kinds of labour and fixed capital they use and the efficiency of the production process and, hence, of the allocation of resources.
- 29.63 For connected goods and services, there is no particular interest in their conditions of production because they are not typical of the field of interest. If the conditions of production are important, then the items should be considered characteristic products and not connected products. For example, pharmaceutical products might be considered characteristic in the account for health of a country in the first stages of developing a domestic industry. The precise borderline between characteristic and connected products depends on the economic organization in a given country and the purpose of a satellite account.

4. Components of uses/national expenditure

- 29.64 The components of uses or national expenditure are the following:
1. Consumption of specific goods and services,
 2. Capital formation in specific goods and services,
 3. Fixed capital formation of characteristic activities in non-specific products,
 4. Specific current transfers,
 5. Specific capital transfers.

Each of these items is discussed below.

Consumption

- 29.65 Item 1 is consumption of specific goods and services. It covers actual final consumption (as defined in the central framework) and intermediate consumption. Market

products, products for own final use and non-market products are distinguished and, for the latter, individual and collective consumption may be shown separately. Intermediate consumption generally has a broader coverage than in the central framework, as the output of the relevant ancillary activities is identified with intra-establishment deliveries being recorded. As a consequence, it covers (actual) intermediate consumption as defined in the central framework and internal intermediate consumption. In some cases, such as transport services, the last component may be important in size. Sometimes, it could be considered that this internal intermediate consumption should be treated as final consumption and added to actual final consumption, as in the use of ancillary education and health services, thus broadening the scope of household actual final consumption. Alternatively, the scope of consumption may be narrowed, if the use of certain services is treated as fixed capital formation in a satellite account instead of intermediate or final consumption as in the central framework.

Capital formation

- 29.66 Item 2 is capital formation in specific goods and services. Since, item 2 includes changes in inventories, if appropriate, it may cover work-in-progress in specific services. In an account for culture, for example, there may also be acquisition less disposals of valuables.
- 29.67 Item 3, fixed capital formation of characteristic activities in non-specific products and their acquisitions less disposals of non-produced non-financial assets is a bit more complex:
- a. It does not cover the total fixed capital formation of these activities because that part consisting of specific products is already included in item 2.
 - b. Only the fixed capital formation of activities whose output consists of characteristic goods and services is covered in item 3. (If the exclusion of capital formation of activities whose output consists of connected goods and services proves important, the products and activities in question may have to be redefined to be characteristic.)
 - c. An analysis based on establishments may give a broader coverage than normal because they may cover some secondary activities.
 - d. Item 3 includes acquisitions less disposals of non-produced non-financial assets.

Transfers

- 29.68 Items 4 and 5, specific current transfers and specific capital transfers, are the most important components of national expenditure in cases such as social protection or development aid. In these fields, items 1 and 2 refer only to the administrative costs, both current and capital, of the agencies managing social protection or international aid. The core of the expenditure consists of transfers.
- 29.69 In some situations, there may be subsidies designed to reduce the prices paid by final consumers for certain goods

or services, such as food, transport services, or housing services. They are commonly called consumption subsidies. In the central framework, when these goods and services are considered market products, they are included in final consumption at purchasers' prices. In a satellite account there are two options: either consumption (item 1) is valued differently from the central framework in order to include the value of consumption subsidies or consumption is valued as it is in the central framework and specific current transfers (item 4) must include consumption subsidies. Subsidies included in item 4 may also be directed toward reducing the prices of intermediate consumption. Item 4 may also include other subsidies on production.

- 29.70 In each field a classification of specific transfers has to be established. As it is used for analysing both uses and financing, this classification covers all specific transfers, independently of whether they are counterparts of items 1 to 3 or not.

Total uses and national expenditure

- 29.71 The total uses of resident units are the sum of the five components above. From this, current uses financed by the rest of the world are deducted to reach national expenditure. National expenditure is thus equal to total uses of resident units financed by resident units. It is desirable if possible to distinguish between current and capital uses financed by the rest of the world.
- 29.72 National expenditure, as defined above, does not include transactions in financial instruments. However, for certain types of analysis, such as development aid, loans which are given or received at preferential conditions must be accounted for. Benefits or costs resulting from rates of interest lower than the market ones involve implicit transfers as described in chapter 22.
- 29.73 Uses/national expenditure may be shown by type of products and transfers or by type of purpose (programmes). The main emphasis may be put on one or the other of these two alternatives, or they might be used jointly, depending on the field covered or the aim of the analysis pursued. The approach by programme is particularly relevant in the case of environmental protection or social protection.

5. Users/beneficiaries

- 29.74 For users or beneficiaries, the terminology used may differ from one satellite account to another. "Users" is more relevant to tourism or housing for example, "beneficiaries" to social protection or development aid. In both cases, the terms refer to who is using the goods and services or benefitting from the transfers involved.
- 29.75 At the most aggregated level, the classification of users/beneficiaries is simply a rearrangement of the central framework classification of institutional sectors and types of producers, in which the production and consumption aspects are separated. It may be as follows:
- a. Market producers;
 - b. Producers for own final use;

- c. Non-market producers;
- d. Government as a collective consumer;
- e. Households as consumers;
- f. Rest of the world.

- 29.76 Households as consumers are the most important type of users/beneficiaries in many satellite accounts. In order to be useful for social analysis and policy, a further breakdown of households is necessary. For this purpose, one of the sorts of sub-sectoring of households discussed in chapter 24 could be considered

6. Financing

- 29.77 Because users do not always bear the expenses themselves, it may be desirable to try to analyse the units that ultimately bear the expenses. This is more feasible when the field of interest covers complete institutional units than when it concerns establishments (or units of homogeneous production) covering only part of the output of the whole enterprise.
- 29.78 One way to approach the question of financing is to first establish what types of financing are used and then identify which sorts of units provide each type of financing. The question of "ultimate" bearer of the cost also needs addressing. Some household consumption is provided by government as social transfers in kind, which in turn is largely financed by taxes received by government from households and enterprises. In one sense, therefore, it could be argued that social transfers in kind are ultimately financed by households and enterprises. Some conventions have to be established about how far back down the financing chain to go to determine the "ultimate", or perhaps more correctly the indirect, source of financing.
- 29.79 Another problem that arises is that, except in cases of transactions in kind, there is no necessary link between one source of funding and one type of expenditure. However, it is convenient to pair various types of financing and expenditure to see how far they correspond, as follows:
- a. Intermediate consumption of market producers compared with revenue from sales;
 - b. Intermediate and final consumption of government compared with taxes;
 - c. Intermediate and final consumption of NPISHs compared with contributions received;
 - d. Final consumption expenditure by households compared with compensation of employees and transfers such as pensions;
- 29.80 Capital formation may be funded in a number of ways; from revenue from sales, from the disposal of assets (including financial assets), from the receipt of a transfer in kind or from borrowing. In the case of capital formation by government, this may be funded by the issue of securities or by capital transfers or loans from the rest of the world;

29.81 The source of financing of transfers depends in large part on the field being studied. If social benefits are included, they should be treated as mainly financed by social contributions from other households. Governments will be the provider of transfers in some cases (including subsidies) and the recipient in others (including taxes).

29.82 In a number of cases, it may be particularly relevant to identify financing from the rest of the world.

7. Production and products

29.83 As with key sector accounts, it will almost always be useful to develop a set of supply and use tables for the

characteristic and connected products of interest and the producers of the characteristic products. This may be extended to cover the generation of income account also and non-monetary data concerning employment and indicators of output.

8. Physical data

29.84 Data measured in physical units should not be considered a secondary part of a satellite account. They are essential components, both for the information they provide directly and in order to analyse the monetary data adequately.

F. Examples of satellite accounts

29.85 As explained in the introduction, there are two types of satellite accounts, serving two different functions. The first type, sometimes called an internal satellite, takes the full set of accounting rules and conventions of the SNA but focuses on a particular aspect of interest by moving away from the standard classifications and hierarchies. Examples are tourism, coffee production and environmental protection expenditure. The second type, called an external satellite, may add non-economic data or vary some of the accounting conventions or both. It is a particularly suitable way to explore new areas in a research context. An example may be the role of volunteer labour in the economy. Some sets of satellite accounts may include features of both internal and external satellites.

29.86 The boundary between satellite accounts and a straightforward elaboration of the SNA or even with other systems is not clear cut. The links to balance of payments and the international accounts as presented in *BPM6*, government finance statistics as in *GFSM2001*, or the *Monetary and Financial Statistics Manual (MFSM)* could all be seen as a form of satellite account. The treatment of NPIs in chapter 23 and the informal sector in chapter 25 are clearly satellite accounts. Even the pension table in chapter 17 could be seen as a form of satellite account, even though its compilation is part of the central guidelines of the SNA.

29.87 In this section, some further satellite accounts are described. The descriptions are brief, being intended to give a flavour of the accounts only; references are given for further information. Four areas in total are described. For two of these, the tourism satellite account and the environmental satellite account, the international manuals are now in their second version. The health satellite account is still in a preliminary version but under active revision. The fourth area covers unpaid household production activities. This has been an area of interest for very many years but the difficulties in determining how to measure unpaid activities has so far been a stumbling block in reaching international agreement on how to proceed. Nevertheless, some of the most recent work in this is reviewed for those interested.

29.88 Other satellite accounts have been developed or are under development. Some such as a satellite investigating productivity across a number of countries, called the KLEMS project, have been conducted to date as a research exercise. Others, such as accounts for water and forests, have been developed as elaborations of the main environmental satellite account (*Integrated Environmental and Economic Accounting*, known as *SEEA*) to the point where international guidelines on these are now accepted. Further satellite accounts for agricultural products would be useful for a number of developing countries. Here and elsewhere, as there is agreement on how to compile a new form of satellite account, new international guidelines can be developed. International guidelines on satellite accounts themselves may be subject to revision and may eventually move towards an accepted international standard as is planned for the *SEEA*.

1. Tourism satellite accounts

29.89 The tourism satellite account (*TSA*) is a long established satellite account with more than 70 countries having compiled one at some stage. A manual of international guidelines, known as the *Tourism Satellite Accounts: Recommended Methodological Framework* was first published in 2000 and was updated in 2008. The coverage of second homes and the activity of meetings and conferences are extensions to the *TSA* made in the 2008 update.

29.90 The goal of the tourism satellite account is to provide the following information:

- Macroeconomic aggregates that describe the size and the economic contribution of tourism such as tourism direct gross value added (TDGVA) and tourism direct gross domestic product (TDGDP), consistent with similar aggregates for the total economy and other productive economic activities and functional areas of interest;
- Detailed data on tourism consumption, a more extended concept associated with the activity of visitors as

Table 29.1: Table 6 from the Manual on Tourism Satellite Accounts

Total domestic supply and internal tourism consumption (at purchasers' prices) (*)

Products	TOURISM INDUSTRIES												Other industries		Output of domestic producers (at basic prices)		Imports*		Taxes less subsidies on products nationally produced and imported		Trade and transport margins		Domestic supply (at purchasers' prices)	Internal tourism consumption	Tourism ratios (%)
	1 - Accommodation for visitors		1 - a. accommodation services for visitors except in 1-b		1 - b. accommodation services associated with all types of vacation home ownership		...		12. Country specific tourism industries		TOTAL														
	output	tourism share (in value)	output	tourism share (in value)	output	tourism share (in value)	output	tourism share (in value)	output	tourism share (in value)	output	tourism share (in value)	output	tourism share (in value)	output	tourism share (in value)	output	tourism share (in value)	output	tourism share (in value)	(6.4) = (5.15)+ (6.1) + (6.2) + (6.3)	(4.3)	(6.5)= (4.3) x 100 (6.4)		
	(5.1)		(5.1a)		(5.1b)		(5...j)		(5.12)		(5.13)		(5.14)		(5.15) = (5.13) + (5.14)		(6.1)		(6.2)		(6.3)				
A. Consumption products (*)																									
A.1 Tourism characteristic products (d)																									
1 – Accommodation services for visitors																					X	X			
1.a – Accommodation services for visitors other than 1.b																					X	X			
1.b – Accommodation services associated with all types of vacation home ownership																					X	X			
2 – Food and beverage serving services																					X	X			
3 – Railway passenger transport services																					X	X			
4 – Road passenger transport services																					X	X			
5 – Water passenger transport services																					X	X			
6 – Air passenger transport services																					X	X			
7 – Transport equipment rental services																					X	X			
8 – Travel agencies and other reservation services																					X	X			
9 – Cultural services																					X	X			
10 – Sports and recreational services																					X	X			
11 – Country-specific tourism characteristic goods		X		X		X		X		X		X		X		X		X			X	X			
12 – Country-specific tourism characteristic services																					X	X			
A.2 Other consumption products (a) (d)																					X	X			
B. Non consumption products (d)																					X	X			
B.1 Valuables		X		X		X		X		X		X		X		X		X			X	X			
B.2 Other non consumption products (**) (b) (d)																					X	X			
I. TOTAL OUTPUT (at basic prices)																									
II. TOTAL INTERMEDIATE CONSUMPTION (at purchasers price) (c)																									
(I - II) TOTAL GROSS VALUE ADDED (at basic prices)																									
Compensation of employees																									
Other taxes less subsidies on production																									
Gross mixed income																									
Gross operating surplus																									

X does not apply

... Means that all tourism industries of the proposed list have to be considered one by one in the enumeration

* Imports excludes direct purchase of residents abroad

(*) The value of **A. Consumption products**, is net of the gross service charges paid to travel agencies, tour operators and other reservation services.

(**) Includes all other goods and services that circulate in the economy of reference.

(a) If relevant and feasible, countries should separately identify both components ("tourism connected products" and "non-tourism related consumption products"). In both cases, goods and services should be separately identified, if possible (see para. 4.15.).

(b) Goods and services should be separately identified, if possible (see para. 4.16.)

(c) Breakdown should be provided, if possible (see para. 4.17.)

(d) For goods, the tourism share is to be established on the retail trade margin only (see Annex 4)

consumers, and the description on how this demand is met by domestic supply and imports, integrated within tables derived from supply and use tables that can be compiled both at current values and in volume terms;

- c. Detailed production accounts of the tourism industries, including data on employment linkages with other productive economic activities and gross fixed capital formation;
- d. A link between economic data and non-monetary information on tourism such as number of trips (or visits), duration of stay, purpose of trip, modes of transport, etc. which are required to specify the characteristics of the economic variables.

Defining visitors and tourists

- 29.91 At the centre of the TSA is the idea of a visitor. A visitor is defined as someone who is outside their usual environment but not employed by an entity resident in the place he is visiting. The usual environment is not identical with country of residence. It refers to the area within which a person is normally to be found. It includes the area around the home and also the place of work. Thus border workers, although they cross a country boundary, are not visitors. Visitors are therefore a subset of travellers.
- 29.92 Visitors may be divided into two categories: those that are overnight visitors called tourists and those that are same day visitors called excursionists. Further, it is important to divide tourists according to their country of residence into domestic and external tourists. A resident visiting a country abroad is undertaking outbound tourism; a non-resident visiting the domestic economy is undertaking inbound tourism. The total amount of tourism undertaken by residents, known as national tourism, is the sum of domestic tourism (tourism within the domestic economy undertaken by residents) plus outbound tourism. Internal tourism is the sum of domestic tourism plus inbound tourism.

	Within the country	Outside the country	Total
Residents	Domestic tourism	Outbound tourism	National tourism
Non-residents	Inbound tourism		
Total	Internal tourism		

- 29.93 Tourism is not restricted to activities normally thought of as typical of recreation but include all activities undertaken by the tourist. Travelling for business or for education or training is included. The purpose of the tourist's visit is categorised according to whether it is personal or business and professional. The personal heading is further divided into eight categories: holidays, leisure and recreation, visiting friends and relatives, education and training, health and medical care, religion or pilgrimages, shopping, transit and other.

Definition and scope of tourism expenditure

- 29.94 Tourism expenditure is defined as the amount paid for the acquisition of consumption goods and services as well as valuables for own use or to give away after or during tourism trips. It includes expenditures by visitors themselves as well as expenses that are paid for or reimbursed by others.

Definition and scope of tourism consumption

- 29.95 The concept of tourism consumption goes beyond that of tourism expenditure in that it also includes services associated with occasional accommodation on own account, tourism social transfers in kind and other imputed consumption. While information on tourism expenditure can be obtained by surveys of tourists, the adjustments to tourism consumption have to be estimated from other sources.
- 29.96 Tourism consumption can be characterised according to where the tourism takes place and whether the tourist is a resident or non-resident in a manner similar to that already described for tourism.

Characteristic products

- 29.97 The consumption products considered by the TSA are divided into tourism characteristic products and other consumption products. Tourism characteristic products are further subdivided into internationally comparable tourism characteristic products and country specific tourism characteristic products. The TSA manual includes a list of the first. Other consumption products are divided between tourism connected products and non-tourism related products. Non-consumption products include all products that do not constitute consumption goods and services. These include valuables, tourism gross fixed capital formation and collective consumption. A list of 12 classifications of products and activities characteristic of tourism are given in the TSA manual.

Tourism industries

- 29.98 A tourism industry represents the grouping of those establishments whose main activity corresponds to a characteristic product. Tourism industries cover accommodation for visitors, the food and beverage serving industry, railway, road, water and air passenger transport, transport equipment rental, travel agencies and other reservation service industries, the cultural industry, the sports and recreational industry, the retail trade of country specific tourism characteristic goods and country specific tourism characteristic industries.
- 29.99 Based on this information a full set of TSA accounts consisting of 10 tables can be compiled. The first three consist of tourism expenditure. Table 4 shows a breakdown between domestic and inbound tourism and the adjustments that need to be made to move from tourism expenditure to tourism consumption. Table 5 shows the supply of the tourism industry. Table 6 is the heart of the TSA and shows the main aggregates derived; the aggregates are listed below. Table 7 covers employment. Tables 8 and 9 cover

fixed capital and collective consumption. Table 10 covers non-monetary information.

Main aggregates

29.100 The following aggregates are taken to be a set of relevant indicators of the size of tourism in an economy. They include:

- a. Internal tourism expenditure;
- b. Internal tourism consumption;
- c. Gross value added of the tourism industry (GVATI);
- d. Tourism direct gross value added (TDGVA);
- e. Tourism direct gross domestic product (TDGDP).

29.101 The derivation of these items is shown in table 6 of the TSA manual which is included as table 28.X.

2. Environmental accounting

29.102 Environmental accounts aim to reflect within a framework based on the SNA the impacts of using (and sometimes using up) natural resources and the generation of residuals that pollute the air and water. They also identify specific activities undertaken to prevent or combat the environmental impacts of human activity.

29.103 An interim version of a satellite for *Integrated Environmental and Economic Accounts* (referred to as the SEEA) was published in 1993. An updated version was released in 2003. Work is in hand to revise this further with a view to publication in 2012. The goals of the SEEA are to assist in:

- a. encouraging the adoption of standard classifications in environmental statistics, which extends the value and relevance of existing environmental information;
- b. bringing a new dimension to environmental statistics by applying the economic accounting traditions linking stocks and flows;
- c. providing a link with the economic information contained within the traditional economic accounts, leading to improvements in the reliability and coherence of both sets of information;
- d. identifying use and ownership and hence responsibility for environmental impacts;
- e. encouraging the development of comprehensive and consistent data sets over time;
- f. facilitating international comparisons.

29.104 As with the SNA, the SEEA accounts provide a score-keeping function from which key indicators can be derived and a management function in that they can be used in the

analysis of policy options. The accounts provide a sound basis for the calculation of measures which may already be included in sets of sustainable development indicators, but they may also be used to develop new indicators, such as environmentally-adjusted macro-aggregates which would not otherwise be available.

The different parts of the SEEA

29.105 The SEEA should be seen as a satellite account to the SNA with features of both internal and external satellites. The full system consists of three main sections, two of which can be implemented more or less independently and a third which is designed to integrate the first two with each other and with the SNA. The three sections consist of:

- a. An extended form of supply and use tables capable of incorporating physical data alone or in addition to monetary data;
- b. Elaborations of parts of the central framework of the SNA with some extensions; and
- c. Consideration of extending the SNA to allow the effects of depletion and degradation to impact the macro-aggregates such as GDP.

Physical and hybrid supply and use tables

29.106 Four different types of flows are distinguished in the SEEA.

- a. **Products** are goods and services produced within the economic sphere and used within it, including flows of goods and services between the national economy and the rest of the world.
- b. **Natural resources** cover mineral and energy resources, soil, water and biological resources.
- c. **Ecosystem inputs** cover air and the gases necessary for combustion and the water to sustain life.
- d. **Residuals** are the unintended and undesired outputs from the economy which have zero price and may be recycled or discharged into the environment. "Residuals" is the single word used to cover solid waste, effluents (discharges to water) and emissions (discharges to air).

29.107 The first set of environmental accounts consists of a link to environmental statistics formed by structuring physical environmental data in a supply and use or input-output framework. Physical flow accounts consist of merging accounts for products, natural resources, ecosystem inputs and residuals, each account being expressed in terms of supply to the economy and use by the economy. Purely physical accounts can show the relative importance of different economic activities in terms of their effect on the environment.

29.108 However, the power of this approach comes from being able to draw parallels between the physical and monetary

flows to compare and contrast this environmental importance with the corresponding importance of the activities in economic terms. The hybrid supply and use or input-output tables superimpose monetary values for products on their physical equivalents and add the balancing item of value added. Hybrid input-output tables have been successfully used to explore environmental themes such as greenhouse effects or solid waste. Examples can be found in the SEEA manual.

- 29.109 An example of a hybrid SEEA input-output table is given in table 29.x.

Identifying environmental aspects of the central framework

- 29.110 The second strand of the accounting system is to identify precisely those monetary transactions in the SNA that are directly related to the environment. In terms of flows, this concerns environmental taxes, property income and property rights, and environmental protection, natural resource use and management expenditure.

Environmental taxes, property income and property rights

- 29.111 An environmental tax is one whose tax base is a physical unit (or proxy of it) that has a proven specific negative impact on the environment. Four types of taxes can be considered to be environmental; energy taxes, transport taxes, pollution taxes and resource taxes. As elsewhere in the SNA, care has to be taken to distinguish between taxes and fees for a service. Landfill charges, for example, may fall in the latter category even though levied by government.
- 29.112 Resource rent on natural assets is shown in the SNA as property income when paid to another unit. As shown in chapter 20, however, it is possible to identify the element of operating surplus corresponding to the resource rent on a natural asset used by the owner also.

- 29.113 Another aspect of importance for the use of natural resources is the question of permits to use these over an extended period, as discussed in chapter 17. Permits may relate to extraction of natural resources or the use of them as a sink.

A set of accounts for environmental protection expenditure

- 29.114 A set of environmental protection accounts can be compiled using fairly standard satellite account techniques according to the following steps:
- Relevant ancillary activities should be treated as secondary products;
 - A set of characteristic products should be identified;
 - Transfers specific to environmental protection need to be identified;

- National expenditure on environmental protection can be calculated;

- The sectors financing the expenditure can be identified.

- 29.115 All these steps are described in detail in the SEEA manual. There is discussion there also on a set of characteristic products identified as the “environment industry” for comparable international use. An example of an environmental protection expenditure account is shown in table 29.x

Asset accounts

- 29.116 For stocks and changes in stocks, the asset accounts described in chapter 11 are used for natural resources, in both value terms and physical units. In the SEEA, asset accounts may be compiled in physical terms for natural resources that have no monetary value and thus do not appear within the SNA asset boundary. For resources such as air and water that may not have a monetary value, nor even a stock value, accounts of changes in physical units may still be useful.

Integrating environmental adjustments in the flow accounts

- 29.117 The third and last main section of the SEEA is the external part of the satellite account. It relaxes the constraint which has been respected in the accounts described so far not to make any fundamental change to the SNA. The idea is simple, to convert hybrid tables to fully monetised tables by placing monetary values on those flows below and to the right of a hybrid table which have so far been expressed in physical terms only. However, although the idea is simple, implementing it is not. This part of the SEEA is more experimental and consensus on proposals made so far has not been reached.

Depletion

- 29.118 Valuing inputs into the economic system is the first and easier step. Since these inputs are incorporated into products which are sold in the market place, in principle it is possible to use direct means to assign a value for them based on market principles. Even within the SNA, such valuations are sometimes made though the results are placed in the other changes in assets account rather than in the flow accounts. Thus another way of looking at the process of incorporating the use of environmental inputs into the system is to relocate some of the other changes in assets items into the accounts portraying transactions. In particular, if an environmental resource is not being used sustainably, an alternative measure of income allowing for the consumption of natural capital as well as consumption of fixed capital may be considered to take account of the depletion of natural resources.

Defensive expenditure

- 29.119 Some actions are already taken to limit residuals generation or to mitigate the impact of those which are emitted. These expenditures are sometimes referred to as defensive

Table 29.2: Example of a hybrid supply and use table from the SEEA

Table 2.9 A simple hybrid supply and use table (SEEAland data set)

Monetary data (*in italics*) in billions of currency units; physical data (non-italic) in millions of tonnes

		Economy					Total economy	Residuals		9. Material balance	Total use
		1. Products	2. Industries	3. Consumption	4. Capital	5. ROW (products)		10. National destination	11. ROW destination		
		Physical Monetary									
Economy	1. Products		Products used by industry	Products used for consumption	Products used for capital	Products used by ROW (exports)					
	Physical		442	39	119	101				0	701
	Monetary		664	506	146	403	1 719				
	2. Industries	Products supplied by industry 551 1 356					1 356	Residuals generated by industry 275	Residuals generated by industry in ROW 5	0	831
	3. Consumption							Residuals generated by consumption 47	Residuals generated by consumption in ROW 1	Net material accumulation by consumption 17	65
	4. Capital							Residuals generated by capital 73		Net material accumulation by capital 72	145
Economy	5. ROW (products)	Products supplied by ROW (Imports) 150 363					363	Residuals generated by non-residents 6		Net material accumulation by ROW economy - 52	104
	Value added		692				692				
Total economy		1 719	1 356								
Natural resources	6. National environment		Natural resources supplied to industry 256	Natural resources supplied to consumption 1		Natural resources extracted by ROW 1				Net accumulation of natural resources in the national environment - 258	0
	7. ROW origin		Natural resources supplied to industry 5	Natural resources supplied to consumption 1						Net accumulation of natural resources in the ROW - 6	0
Ecosystem inputs	8. National environment		Ecosystem inputs to industry 118	Ecosystem inputs to consumption 23		Ecosystem inputs to ROW economy 2				Net accumulation of ecosystem inputs in the national environment - 143	0
	9. ROW origin		Ecosystem inputs to industry 3	Ecosystem inputs to consumption 1						Net accumulation of ecosystem inputs in the ROW - 4	0
Residuals	10. National origin		Residuals re-absorbed by production 7		Waste to landfill sites 26				Cross boundary residual out-flows 4	Net accumulation of residuals in the national environment 373	409
	11. ROW origin							Cross boundary residual in-flows 8		Net accumulation of residuals in the ROW 1	9
Total supply		701	831	65	145	104		409	9	0	2 264

Table 29.3: Example of a combined supply and use table for environmental protection goods and services

Table 5.6 Combined supply and use table for environmental protection goods and services

Million currency units

	Government services	Specialist services	Ancillary services	Cleaner/connected products	Non-environmental protection goods and services	Total	Government producers of environment services	Specialist producers of environment services	Ancillary production of environment services	Producers of cleaner/connected products	Other producers	Total intermediate consumption	Government consumption	Household consumption	Capital formation	Exports	Total
Government services												0	1 800	1 320			3 120
Specialist services								1 500				3 400		1 650	100		6 650
Ancillary services												4 000					4 000
Cleaner/connected products								400				200		600			1 200
Non-environmental protection goods and services							2 000	1 100	1 000	300	*	*					*
Total							2 000	3 000	1 000	300	*	*	1 800	3 570			*
Government producers	3 000				0	3 000											
Specialist producers		6 500		0	0	6 500											
Ancillary production			4 000			4 000											
Producers of cleaner/connected products				1 000	0	1 000											
Other producers	0	0	0	0	*	*											
Total output																	
Compensation of employees							600	2 000	2 000	500	*	*					
Consumption of fixed capital							400	1 000	1 000	200	*	*					
Taxes on production less subsidies on production							0	0	0		*	*					
Net operating surplus							0	500	0		*	*					
Output at basic prices	3 000	6 500	4 000	1 000	*	*	3 000	6 500	4 000	1 000	*	*					
Imports				50	*	*											
Taxes and margins	120	150		150	*	*											
Output at purchasers' prices	3 120	6 650	4 000	1 200	*	*											
Gross fixed capital formation							1 100	1 000	2 500	1 500	*	*					
Capital stock							7 000	15 000	12 000	10 000	*	*					
Labour input							4 000	10 000	8 500	5 000	*	*					

Source: SEEAland data set.

expenditures. One possible way to adjust the macro-economic aggregates is to treat this expenditure as capital formation with offsetting depreciation.

Accounting for environmental degradation

- 29.120 This is the most difficult part of environmental accounting and one where there is still a wide divergence of views. There are two problems raised by the question of how to incorporate the effects of degradation in the SNA. The first is how to place a value on degradation; the second how to locate this valuation in the accounts.
- 29.121 The variety of approaches advocated can be illustrated briefly in terms of the focus of attention.
- 29.122 One approach is to focus on maintenance costing. (This is the approach taken in the 1993 version of the SEEA.) The object of the exercise is to answer the question: *What would the value of net domestic product have been if hypothetical environmental standards were met using current costs and current technologies?*
- 29.123 The problem with this approach is that if the question is posed in respect of significant changes in environmental standards, the resultant price rises involved are likely to bring about a change in behaviour that would affect the level of demand for those products. In turn this would show up either as a change in the level of output of those products or a change in the technology of production to reduce dependence on the newly expensive products. Nevertheless, for marginal changes in standards, this technique may be used to give an upper bound on the impact on NDP from moving to more rigorous environmental standards. The aggregates from such an exercise are referred to as “environmentally adjusted”.
- 29.124 A second type of cost-based estimates, known as “greened economy modelling” attempts to resolve the problems raised by maintenance cost approaches for the non-marginal cases of changes in environment standards. They attempt to answer the question: *What level of GDP could be achieved if steps were taken to internalise maintenance costs?*
- 29.125 A particular application of greened economy models aims not just to determine a set of values for output, demand and so on which satisfy the national accounting balances but to determine levels of output which lead to levels of income which are sustainable over a given time period. It attempts to answer the question: *What level of income and environmental functions can be sustained indefinitely?*
- 29.126 Damage based measures derive from the impact of actual residual generation. The biggest impact is on human health. They attempt to answer the question: *What is the impact on the level of NDP of environmental impacts on natural and man-made capital and on human health?*
- 29.127 “Damage-adjusted income” is thus a first step on the way to converting GDP type-measures to welfare indices but many other aspects of welfare are deliberately ignored.

3. Health satellite accounts

- 29.128 The health care industry is of significant size and importance in many countries in terms of the number of people employed and level of turnover and is always a matter of significant policy concern. In 2000, the OECD published the *System of Health Accounts (SHA)* which built on experience over the previous 15 years of information being collected on health care data. One of the main purposes of the manual was to provide a framework for analysing health care systems from an economic point of view, consistent with national accounting rules. As part of this, the conceptual links between the System of Health Accounts and health satellite accounts were examined. The manual is currently in the process of being updated as a joint effort by the OECD, Eurostat, and WHO, with a revised version expected about the end of 2010.
- 29.129 In order to see how a health satellite account can be developed it is useful to begin by looking at the *SHA*. There are four categories of information provided: a functional classification of health care, an analysis of health care provider units, information on expenditure on health care and information about the funding of health care. Each of these is described briefly in turn.

Functional classification of health care

- 29.130 The activities of health care cover the application of medical, paramedical and nursing knowledge and technology, either by institutions or individuals, in pursuit of the following goals:
- Promoting health and preventing disease;
 - Curing illness and reducing premature mortality;
 - Caring for persons affected by chronic illness who require nursing care;
 - Caring for persons with health-related impairment, disability and handicaps who require nursing care;
 - Assisting patients to die with dignity;
 - Providing and administering public health;
 - Providing and administering health programmes, health insurance and other funding arrangements.
- 29.131 Following from this there are three main functional classifications of health care;
- Personal health care services and goods;
 - Collective health care services;
 - Health care related functions.
- 29.132 Each of these headings is broken down into a number of finer categories. Personal health care distinguishes services of curative care, services of rehabilitative care, services of long-term nursing care, ancillary services to health care and

medical goods dispensed to outpatients. Collective health care services are divided between preventive and public health services on the one hand and health administration and health insurance on the other. Health-related functions include capital formation of health care provider institutions, education and training of health personnel, research and development in health, food, hygiene and drinking water control, environmental health, administration and provision of social services in kind to assist living with disease and impairment, and administration and provision of health-related cash benefits.

Health care provider units

29.133 The providers of health care are divided into the following categories:

- a. Hospitals;
- b. Nursing and residential care facilities;
- c. Providers of ambulatory health care;
- d. Retailers and other providers of medical goods;
- e. Provision and administration of public health programmes;
- f. Health administration and insurance;
- g. Other industries (rest of the economy);
- h. Rest of the world.

29.134 Each of these providers can be allocated to one or more of the institutional sectors of the SNA.

Expenditure on health care

29.135 Total expenditure on health measures the final use by resident units of health care goods and services plus gross capital formation in health care provider industries (institutions where health care is the predominant activity).

29.136 Expenditure on health can be divided into the following categories;

- a. Personal health care services;
- b. Medical goods dispensed to outpatients;
- c. Total personal expenditure on health;
- d. Prevention and public health services;
- e. Health administration and health insurance;
- f. Total current expenditure on health (the sum of the above);
- g. Gross capital formation in health care industries;

h. Total expenditure on health.

29.137 The production boundary of health care services is very close to that of the SNA but with two exceptions. Occupational health care is included within the SHA whereas it is treated as ancillary services in the SNA. The cash transfers to private households (the care-givers at home) are treated as output of domestic services paid for by the transfers.

Funding of health care

29.138 The funding of health care is divided between that provided by general government, that from the private sector and that from the rest of the world. Within general government a distinction is made between the levels of government and social security funds. Within the private sector a distinction is made between private social insurance, other private insurance, private households, NPISHs and corporations excluding health insurance.

Converting the SHA to health satellite accounts

29.139 The following steps are required in order to translate the economic framework of the SHA into a health satellite account:

- a. A comprehensive listing of goods and services considered specific to the production of health care services needs to be determined;
- b. The boundary line of production to define total expenditure on health needs to be determined;
- c. The activities for which capital formation will be recorded needs to be determined;
- d. Specific transactions need to be identified;
- e. The detailed analysis of transfers as an integral part of health accounting needs to be provided;
- f. Ultimate users and ultimate mirrors of health expenses need to be identified.

29.140 One of the difficulties with establishing a list of characteristic products is that the CPC does not deal with categories of health care services in the detail that is required for health accounts. Therefore a more detailed classification is required. Further, since health care is often a public responsibility information drawn from administrative data is often inadequate to provide the degree of detail that is required for a satellite account.

29.141 Despite these difficulties it is proposed that four additional accounts would extend the SHA into a satellite account for health:

- a. Production account and health care value added by health care industry;
- b. Intermediate inputs to the production of health care industries by type of input;

Table 29.4: Example of a supply and use table from the System of Health Accounts

Table 8.2. SHA supply and use table (part 1)

	Total supply, purchasers' prices	Taxes on products minus subsidies on products*	Providers of health care services and goods					Other producers	Total economy	Imports of health care goods and services
			Total	Principal producers	Secondary producers	Occupational health care	Private households (home care)			
Resources										
<i>Goods and services</i>			<i>Output</i>							
supply:										
Health care goods and services by function										
HC.1 Services of curative care										
HC.2 Services of rehabilitative care										
HC.3 Services of long-term nursing care										
HC.4 Ancillary services to health care										
HC.5 Medical goods dispensed to out-patients										
Total supply of personal health care										
HC.6 Prevention and public health services										
HC.7 Health administration and health insurance										
Total supply of health care services and goods										
Other products										
<i>Total</i>										

(*): Including trade and transport margins which are of negligible magnitude for health care services and goods for final use.

Table 29.4 (cont): Example of a supply and use table from the System of Health Accounts

Table 8.3. SHA input-output table (part 2)

	Total uses in purchasers' prices	Taxes on products minus subsidies on products*	Providers of health care services and goods					Other producers	Total economy	Exports of health care goods and services	Final consumption expenditure			Gross capital formation
			Total	Principal producers	Secondary producers	Occupational health care	Private households (home care)				Households	NPISHs	Government	
Resources														
<i>Goods and services</i>			<u>Intermediate consumption</u>											
uses:														
Health care goods and services by function														
HC.1 Services of curative care														
HC.2 Services of rehabilitative care														
HC.3 Services of long-term nursing care														
HC.4 Ancillary services to health care														
HC.5 Medical goods dispensed to out-patients														
Total personal health care														
HC.6 Prevention and public health services														
HC.7 Health administration and health insurance														
Total health care services and goods														
Other products														
<i>Total</i>														
<i>Total gross value added/GDP</i>														
Compensation of employees														
Taxes on products														
Other taxes on production														
Subsidies on products														
Other subsidies on production														
Operating surplus, net														
Mixed income, net														
Consumption of fixed capital														
Operating surplus, gross														
Mixed income, gross														
<i>Total</i>														
Labour inputs														

- c. Health care industry's gross capital stock;
- d. An input-output table of health care industries.

29.142 Table 29.x shows indicative supply and use tables that might be drawn up for health care.

4. Unpaid household activity

29.143 This section is not concerned with a normal satellite account. It is difficult to determine products that are characteristic solely of unpaid household activity nor are there agreed standard tables to be produced. However, it is an area of considerable analytical and policy interest and an area where there is considerable research work being undertaken currently. The purpose of this section therefore is simply to report on the approaches being considered and give some indication of where further information on ongoing research may be found.

29.144 It is convenient to separate the consideration into three areas;

- a. unpaid household services;
- b. a consideration of the treatment of consumer durables;
- c. the question of volunteer labour in general.

Unpaid household services

29.145 The question of valuing household services produced for own consumption is interesting in its own right. In addition it is often argued that the growth of GDP in industrialised countries since the end of the Second World War is due in part to the increasing participation in the labour force of the women previously undertaking only household activities. It is often argued that, had household activities been valued, the women's change of occupation would not have led to such large increases in GDP. For long-term analysis therefore, there may be quite considerable interest in placing a value on unpaid household activities.

29.146 There is no ambiguity in the central framework of the SNA; unpaid household services are excluded from the production boundary. However, in a satellite account it is perfectly possible to extend the production boundary so that such services may be included. Even with an extended production boundary, however, it is unlikely that services that cannot be performed by a third party such as eating, sleeping and exercising would be treated as part of the production boundary. Some work has been done to estimate the value of leisure when some of these activities are valued but this is not considered in this section.

29.147 There is fairly widespread agreement that the way in which to start measuring household services for own consumption is by means of measuring the amount of time spent on them. There is increasing interest in conducting time use surveys that make such information available. Time use surveys, however, are not unambiguous. There is the question of multitasking. For example, it is possible for somebody to prepare a meal, keep an eye on a small child

and help an older child with their homework all at the same time. Should the total amount of time be divided by three or should each activity count the whole amount of time spent?

29.148 There is a question about the borderline with leisure. Some people would regard gardening as a chore; others may see it as a leisure activity. While looking after children on a full-time basis clearly counts as a household service, does the amount of time grandparents spend with their grandchildren necessarily count as household services or is this a leisure activity?

29.149 There is a question about how to value household activity. One possibility is to have a complete production account and, for example, to consider the food purchased by a household as an input into the preparation of meals. In this way households would consume very few goods directly; many of them would be treated as intermediate consumption to some kind of service output. The alternative, which is usually the approach adopted, is to leave the inputs as household consumption expenditure and simply make separate estimates of the time that has not been previously valued.

29.150 The basic question in valuing the time spent on household services is whether to use the opportunity cost of the person performing the task or a comparator cost. Both of these present difficulties. The opportunity cost seems appealing because application of economic theory suggests that somebody capable of earning more money than the comparator would indeed earn the extra money and pay somebody else to undertake the household tasks. But this is clearly not what happens in practice. Comparator costs may be difficult to come by and may be unrealistic. A professional plumber, for example, may be able to fix a leaking tap in a matter of minutes whereas an amateur may spend an hour over it. If the plumber's wage is applied to the time spent by the amateur, clearly the amount of production estimated will be unrealistically high.

29.151 Various attempts to resolve the question of valuing output can be found in the literature. Examples include *Household Production and Consumption: Proposal for a Methodology of Household Satellite Accounts*, *Household Production and Consumption in Finland, 2001* and *Beyond the Market: Designing Non-market Accounts for the United States*.

Consumer durables

29.152 It is frequently argued that consumer durables should be treated as a form of fixed capital formation by households and not simply as final consumption expenditure. It is true that there is a grey area concerning some household equipment. In some circumstances the cost of a house may include all kitchen equipment such as cookers, refrigerators and washing machines; in other cases these appliances are treated as consumption expenditure.

29.153 The main reason for excluding consumer durables from the asset boundary is linked to the exclusion of household services. If washing clothes for the household were to be an activity within the production boundary when undertaken by machine, it is not clear why it would be excluded when undertaken by hand.

29.154 Nevertheless there is certainly interest in monitoring the acquisition of consumer durables. The acquisition is often cyclical in nature, although sometimes variation in expenditure may simply follow the introduction of a new product.

29.155 There are two approaches that could be taken in a satellite account. The first is to adopt an alternative treatment for consumer durables at the same time as valuing unpaid household production. The other is to leave unpaid household production excluded from the production boundary but consider replacing consumer durables by an estimate of the services they provide. Treating consumer durables as assets is also of interest in the context of measuring household saving and wealth. Examples of this type of analysis can be found in *Durable Goods and their Effect on Household Saving Ratios in the Euro Area*.

Volunteer labour

29.156 The provision of unpaid services to households is excluded from the production boundary. This exclusion applies whether the household being provided with the services is the one to which the volunteer belongs or another.

29.157 If a volunteer is providing services to a non-market producer or to a market NPI, the activity in which they participate is included within the production boundary. However, the value of the services provided appears at cost. This may be strictly zero or it may be nominal, including wages and salaries in kind. For example, religious orders offering health and education services may not pay the individuals providing the services a wage but may provide them with food and accommodation. In principle, these costs should be treated as wages and salaries in kind.

29.158 It is possible for there to be some volunteer labour within government, for example teaching assistants. It is also possible to envisage volunteer labour working for market

non-profit institutions, for example in a museum or art gallery. There may be some unpaid people working in corporations, for example as part of a work experience scheme, but volunteer labour in market NPIs is quite common. Even if the owner of a quasi-corporation or an enterprise does not take his salary, it could be argued that in principle this should be treated as first the receipt of compensation of employees and then an injection of capital of the same amount into the enterprise. It is unlikely to be recorded as such but this case is clearly different in kind from the normal understanding of voluntary labour.

29.159 The question of valuing volunteer labour is the same as that of valuing the time spent on unpaid household activities and the same alternatives are available. If voluntary labour were valued, the following accounting entries would be necessary:

- a. compensation of employees of the unit employing the volunteer labour;
- b. income for the household to which the volunteer belongs;
- c. a transfer of the same amount by the volunteer to the employing unit;
- d. final consumption expenditure of the employing unit;
- e. almost always social transfers in kind.

29.160 (This is in fact the way it is recommended that collective construction projects are measured.) Even in the case of market NPIs, as explained in chapter 23, it is possible that in a satellite context the market NPI could be regarded as undertaking non-market activity also and this would include the activity of volunteers.