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GUIDELINES ON STATISTICS OF TANGIBLE ASSETS

UNITED NATIONS

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GUIDELINES ON STATISTICS OF TANGIBLE ASSETS

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PREFACE

At its eighteenth session, the Statistical Commission considered a draft of international guidelines on national and sectoral balance-sheet and reconciliation accounts for enterprises. In this connexion, the Commission pointed out the need for international guidelines on statistics of the stock of tangible capital assets of establishment-type units and recommended that such guidelines should be prepared in the context of the System of National Accounts (SNA) 1/ and the Material Product System (MPS). 2/

The present document was prepared by the United Nations Statistical Office in response to that request, with the assistance of Mr. J. Arvay, acting as a consultant to the United Nations. Draft guidelines on statistics of tangible assets 3/ were considered at the twentieth session of the Statistical Commission. The Commission recommended that these guidelines, amended as necessary in the light of its discussions, should be published for global use in the compilation and presentation of statistics on tangible capital assets.

1/ United Nations publication, Sales No. E.69.XVII.3.

2/ The Material Product System is described in Basic Principles of the System of Balances of the National Economy (United Nations publication, Sales No. E.71.XVIII.10).

3/ "Draft international guidelines on statistics of tangible assets" (E/CN.3/508).

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Annexes (continued)

INTRODUCTION

1. Both economic theory and empirical experience confirm that the significant differences in the level of economic development and rates of economic growth among countries or in the same countries over time are, to a great extent, interrelated with the differences that exist in the level and composition of the capital stock. Therefore economists have for a long time used capital stock estimates in their analysis of the results of productive activity. Traditionally, estimates of this type (including net financial claims on the rest of the world) are called national wealth estimates. Capital stock estimates are now in general made within the framework of national accounting and are closely connected with the estimates of the flow accounts. However, the coverage and methods of estimation of the capital stock differ considerably among countries. 1/ International guidelines in this field of statistics are therefore needed. In addition to promoting international comparability, the guidelines should assist countries in developing and extending their estimates of the stock of capital.

2. Although national wealth estimates may be used for many analytical purposes two major directions of analysis may be distinguished. From one point of view, the financial aspect of the assets is most important. From this point of view the assets are looked upon as components of the wealth of individual owners and for this use the composition of the assets by type of goods and their role in production is of secondary importance. From the other point of view, assets are considered as resources for the production of goods and services. Interest then focuses on measuring the productive capacity available in a country, and in this context the composition of the capital stock by type and its distribution among the various kinds of economic activity are important. While estimates of the capital stock net of capital consumption are appropriate for balance-sheet purposes, it is preferable to use gross estimates for comparisons between capital and production.

3. In accordance with these two main kinds of analysis, the international guidelines on statistics of national wealth have been elaborated in two stages and in two separate documents. For statistics of national wealth from the financial point of view, guidelines on balance-sheet and reconciliation accounts (referred to below as BSH) were published in 1977. 2/ The present document discusses national wealth from the second point of view and aims at providing international guidelines on statistics of stocks of tangible assets as resources for production.

1/ See M. J. Ward, The Measurement of Capital (Paris, Organisation for Economic Co-operation and Development, 1976), for a description of the various methodologies used by members of OECD.

2/ Provisional International Guidelines on the National and Sectoral Balance-Sheet and Reconciliation Accounts of the System of National Accounts (United Nations publication, Sales No. E.77.XVII.10).

4. The recommendations on statistics of tangible assets in this document are applicable in countries using either the System of National Accounts (SNA) 3/ or the Material Product System (MPS). 4/ While there are essential differences between SNA and MPS in the concepts of production and income, there are no significant substantive differences in the concepts relating to capital formation and the stock of accumulated reproducible tangible assets. Consequently, the concepts and definitions proposed in the present paper may be linked both to SNA and MPS. They may also be linked to the concepts and definitions in two documents on fixed assets and on national wealth adopted by the Standing Commission on Statistics of the Council for Mutual Economic Assistance. 5/

5. In view of the fact that most of the concepts and methods proposed in BSH and in other documents already adopted are valid also for the statistics set out in the present document, attention here is focused mainly on those aspects that are important for the measurement of tangible assets but are not discussed elsewhere or are not adequately detailed. The present document should therefore be regarded as a supplement to BHS and persons wishing to establish statistics on tangible assets will need to use both publications.

6. The present publication is organized in the following way. Chapter I discusses the uses of data on tangible assets. The following chapter defines the scope of tangible assets and chapter III discusses the relationship between these data and the systems of statistics defined in SNA and MPS. The next two chapters deal with classifications of transactors and tangible assets respectively. Chapter VI discusses some problems of valuation and chapter VII deals with the related question of reconciling opening and closing stocks of assets with the flows recorded in SNA and MPS statistics. Table outlines are presented in chapter VIII and the last chapter deals with sources of data on tangible assets and methods of compiling the statistics.

Chapter I

USES OF STATISTICS OF TANGIBLE ASSETS

1.1 The BSH guidelines provide a systematic review of the wide range of fields in which the statistics of national wealth and sector balance-sheets may be used and furnishes a brief description of the scope of statistics of tangible assets. In this chapter the possible uses of these statistics are dealt with in more detail, since they have implications for the classifications, definitions and presentation of data on tangible assets.

3/ A System of National Accounts (United Nations publication, Sales No. E.69.XVII.3).

4/ The Material Product System (MPS) is described in Basic Principles of the System of Balances of the National Economy (United Nations publication, Sales No. E.71.XVII.10).

5/ "System of basic indicators and methodology of the statistics of fixed assets in the CMEA countries" (adopted at the ninth session of the CMEA Standing Commission on Statistics), Basic Methodological Regulations of Statistics, vol. I (Moscow, CMEA Standing Commission on Statistics, 1972), pp. 145-152 (in Russian). Also "Basic methodology of computing the indicators of national wealth" (adopted at the nineteenth session of the CMEA Standing Commission on Statistics).

A. Economic analysis

1. Capital as a factor of production

1.2 Estimates of the gross stock of capital assets are frequently used in determining the magnitude of and changes in productive capacity. They are useful in estimating potential output and in comparing potential and actual production in the analysis of cyclical fluctuations and demand pressures.

1.3 Statistics designed to quantify the contribution of capital to production play an important part in the analysis of the level of output and the rate of economic growth. On the one hand, capital inputs may be examined in terms of the investments needed to expand production. This includes analyses of capital output ratios of different industries and at successive points of time. On the other hand, analyses may be directed towards measuring the services rendered by functioning assets. 1/ Data on capital inputs are needed in fitting production functions for short- or long-term forecasting and in elaborating development plans for an economy.

1.4 Statistics on tangible assets are important for the analysis of total factor productivity. The allocation of the sources of growth between capital and labour and perhaps other factors of production requires statistics relating to properly chosen and clearly defined capital concepts and a relatively detailed classification of the stock of assets. An important criterion of classification for this purpose is that by type of capital asset, since the roles of different types in the production of goods and services differ substantially and consequently the degree to which they contribute to economic growth also differs.

2. Relation between capital and labour

1.5 The analysis of manpower utilization and labour productivity cannot be considered as comprehensive if it does not cover information on the degree to which labour is supplied with equipment. This capital labour ratio is often called "capital intensity". The uses of the statistics on assets for studying the relationship between capital and labour are varied. Beyond the strictly economic aspects of the connexion between capital and labour, the subject also deserves attention from the point of view of social policy; e.g., an increase in the level of employment may require either the establishment of new working places or the organization of employment in more than one shift - and the choice has important social implications.

3. Planning and forecasting of future demand for capital goods

1.6 Investment functions and other models used in forecasting demand for capital goods require basic data from the statistics of tangible assets. Estimates of the gross stock of fixed assets are particularly important for this purpose. Sometimes not only the final results of the estimates but also the partial findings obtained in the intermediate stages of the computations provide valuable information.

1/ See D. W. Jorgenson and Z. Griliches, "The explanation of productivity change", Review of Economic Studies, vol 34 (July 1967). Also see The Measurement of Capital.

Forecasting models commonly divide future demand for capital goods into two major components. The first component is the investment necessary for the replacement of retired and scrapped assets. Estimates of retirements of capital consistent with the capital stock estimates or information on the age composition of the gross stock of fixed assets are needed to determine what will have to be replaced at different points of time in order to maintain productive capacity. The second component is the creation of new capital goods necessary to increase production. This type of investment may be planned by forecasting the expected development of output and by the use of empirical capital output ratios.

4. Age composition of capital goods

1.7 As well as being useful in forecasting demand for capital goods, data on the distribution of assets by age may be useful in drawing other conclusions. For instance, in individual industries the value of fixed assets representing older technological levels may be compared to the value of assets acquired at a later time and representing, therefore, a more advanced level of technology. A comparison can be made between rapidly developing industries having at their disposal mostly new assets and stagnant or declining industries dominated by assets acquired relatively long ago.

1.8 Data on the age distribution of assets provide a very important starting-point both for the estimation of expected life and thus of survival curves and also for calculating depreciation. In addition, they contribute to an explanation of the differences in the costs of capital and required maintenance and repairs within and among industries, and of the dispersion of the average degree of obsolescence of fixed assets, and they may be used as an element in estimating the flow of capital services.

5. Environmental aspect of the assets

1.9 For both fixed assets and natural resources, questions of the preservation of the environment are becoming increasingly important. SNA and MPS do not take into account the harmful effects on the environment of the operation of certain installations but proposals have been made to treat these effects as negative output. This would, of course, have repercussions for the value of fixed assets of the installations in question, since these should approximate the capitalized value of future output. Short of such major changes of concept, however, it is interesting to separate equipment installed for the purposes of pollution control or abatement from assets that directly serve production, where this is possible.

1.10 The measurement of the stock of availale natural resources is perhaps even more important for the study of the protection of the environment. Changes in natural resources due to depletion of existing reserves or additions to them through new discoveries are not covered by the flow accounts. It is therefore the responsibility of the statistics on stocks of tangible assets to provide this information. All positive and negative changes in natural resources have an impact on the environment. It follows that the measurement of the changes in quantitative terms and, if feasible, in value terms is very useful for research on these matters.

6. Intensity of the use of the assets

1.11 Although the magnitude of the output achieved is an indicator of the use of the available productive capacity, it does not show directly the intensity of the

utilization of that productive capacity. Direct studies of this question have been undertaken in several countries. As a rule the following two circumstances are studied: (a) the proportion of the stock of fixed assets utilized in one, two or more shifts; and (b) the duration of shut-downs of fixed assets for repairs and maintenance or because of unforeseen events, lack of orders or other factors. Information about these matters may promote a fuller utilization of the nation's capital resources and may also explain differences in capital-output ratios among different industries, or over periods of time.

B. Assistance in compilation of national accounts and balance-sheets

1.12 Statistics of tangible assets precede in logical order the compilation of national and sectoral balance-sheets and in part also the estimation of capital transactions in the income and outlay accounts, e.g. depreciation. Therefore, the development of statistics of tangible assets and the use of new data sources should contribute to an improvement of the reliability of the estimates of the relevant flow accounts and to an increased understanding of the links between economic processes. Regular estimates of the stock of fixed assets make it possible to provide more reliable data on capital transactions and balance-sheets. If current estimates of the stock of fixed assets are based on the perpetual inventory method, direct estimates of the capital stock at regular intervals may help to furnish a basis for the extrapolation or interpolation of data for other years. The establishment of time series on the stock of fixed assets and its allocation among industries and sectors, combined with an investigation of the items causing changes between the opening and closing stocks, should provide information that is of assistance in improving the estimates of depreciation.

1.13 Statistics of tangible assets provide a bridge between the current production flow accounts and balance-sheets in the sense that they rearrange the wealth components classified by institutional sectors in the balance-sheets into categories classified by type of economic activity. The latter may then be compared with the production aggregates of the national accounts. Cross-checking of these three sets of data can significantly decrease statistical discrepancies.

Chapter II

SCOPE AND MEASUREMENT OF THE STATISTICS

2.1 As was mentioned in chapter I, capital stock estimates may be used in various ways, and different concepts will be needed for different purposes. The guidelines presented here do not cover all the concepts that may be desired but only those which most countries can be expected to need and which can be measured in the foreseeable future.

2.2 The scope and definitions of the concepts suggested for use in statistics of tangible assets are dealt with below.

A. Scope of the statistics

1. Assets included

2.3 In determining the scope of assets to be covered, the following general definition of "capital" may serve as a starting point: the concept of capital

covers all types of man-made goods and natural resources available in the country at a given point of time for use in the production of goods and services, except for goods and services which are totally used up in the production process during the period of account. The different types of assets are examined below in terms of this definition and proposals are made as to which assets should be included in or excludeed from capital stock statistics.

2.4 There is no doubt that all man-made goods accumulated from the production of preceding periods with the purpose of producing with or from them new goods and services should be included in the statistics. These are the fixed assets and the inventories that are gradually used up during the production process and are reproduced in the process of production. They are reproducible tangible assets. The distinctions among different types of reproducible tangible assets are dealt with in chapter V, below.

2.5 Natural resources also participate in the production process but the various types of these assets contribute to output to a different extent. Among them, land is one of the most important of the assets that participate in a direct way, regularly and repeatedly, in the production process. Therefore, its inclusion in the capital stock is well founded.

2.6 Subsoil assets, including off-shore mineral deposits, represent another important group of natural resources. These resources are found in their natural geological state (in situ). It is possible to exploit economically only part of the totel discovered stock of subsoil assets at the level of technology which exists at a given point of time. These currently exploitable reserves are more closely linked to current production than are the total discovered resources. Only these economically exploitable reserves should therefore be included in the stock of tangible assets. A survey of national practices shows that many countries exclude all subsoil assets from capital inputs and from the calculation of capital -output ratios. Data on reserves of subsoil assets are, however, indispensable for some uses of capital stock statistics. They are needed, for instance, in assessing the possibilities of expanding production and in the study of the degree of self-sufficiency of a country in raw materials.

2.7 Forests may be considered as a special renewable type of natural resources. Although perhaps only natural forests can be considered as natural resources similar in character to suboil assets, both natural forests and forests resulting from afforestation, timber management and other human efforts should be included in capital stock statistics. Statistics of fisheries should include stocks of fish and the associated works in the case of fish ponds, cultivated oyster beds etc. Like forests, these fisheries are renewable resources. Commercially run fisheries in inland waters should also be included. Recoverable stock from forests and fisheries should be estimated after allowing for natural increase and recovery rates.

2.8 It is hard to find even an indirect connexion between the stock of the assets belonging to the group "historical monuments" and the level of production (except possibly in the case of the tourist industry). It is also impossible to cover fully the stock of cultural objects. In spite of this it is proposed that these assets should be included in capital stock statistics if they have recently been purchased or sold, in order to ensure full correspondence with the relevant aggregates of BSH.

2.9 Land, forests, mineral resources, fisheries and historical monuments combined are called "non-reproducible assets". It is to be noted that this is not an entirely apt denomination. For instance, the stock of available land can be increased through land fills or reclamation from rivers or the sea and forests can be renewed through afforestation.

2.10 The present document proposes to include in the scope of capital stock statistics all types of assets mentioned in paragraphs 2.4-2.9. In the aggregate these assets are called "tangible assets".

2.11 As far as reproducible tangible assets are concerned, no problems arise in achieving consistency with the flow accounts of SNA and MPS. These assets are linked with the flows of capital formation and are components of national wealth in both systems. But this is not so in the case of non-reproducible tangible assets. Whereas the national wealth concept of SNA (and BSH) covers the value of natural resources, the value of these resources is excluded from the MPS concept because of the conceptual and practical difficulties of finding suitable values. However it is proposed in table 5.1 of MPS that land and forests be added to the national wealth as complementary items. (Table 5.1 is reproduced in annex II below). In countries with market economies a relatively large share of natural resources has come into the possession of their present owners by purchase; they therefore represent wealth not only potentially but also as marketable assets. The costs of their acquisition appear among the capital inputs for production. As opposed to this, in countries with centrally planned economies natural resources - disregarding some exceptions of minor importance - are not subject to purchase and sale.

2.12 In spite of this it seems possible and desirable to include natural resources in capital stock statistics in the countries with centrally planned economies also. In these countries the view is gaining ground that estimates of the value of natural resources may make a useful contribution to various economic studies, e.g. studies relating to the calculation of prices.

2. Assets excluded

2.13 Financial assets are excluded from the scope of capital stock statistics even though these assets are also necessary for the uninterrupted process of production and distribution. Since, however, financial assets within a country are balanced by financial liabilities, financial assets should not be considered as assets contributing to production in the macro-economic sense. Studies of the links between financial assets and production may make use of the relevant data furnished within the framework of balance-sheet statistics. Non-financial intangible assets such as patents, licences to utilize inventions etc. play an important role in increasing production. Nevertheless it is proposed to confine the scope of the present statistics to tangible assets only. Non-financial intangible assets generally appear in balance-sheet statistics only to the extent they are purchased and sold. Inventions and innovations developed by the producers themselves and used for their own purposes cannot be measured.

2.14 Sometimes a concept of capital is used which covers human capital in addition to tangible assets. The value of the attempt to measure the magnitude and qualitative composition of human capital cannot be doubted and, logically, it fits into the scope of statistics aiming at investigating the connexions between production and all contributing factors. However, discussion of the concept of human capital is outside the scope of the present document.

2.15 There are a number of resources which, according to their character, are "free goods", e.g. water and air. In the highly industrialized countries these assets gradually become economic goods, because they require investment and maintenance costs in the same way as fixed capital. Recently these resources have frequently been dealt with in the context of the environment and in principle it would be advantageous to classify them as natural resources and include them in the scope of the present statistics. However, because of the difficulty of valuing them it is proposed not to include these resources in capital stock statistics at the present time.

2.16 SNA and MPS do not treat purchases of consumer durables by households as capital formation but include them with consumption. There is no doubt that, conceptually, durable consumer goods acquired by households form a part of national wealth. BSH, in order to conform to the practices of national accounting, separates these goods from the other reproducible assets and recommends their presentation in a complementary table. MPS, on the other hand, suggests that household durables should be included in national wealth (see table 5.1 of MPS, reproduced in annex II). However, since the primary purpose of the capital-stock statistics considered here relates to the part they play in production, consumer durables are excluded from these statistics.

B. Problems of measurement

1. Measurement in value terms

2.17 It is very important to register the physical quantities of the individual types of assets in the greatest possible detail. Besides their importance for economic analysis the data on quantities of assets serve as a useful basis for estimating the value of the various capital goods and natural resources. It is therefore desirable that countries include surveys of the various types of capital assets in physical quantities in their programme of developing the statistics on tangible assets.

2.18 The present document does not, however, deal with data in quantum terms. It is exclusively concerned with estimates in value terms which facilitate macro-economic research on a relatively highly aggregated level. The data on assets are aggregated partly in the sense that different types of capital goods are combined and partly in the sense that they are grouped by broad classes of kind of economic activity (major divisions, divisions).

2. Measurement of capacity

2.19 A measure of the capital stock is not in itself a measure of capacity but it is an important ingredient in making such an estimate. Capacity may be either a technical or an economic term but in either case it refers to a rate of flow of output in a fixed time period. In a technical sense, this may be x tons of cement or y tons of steel in a year. In an economic sense, there are usually many factors that reduce the practical rate of output of a given plant below its theoretical technical maximum; such factors are usually well known by plant managers and engineers. The capacity of a given piece of equipment is usually not fixed over its whole life. There will be an initial learning period during which output will increase and, conversely, as the machine ages its potential output may drop because of increased need for maintenance etc. But these are second-order differences.

The maximum capacity is reached relatively shortly after installation and it remains constant during most of the service life of the equipment, perhaps declining abruptly at the end.

2.20 While most analysts therefore prefer to use gross values for measuring productive capacity, it has sometimes been suggested that net values may be more appropriate. The argument here is that because net values give greater weight to the more productive newer assets and less to the relatively inefficient older ones, net valuation will better reflect the productive capacity of a group of assets of different ages. This argument deserves attention particularly when comparisons are being made between industries growing at very different rates.

2.21 It is proposed that both the net and gross concepts should be used in the statistics of tangible assets. The divergence of net value from gross value reflects the reduction in future service life in addition to differences in the productivity of assets of different ages. Although the use of gross values may give too much weight to old assets, net values may give too litte. The extent of bias in each measure will mainly depend on the relationship between the rate of technical advance, the expected lifespan of the fixed assets and the age distribution of the stock of fixed assets.

3. Utilized capital

2.22 The utilization of the stock of fixed assets may vary for a number of reasons. For instance, a factory may be supplied with new equipment but be closed down because of a strike, lack of orders, unavailability of raw materials or lack of skill in handling the machinery. Utilized capital may be put equal to gross value adjusted by a rate reflecting the relationship between its actual and hypothetical working time. It should be taken into account that, for instance, a production line may be operated at half-speed which is analogous to having two machines of equal capacity but operating only one of them. In aggregate, the concept of utilized capital may be considered as equal to the gross value of assets weighted by the time of their actual use. Sometimes an "efficiency" rate is also taken into account in order to measure utilization more precisely.

2.23 In countries with market economies the rate of utilization of assets may vary sharply from period to period as the level of output is adapted to market conditions. Because of its short-term nature, the change in utilization rates must obviously be measured at fairly frequent intervals. An annual time series on asset utilization may have considerable analytic value, but a series based on 5-yearly surveys would have little meaning for most market economies.

2.24 In the present guidelines the explicit measurement of the concept of utilized capital is not suggested. It is, however, proposed that special inquiries be made to gather information on the number of shifts during which the various assets are utilized and on the duration of shut-downs for various reasons. These surveys must clearly be confined to industries where production levels are in practice controlled by varying the number of shifts worked. The industries mainly involved here are manufacturing, mining and quarrying, and (possibly) construction, and electricity and gas production. This kind of information would facilitate the measurement of utilized capital by researchers concerned with this topic.

4. Capital input: measurement of stock or of flow of capital services

2.25 In studying the role of fixed capital in production the definition of capital input is important. In measuring the contributions of factors of production, the value of the flow of capital services would be a more appropriate indicator of capital input than the value of the capital stock. This flow cannot be measured directly. However, it is a function of the length of life of an asset, the intensity of its use in the process of production and its susceptibility to technical obsolescence. When appropriately valued, the flow of capital services would approximately reflect the rental value of capital factor services, comparable in concept to labour factor payments in the form of compensation of employees. Because of the difficulties of estimating this measure, the present document does not include estimates of the value of capital services in the statistics of tangible assets. It is proposed, however, that the existing capital goods should be classified by age, which should help in assessing the flow of capital services. It should be noted that estimates of the stock of assets have been used as indicators of the magnitude of capital inputs in a number of interesting studies. Consumption of fixed capital may also be used as a proxy measure of capital services.

5. Treatment of technical progress embodied in capital

2.26 Technical and scientific progress embodied in capital goods is treated in the national accounts as an improvement of quality and therefore as an increase in the quantum of capital goods. It is thus reflected in the estimates of capital formation. The same principle should be followed in estimating the stock of accumulated assets in order to ensure consistency with the basic systems of national accounts. According to some views, however, in order to achieve a more accurate allocation of sources of growth, the effect of technical progress should be distinguished from "pure" quantitative changes because these two factors differ significantly in their nature and effects. The question then arises whether the results of technical and scientific progress should appear in the period when the improved capital goods are produced or in the periods when they are utilized in production.

2.27 As explicit measure of the effects of technical progress would be particularly useful in analysing the role of different factors of growth. Considering, however, the great difficulties of separating technical progress from "pure" changes of quantity, it is not suggested here that an attempt should be made to distinguish these two elements of growth.

Chapter III

RELATION OF THE STATISTICS TO FLOW ACCOUNTS AND TO BALANCE-SHEETS

A. Relation to the flow accounts of SNA and MPS

3.1 It is essential that the concepts, definitions and classifications of the capital stock statistics should be fully harmonized with those of the accounts which present the flows of production processes and with those for balance-sheet statistics. Wherever possible the concepts and classifications proposed for the statistics of tangible assets are equivalent to those which have already been

adopted in the above-mentioned guidelines. Where new concepts or new classifications are introduced, e.g., the use of gross value instead of net value or the separation of completed and uncompleted construction, links are shown with the guidelines already adopted.

3.2 The concepts, definitions and classifications of reproducible tangible assets are consistent with those of the corresponding flow accounts of SNA and MPS. The relevant capital flows consist of the following items: (a) gross fixed capital formation; (b) increase in stock of inventories; (c) normal consumption of fixed assets; and (d) losses in fixed and circulating assets (in the case of MPS).

3.3 The situation is different for non-reproducible assets. Both SNA and MPS exclude the increase or decrease in these assets from the output and income of the period under review. The input of labour and materials used for improvement of land, establishment of plantations etc. form a part of output and capital formation but their order of magnitude does not at all represent the value of the entire stock of these assets. As will be pointed out in chapter V, "virgin" natural resources (reserves in situ) should be distinguished from the man-made assets produced in connexion with them. The "virgin" non-reproducible tangible assets may be linked to the flow accounts of SNA and MPS only formally, namely, by means of reconciliation items. The explicit inclusion of reconciliation items facilitates the co-ordination of the concepts of the flow accounts and those of the stock accounts.

3.4 SNA indicates the place of stocks of both reproducible and non-reproducible tangible assets in the system. In table 2.1 of SNA which illustrates the full system of accounts, the items relating to tangible assets appear in columns 75 through 79. In row 4 the opening stocks and in row 88 the closing stocks of these assets are presented, while the changes in the stocks during the year appear in rows 69 and 70 and in row 84 which relates to revaluations. In this table the assets are valued net of depreciation but a concept gross of depreciation could also be used.

3.5 Revaluations of tangible assets are included in row 84 of table 2.1. Revaluations cover the changes in the value of reproducible assets due to price movements and for other reasons not accounted for in the capital-formation account. This broad content of row 84 is the reason why BSH proposes to use the term "reconciliation" instead of "revaluation". This terminology has also been used in the present document.

3.6 In MPS reproducible assets, i.e. stocks of fixed assets and inventories, are shown in table 5.1 (see annex II below) and in tables 5.2 and 5.3 which give the balances of fixed assets valued at depreciated and full values respectively. In addition the MPS table 2.1 (see annex II below), which presents the balance of production, consumption and accumulation of the global product, shows the change in stocks of fixed assets and inventories. Natural resources may be linked to MPS with the help of reconciliation items in the same way as for SNA.

B. Relation to the recommendations for balance-sheet statistics

3.7 The present guidelines propose some modifications of the concepts of BSH because the statistics of tangible assets consider the assets from a different point of view, namely, as participating in the process of production. The proposed statistics of tangible assets differ from BSH on the following points:

(a) While in BSH the stress is put on data for tangible assets net of depreciation, the statistics of tangible assets include both gross and net concepts;

(b) BSH deals exclusively with the current-price estimates. The statistics of tangible assets also include constant price estimates;

(c) The present guidelines propose that certain assets be classified by user, whereas BSH classifies all assets by owner;

(d) In BSH the proposed statistical reporting units are legal entities or their equivalents, classified primarily by institutional sectors. In the statistics of tangible assets, however, priority is given to establishment-type units classified mostly by kind of economic activity, although provision is also made for institutional-sector classification.

3.8 In addition to the above, the proposals for statistics on tangible assets also deviate from the recommendations of BSH on a few other points. This is partly because of differences in the uses to which the two kinds of statistics are meant to be put and partly because the guidelines for statistics of tangible assets are meant to be applicable both in countries using SNA and in those using MPS. These differences are discussed in the relevant parts of the chapters below.

Chapter IV

STATISTICAL UNITS AND THEIR CLASSIFICATION

A. Statistical units

4.1 Since the primary objective of the statistics of tangible assets is to furnish the basis for studies of the relation between capital and production, the same statistical unit has to be used as in production statistics. In the accounts for production processes, SNA proposes the establishment-type unit as the statistical unit, whereas MPS applies the enterprise or a similar unit (institution, farm etc.). It should be noted that the enterprise as a statistical unit is defined in a slightly different way in MPS than in SNA. In MPS, if an enterprise is engaged in more than one type of activity, it is considered to consist of two or more establishments each belonging to its respective branch (see para. 1.25 of MPS). In practice, however, CMEA member countries commonly apply the establishment or branch, i.e. units producing more or less identical products, as statistical units in their classifications by kind of economic activity. Therefore, the degree of homogeneity of classes of kind of economic activity may be considered practically identical in the two groups of countries. The establishment-type statistical unit is defined in paragraphs 5.15 through 5.23 of SNA, and the definition of the enterprise-type unit applied in MPS is found in a document on the classification of the economic activities in countries with centrally planned economies. 1/ Both SNA and MPS use the same statistical unit in accounting for gross capital formation and depreciation as is applied in the statistics of production.

1/ "Revised classification of the national economy according to branches in the CMEA member States". Approved by the CMEA Standing Commission on Statistics, November 1975.

4.2 Although the establishment is the main statistical unit used in statistics of tangible assets, for some important analytical and practical purposes where the stock of assets is classified by institutional sectors it is desirable to use the legal entity as statistical unit. A classification by institutional sectors is necessary in the statistics of tangible assets because consistency between these statistics and those of balance-sheets can only be ensured in this way. Also, sometimes the primary data on tangible assets are obtained from enterprises or units of legal entity. Classifications of assets according to institutional sectors are also needed for economic analysis. For instance, investment functions and capital inputs are frequently computed on the basis of gross value and classified by institutional sectors. Furthermore, this type of classification is useful also because the capital intensity of production is very different, e.g., in corporate enterprises and in small family factories, even if they operate in the same industry. The definition of the legal-entity-type statistical unit is given in paragraphs 5.60-5.63 of SNA.

B. Classification by kind of economic activity

4.3 The kind of economic activity classifications used in SNA and MPS are detailed in the publications on the two systems. 2/ Three problems relating to classification by kind of economic activity are discussed below.

4.4 First, the detailed classifications, i.e., the composition of the individual groups of kinds of economic activity, that are used in SNA and MPS are not the same, although at the less detailed levels some activity groups are approximately identical, e.g. agriculture, trade, transport and most divisions of manufacturing. Alternative classifications are therefore provided for in the relevant tables of this report.

4.5 Secondly, it must be decided what degree of detail in classification can realistically be called for. Ideally, the same detail should be used as in the classification of production but because the errors in estimating the value of assets are significantly higher than for production statistics, only a relatively condensed classification can be recommended. It may be set as a minimum goal for international reporting that for statistics on tangible assets the one-digit level of the International Standard Industrial Classification of All Economic Activities (ISIC) should be used, while the two-digit level sould be used for production statistics. At the national level, the classifications could be extended to further subdivisions subject to the possibilities of data collection and the reliability of the data.

4.6 It is of course recognized that countries that are just beginning to compile statistics of tangible assets may only be able to make global estimates without any breakdown by kind of activity. This will often be the case when the estimates are built up by the perpetual inventory method using statistics of gross fixed capital formation which are available only according to type of capital goods. The fact that no activity breakdown is possible should not however discourage countries from initiating statistics on tangible assets.

4.7 Thirdly, a problem arises because the statistics of tangible assets attribute certain assets to the economic units which use them and not to their owners. In practice it may not be possible to be entirely consistent in allocating the fixed

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2/ See table 5.2 of A System of National Accounts and para. 1.13 of Basic Principles of the System of Balances of the National Economy.

assets concerned to the industry that uses them and sometimes there will be a break in the comparability of the data on production and assets. The problem arises especially for division 833 of ISIC (Machinery and equipment rental and leasing). The problems connected with rented assets are treated in detail in section E of chapter V, below.

C. Classification by sectors

4.8 The definition of sectors differs from SNA and MPS. Classifications by sectors, however, have in common that they reveal those significant differences between organizational forms of production and ownership that are independent of the concrete kinds of economic activity undertaken. SNA and BSH recommend classification by institutional sectors for this purpose. MPS uses ownership by state, co-operatives, persons etc. in the classification by sectors. Owing to their particular economic structure, some developing countries may attach great importance to the differentiation of the so-called modern and traditional sectors. A review of country practices shows that capital inputs, capital output ratios and other important indicators which fall within the scope of statistics of tangible assets are nearly always classified by some kind of sectoral division.

4.9 The ideal solution would be a cross-classification by kind of economic activity and sector. This would help clarify significant differences due to the technological characteristics of production (kind of activity) as well as the organizational form of the production (sectors).

4.10 The classifications by sectors is intended in the first place for national purposes. The same classification should be used in the statistics of tangible assets as in the flow accounts and balance-sheets. The classifications by sectors used in SNA and in MPS are compared in table 1, below. The definitions of the contents of the groups listed below may be found in table 5.1 of SNA and in paragraphs 1.29-1.38 of MPS, respectively.

Table. 1. Classification of economic units according to sectors

In SNA	In MPS
A. Non-financial enterprises corporate and quasi-corporate	A. State enterprises
Private	State enterprises
Public	Government institutions
B. Financial institutions	B. Co-operative sector
C. General government	C. Social organizations
D. Private non-profit institutions serving households	D. Personal plots of members of co-operatives
E. Households, including private non-financial unincorporated enterprises	E. Personal plots of employees
	F. Private sector (producing units)
	G. Households (dwellings)

4.11 It is important to determine which statistical unit should be used in the classification by sectors suggested for the statistics of tangible assets. SNA and BSH propose exclusively the legal-entity-type unit for the classification by institutional sectors. However, an essential objective of the statistics of tangible assets is to investigate the relation between capital and production by sectors cross-classified by kind of economic activity. Therefore, the present document suggests that in the statistics of tangible assets the classifications both for kind of economic activity groups and for institutional sectors should be made on the basis of the establishment-type economic unit. This objective may be realized by asking the establishments both to specify their major economic activity and to indicate their legal form so that they can be allocated to the correct institutional sector. By these means, the institutional sectors, the activity groups and combinations of the two may be identified.

D. Other types of classifications of economic units

4.12 Where the data permit, it is useful to classify the economic units by additional characteristics. Four possibilities may be mentioned.

4.13 First, the establishments may be classified by size. This classification iillustrates the degree of capital concentration and permits study of the differences between the inputs of capital and labour caused by differences in size. The criteria used to indicate the size of the establishment should be the same as those used in the classification of production (e.g., number of employed persons, value of production).

4.14 Secondly, a classification of the economic units by region may be useful. Classification by region is extensively used for statistics of production, employment, income and consumption. It would be a valuable contribution to the study of regional development if these data could be supplemented with data on the stock of assets.

4.15 Thirdly, a useful classification can be made by grouping the economic units according to the number of shifts they are operating. It has to be recognized that a classification of this type is difficult in practice because in a number of cases some of the workshops of an establishment operate in one shift only while others operate in several shifts. However, information on shifts worked may in some countries be of importance from the point of view of the utilization of assets and for the understanding of capital-output ratios. It is obvious that, ceteris paribus, if the gross value of fixed assets in two industries is the same but one industry works one shift while the other works three shifts, there is a threefold difference between the two industries in capital-output ratios and depreciation rates. It should however be noted that in many countries - particularly those with market economies - the number of shifts worked is highly sensitive to business conditions. Increasing or reducing hours worked is in fact the principle means by which enterprises adapt to changes in demand for their output. For these countries, investigation of relative rates of utilization both between industries or regions and over time is a more complex undertaking. It would require more detailed information gathered at annual or more frequent intervals, but probably from a smaller sample of firms.

4.16 Finally, in developing countries it may be useful to classify fixed assets by whether the establishments using them employ modern or traditional modes of production. Some indication of how these "modes" might be defined are given in chapter IX of SNA but to date there is little information on the practical

application of this proposed classification. At the extremes it is relatively easy, and probably useful, to make the modern/traditional distinction: fishing enterprises that use paddle-powered canoes can easily be distinguished from electronics-laden trawlers, and the housing services rendered by mud and thatch dwellings are quite different from those of concrete sky-scrapers. Howelver, there is a large grey area where the modern merges with the traditional; in the absence of country experience it is premature to make international recommendations on the use of a modern/traditional breakdown for classifying tangible assets.

Chapter V

CLASSIFICATIONS OF TANGIBLE ASSETS

5.1 Chapter II indicated the types of man-made goods and natural resources that should be included in the statistics of tangible assets. In the present chapter the different classifications of tangible assets which facilitate analyses of their role in production, their age and other characteristics will be dealt with. The propsed classifications take into account both analytical usefulness and the possibilities of statistical observation. Reproducible and non-reproducible tangible assets are discussed separately.

A. Classification of reproducible tangible assets by type

1. Distinction between fixed assets and inventories

5.2 All types of reproducible tangible assets assist in the production of goods and services but the effects of the various assets differ greatly. First, a sharp distinction shoauld be drawn between fixed assets and inventories. Some level of inventories is an indispensable precondition of production. It is, however, necessary to separate inventories from fixed assets.

5.3 In drawing the line between fixed assets and inventories, a number of borderline problems require clarification. One problem is the treatment of uncompleted fixed capital formation. SNA includes partially completed construction works in the stock of fixed assets. MPS, on the other hand, includes only finished construction works in the stock of fixed assets and treats partially completed construction works as inventories. In paragraph 6.107 of SNA it is suggested that it is desirable to classify the value of construction works into completed and uncompleted projects. If this is done, it is possible to treat uncompleted construction either as fixed assets or as inventories, as appropriate to the intended use. Consideration of only completed assets may, for instance, lead to more meaningful estimates of capital-output ratios, depreciation and the contribution of fixed assets of production.

5.4 Taking into account the special role of uncompleted construction projects and the desired connexion to the flow accounts and balance-sheets, the present guidelines propose to divide total reproducible, tangible assets into the following three groups: (1) fixed assets put into use; (2) uncompleted construction projects; and (3) inventories. This distinction makes it possible to link the data both to SNA and MPS.

5.5 A further practical question concerns the identification of fixed capital. SNA and MPS, disregarding the value of the assets, include all assets with an expected service life of at least one year. An analysis of country practices

shows, however, that many countries include in fixed assets only durables above a certain value, since this greatly facilitates the collection and computation of data. A number of countries, in addition, set a limit of two or three years of service life for goods to be treated as fixed assets. This means that hand-tools and thousands of other goods of small value and limited durability will be excluded from the scope of fixed assets. It is proposed, however, that the one-year rule be maintained in principle in the interest of international comparability. Any deviations from this rule, such as disregarding low-value assets, should be indicated in foot-notes to the relevant tables.

2. Classification of fixed assets and inventories by type

5.6 For a more detailed analysis it is desirable to break down the three groups of reproducible tangible assets mentioned in paragraph 5.4. It is suggested that two more levels of detail be included in the classification, where the data sources permit. Within fixed assets, construction should be distinguished from machinery and equipment. The sources of data for estimates of these two subgroups frequently differ and the distinction is also needed for economic studies since the degree of contribution of construction and machinery and equipment to output, the average service life of the assets and their elasticities of demand differ to a great extent.

5.7 Besides these two main subgroups there is a third subgroup that is of a significantly different nature. This group should include breeding stock, draught animals, plantations, vineyards and other improvements to land, and the like. It is also desirable to separate plantations and other improvements to land so that, if necessary, they may be combined with the value of the corresponding natural resources.

5.8 A further level of detail is shown in table 2 below. In general, the proposed groups of this classification are the same as those proposed in SNA for classifying fixed capital formation.

5.9 The classification of inventories corresponds to that used in SNA. It consists of a first-digit level according to kind of producer and a further subdivision by type of goods held in inventories for goods-producing industries only.

5.10 Table 2 shows the proposed classification of reproducible tangible assets according to type. The codes in the table refer to the corresponding classes in SNA and in the Indicaters of national wealth for use with MPS. 3/

5.11 The contents of the main groups of table 2 are described in detail in tables 6.2 and 6.3 of SNA. A condensed form of this description is to be found in table 5.1 of BSH (see annex II, below). The proposed classification may serve as a basis for countries using MPS, too; but to be used for this purpose it requires some modifications.

5.12 The definition of inventories is broader in MPS than in SNA. In addition to the inclusion of uncompleted construction, MPS also classifies monetary gold in inventories (SNA treats it as a financial asset). In order to ensure international comparability countries using MPS definitions should omit the value of monetary gold from inventories in statistics of tangible assets, or show it separately. As

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3/ See annex II.

noted above countries using SNA should show separately the value of uncompleted construction.

5.13 In addition, the classification of inventories in table 2 differs from that proposed in MPS. In the MPS classification, all inventories and not only those of goods-producing industries are classified according to type. The categories of MPS may, however, easily be derived from the categories of SNA in the following way. The inventories of wholesale and retail trade (III b) can be treated wholly as "merchandised commodities" (which constitute a separate group in MPS) while the inventories of other industries (III c) consist of materials and supplies and therefore may be amalgamated with the corresponding group of goods-producing industries.

5.14 There are some boundary problems in the classification. In the delineation of completed and uncompleted construction the general rule should be followed that only assets that are already in operation should be classified in completed construction. If a construction project is put into use in two or more stages, e.g., where an electrical plant is planned for three turbines but in the year under review only the first of them has started to generate power, the construction costs of one turbine only should be included in completed fixed assets. The cost of fixed capital formation related to the other two turbines will be part of uncompleted construction.

5.15 In the classification proposed in table 2, inventories are classified according to the characteristics of the producers holding them. Depending on the economic units where a given kind of product, e.g., coal, is stored, it may appear among materials, finished goods, wholesale and retail trade, other industries (e.g. a general need for data on total stocks of the most important individual materials regardless of which economic unit owns them. As an illustration the following main groups may be used: (a) energy-carriers (solid fuels, oils, gasoline etc.); (b) ferrous metal materials (raw and semi-finished products); (c) non-ferrous metal materials (raw and semi-finished products); and (d) cereals. According to the need of individual countries, the number of groups may be increased or the groups may be broken down into more detailed items. This kind of classification is proposed as a supplement to the grouping shown in table 2.

Table 2. Classification of reproducible tangible assets according to type

	Types of assets	Codes in BSH a/	Codes in MPS b/
I.	Fixed assets put into use	10.2*	1.1 + 2.1
	a. Construction		
	1. Residential buildings	10.2.1*	2.1*
	2. Non-residential buildings	10.2.2*	1.11* + 2.1*
	3. Other construction works	10.2.3*	1.11* + 2.1*
	b. Machinery and equipment		
	1. Transport equipment	10.2.5	1.14* + 2.1*
	2. Agricultural machinery and equipment	10.2.6.1	1.12* + 1.13*
	3. Other machinery and equipment	10.2.6.2	1.12* + 1.13* + 2.1*
	c. Breeding stock, land improvements and the like		
	1. Breeding stock, draught animals, dairy cattle and the like	10.2.7	1.15
	2. Plantations, land improvements and the like	10.2.4*	1.16
II.	Uncompleted construction	10.2.1* through 10.2.4*	1.22*
III.	Inventories		1.2* + 2.2
	a. Goods-producing industries	10.1.1	
	1. Materials and supplies	10.1.1.1	1.21*
	2. Work in progress	10.1.1.2	1.22*
	3. Livestock, except breeding stock and the like	10.1.1.3	1.24
	4. Finished goods	10.1.1.4	1.23*
	b. Wholesale and retail trade	10.1.2	1.23*
	c. Other industries	10.1.3	1.21*
	d. Government stockpiles	10.1.4	2.2

* Part only.

a/ Table 5.1. (See annex II)

b/ Indicators of national wealth (for use with MPS). (See annex II).

B. Classification of non-reproducible tangible assets by type

5.16 The classification in table 3 below is based on the physical nature of the different assets and is in accordance with the proposed classification in BSH.

Table 3. Classification of non-reproducible tangible assets according to type

	Type of assets	Codes in BSH a/
I.	Land	11.1
	a. Urban land	11.1.1
	b. Cultivated land	11.1.2
	c. Other land (parks, private gardens etc.)	11.1.3
II.	Timber tracts and forests (including underlying land)	11.2
III.	Subsoil assets and extraction sites	11.3
	a. Coal, oil and natural gas reserves	11.3.1
	b. Metallic mineral reserves	11.3.2
	c. Other non-metallic mineral reserves	11.3.3
IV.	Fisheries	11.4
V.	Historical monuments	11.5

a/ Table 5.2. See annex II for details of the contents of each group.

5.17 The content of the individual groups is defined in detail in table 5.2 of BSH (see annex II, below). A definite distinction is drawn between capital originating from production and from natural resources. In both SNA and MPS, land improvements and the like are included in fixed capital formation. It is proposed that in the statistics of tangible assets improvements to land should be treated as part of the stock of fixed assets and not be included in the value of the land. This treatment ensures a direct connexion with the basic systems and satisfies the requirements of stock estimates based on the perpetual inventory method. It also takes into account that most land improvements can be depreciated, eg. plantations, vineyards, drainage, while depreciation is not appropriate for the land as such. However, since for some purposes of wealth measurement it may be desirable to include land improvements with land, the present document proposes that improvement to land should be included among reproducible fixed assets but should be shown in a separate group.

C. Distinction between productive and non-productive assets

5.18 The distinction between productive and non-productive assets is a basic feature of MPS. Productive assets are defined as assets used for the production of material products including those needed to deliver the products to the place of their destination, e.g., assets of transport and trade. Non-productive assets are defined as assets used in the sphere of non-material services including owner-occupied dwellings. This distinction is maintained in the present document.

D. Classification of fixed assets by age

5.19 Knowledge of the age distribution of fixed assets provides useful information for economic planning and forecasting and for current estimates of the capital stock itself. If the stock of fixed assets is estimated by means of the perpetual inventory method, data on the age distribution of the assets become available as a by-product. A basic problem of estimates of this type is, however, that the results reflect the estimator's initial assumption with regard to the expected lifetime of individual assets acquired at different periods. Experience so far indicates that the average of expected lifetimes and the dispersion of individual assets around the average assumed in the estimated are not based on adequate statistical observations. Sometimes the data on actual lifetimes for a limited range of equipment, e.g. cars, are projected to other types of machines used in production. It should, however, be recognized that even computations based on inaccurate estimates of service life provide usable information, because they take into account the amount and composition of fixed assets acquired during a long previous period year by year.

5.20 In order to obtain more realistic information on the actual age distribution of fixed assets and to use it either for analysis or for increasing the reliability of estimates based on the perpetual inventory method, periodic inquiries on detailed types of assets are helpful. A survey carried out at a given point of time should distinguish: (a) the past service life, namely the number of years between the installation of the given assets and the time of survey; (b) the remaining service life, i.e., the number of years between the time of observation and the expected time of scrapping; and (c) the whole service life, i.e., the sum of (a) and (b).

5.21 An estimate of the value of the stock of fixed assets can be made by the perpetual inventory method even if it is assumed that assets of the same vintage will be discarded fully at the moment they reach the estimated average lifetime. But more realistic figures for the age distribution of fixed assets can be obtained by using "survival curves" which take into account the fact that a part of the assets will be discarded earlier and others later than the averge expected lifetime.

5.22 It should be noted that buildings, as a general rule, have about twice the life-span of machinery and equipment. Table 4 suggests age groups for use in classifying the gross and net values of machinery and equipment and buildings, respectively, by age.

5.23 Countries with centrally planned economies, as a rule, undertake detailed statistical surveys on the age distribution of fixed assets when they are revalued, usually every 8 to 10 years. At the same time, the norms previously applied for the expected lifetime, i.e.,the reverse of the rates of depreciation, are revised.

E. Treatment of assets used but not owned

5.24 In the statistics of tangible assets certain leased assets should not be allocated to the owner but to the economic unit that utilizes them in production. The kinds of assets affected and the problems which may arise in allocating them to the kind of activity are dealt with below.

1. Leased assets

5.25 Some leased assets are used in production by the lessees in the same way as the assets they own, i.e., they are operated by the lessee's employees and the lessee provides for maintenance and repair etc. The owner then is debited only with depreciation and perhaps capital repairs and taxes. Characteristic examples are rented shops, stores, agricultural or construction machines leased without operator and leased land. Assets of this type are generally leased for long periods - say for 12 months or more. It is proposed that leased assets of this type should be reclassified from the owner to the user of the assets. When asset statistics which have been reclassified in this way are compared with statistics on value-added for various kinds of activities, the latter statistics should be corrected by excluding rent payments from the lessees' intermediate consumption and rent receipts from the owners' gross output.

Table 4. Classification of fixed assets by age

Machinery and equipment	Gross value	Net value	Buildings	Gross value	Net value
Years:			Years:		
1-2			1-5		
3-5					
6-8			6-10		
9-10					
11-15			11-20		
16-20					
21-30			21-30		
31-40			31-40		
41 years and more			41-60		
			61-80		
			81 years and more		

5.26 The reclassification of leased assets from the owner to the user requires a further correction with regard to the depreciation of the fixed assets concerned. Depreciation should also be accounted for by the user and not by the owner of the assets. In deciding whether to reclassify depreciation from the owner to the user, in practice the weight of the items in question and the available information should be taken into consideration.

2. Use of the services of rented assets

5.27 Another type of lease is represented by cases where the lessee uses not the asset itself but the services it renders. In such cases the owner operates the assets and provides for their continuous maintenance. Examples are leases of dwellings from the owner or from an institution in charge of the renting of dwellings; transport equipment leased from transport companies; agricultural machines rented with operator and service staff. Assets of this kind are generally leased for shorter periods and in practice the length of lease may be a useful criterion for deciding whether or not the assets concerned should be allocated to the user (long leases) or to the owner (short leases). Although these assets co-operate in the productive activity of the lessee they should not be attributed to the user. This case also presents a problem in connecting output and assets. The leases discussed here distort the capital output ratios because the extent to which they are used may differ for different establishments within the same industry. For instance, if one estabishment performs all transport activity with its own equipment and another with equipment leased from a transport company, other circumstances being the same, the capital input of the latter will be less than that of the former establishment. It is not possible to eliminate this anomaly, since this would require, for instance, that railways and rolling stock should be attributed to the users. These circumstances therefore have to be accepted in the same way as all other effects on the magnitude of input and output resulting from the different degree of integration of economic units.

F. Assets not attributable to users

5.28 Of some assets it can be unambiguously stated that they are not used by the "owner", yet they cannot be attributed to a specific user. The main examples here are "public goods" such as roads, dams, in certain countries water and sewage systems, parks and recreation districts etc. These are all fixed assets but no fee is paid for using them. Frequently it is not possible to determine to what extent they are used by the different economic units. At the same time, it would present a false picture if they were considered as assets used by general government. The procedure recommended is that, in classifying assets by kind of economic activity, only those assets should be taken into account that are actually used on own account by the economic units. In the tables in annex I, assets that cannot be related to a definite user are shown separately and are not distributed among classes of economic activity.

5.29 Assets belonging to the group "historical monuments" should also be treated as assets not attributable to any user. It is recommended that this treatment be adopted even if economic units privately own such assets, e.g., historical pictures. It is difficult to trace even an indirect relation between this type of asset and the level of output, except that of tourism in a few countries; they usually ammount to only a negligible part of a nation's wealth.

5.30 Cultivated land, the timber stock of forests, fisheries and subsoil assets, on the other hand, should be attributed to the kind of activity of their uses - i.e., agriculture, forestry, fishing, and mining - when they are being exploited. Such assets contribute to output to at least as great an extent as the reproducible fixed assets, such as farm machinery, fishing, boats, mine shafts, used in these activities. However, when assets of this kind are held as strategic reserves by the public authorities and are not yet being exploited, they should be regarded as public goods and not attributed to any user.

Chapter VI

VALUATION OF TANGIBLE ASSETS

A. General considerations

6.1 The statistics of tangible assets are useful for the various purposes outlined in chapter I only if the assets which are included in the stock but which are purchased at different times at different prices and which represent various technological levels are consistently valued. Since assets here are considered from the point of view of their contribution to production, the essential principle is that the valuation of the total capital stock should correspond to the valuation of output. This implies that all assets acquired before the period of account should be revalued to the price levels of the years in which production is measured. The value of reproducible assets should be based on gross replacement cost, reflecting the amount that would have to be paid for the assets included in the capital stock if they were acquired and installed in their original form in the current year. For natural resources, current market value should be used, since by their very nature these assets cannot be replaced.

6.2 Like output, the stock of tangible assets may be valued at current prices or at the prices of some other base year. The current value of the stock of assets is not identical with the original purchase value of the assets but should be estimated by adjustments to the current year replacement cost by means of appropriate price indices. The constant price values of the stock of assets at different points of time are obtained by valuing the assets at the prices of the base year. The same year should be chosen as base year for constant price estimates of the stock of assets and of production.

6.3 The statistical sources which are available for use in estimating the value of fixed assets in general differ, often substantially, from current replacement or market value. The most commonly available source is book value, which can often be obtained from enterprise balance-sheets. The usefulness of these figures varies widely, however, depending upon accounting practices.

6.4 In countries with centrally planned economies, book values approach the level of replacement costs of the depreciated assets, although they do not reflect it completely. The lag between current replacement value and book value has in the past been rather small because price increases have been relatively slow and, as was noted above, the gross and net values of assets in these countries are generally revalued to current prices every 8 to 10 years. If the world-wide price inflation is increasingly felt in these countries, however, they may face problems similar to those being experienced in market economies.

6.5 In countries with market economies, there is increasing concern about the need to use replacement cost in valuing assets in order to arrive at more realistic estimates of profits. For example, in the United States public companies are required to prepare annual statements showing the value of tangible assets at replacement costs and in the United Kingdom a number of special price indices are published by the Central Statistical Office for use by companies that wish to revalue their fixed assets to current replacement costs. Clearly where replacement values are available they provide a valuable source for the statistics of tangible assets. For the most part, however, book values commonly reflect historical cost in these countries. Book values therefore represent a combination of many different price levels and, unless there is substantial adjustment, cannot be used as a basis for estimating the value of the capital stock.

6.6 It is an obvious requirement that the valuation concept applied to the gross value should be extended also to the accumulated depreciation and that the net concept should be expressed in the same value as the gross concept. The different valuation concepts are described in chapter VI of BSH; the discussion below contains a few supplementary comments only.

B. Valuation of reproducible tangible assets

1. Fixed assets

6.7 The purchasers' values of the assets at the time of acquisition, adjusted for changes in replacement costs, should be used as a first approximation to the valuation of the stock of fixed assets. The purchasers' value of any alterations and improvements made in the fixed assets which significantly increase their productivity should be included. Construction, machinery etc. made on own account may in practice have to be valued at direct costs plus, perhaps, a margin for overhead and other indirect costs because of lack of data on purchasers' values.

6.8 The gross value of fixed assets should not include the value of repairs which under normal circumstances become periodically necessary during the expected life of the assets for their continuous operation. These repairs do not increase the productive capacity of the assets but only maintain it. In this connexion it should be mentioned that MPS suggests that repairs should be treated as capital formation, even if they do not increase the productive capacity of assets, since their costs are distributed over several years in the same way as the costs of the acquisition of new capital goods. In the MPS treatment, the costs of repairs do not increase the gross value of fixed assets but instead decrease the accumulated depreciation and therefore lead to an increase in the net value only. The rate of depreciation must subsequently be increased to cover the value of the repairs, unless the repairs extend the useful life of the asset.

6.9 A crucial problem in valuing fixed assets at replacement cost arises when, as is usual, there are changes in the specifications of the assets over time, which may either increase or decrease their productivity. In such cases it is often difficult to assign appropriate replacement costs which take into account differences in the quality of different vintages of assets. The United Nations

guidelines on price and quantity statistics 1/ recommend that, as a general rule, changes in the quality of a given item should be considered to be changes in quantity and not changes in price; the same principle should be followed here.

6.10 It is widely recognized that it is difficult to quantify changes in quality, and particularly so in the case of capital goods because they are often non-standard, special-purpose items. The "quality" of a good depends on its utility to the purchaser, and for a capital good utility consists of the capital services which it contributes to a production process. A discussion of various ways of measuring quality changes is contained in the United Nations manual on price statistics for industrial goods 2/ to which reference should be made.

6.11 A further basic principle is that estimates of fixed assets at both current and constant prices should be carried out for as detailed a classification of the different durables as possible. For this purpose, it is also necessary to use correspondingly detailed price indices.

2. Stocks

6.12 Paragraphs 6.109 through 6.113 of SNA recommend that stocks of purchased goods should be valued at purchasers' prices and stocks of own-produced goods should be valued at producers' prices. Purchasers' prices are the total amount paid by purchasers for goods delivered to their premises and so include trade and transport margins; producers' prices are the prices charged by producers when they sell goods at the farm or factory gate. Stocks of own-produced goods may however be valued at cost if this principle is used in valuing increase in stocks in the country's national accounts. In this case goods are valued at the cost of labour inputs, materials and supplies used up in production plus estimated consumption of fixed capital and a share of overhead costs, but excluding any profit which may be realized on the eventual sale.

3. Stock of inventories

6.13 The value of the stock of inventories can be estimated much more easily by using book-value data gathered from balance-sheets of enterprises or records of establishments than can the value of the stock of fixed assets. This is a consequence of the nature of inventories, which are turned over frequently. Most of the stock at the end of the year will therefore have been purchased fairly

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1/ Guidelines on Principles of a System of Price and Quantity Statistics (United Nations publication, Sales No. E.77.XVII.9).

2/ Manuals on Producers' Price Indices for Industrial Goods, Series M, No. 66. To be published in 1979.

recently aside from the exceptional cases when the turnover frequencies are low. As a result book values normally reflect relatively up-to-date prices. The book values of the level of stocks may therefore be used for the statistics of tangible assets even without corrections. In order to achieve the greater accuracy that is required for estimates of the increase in inventories, however, the difference between the value of the stock of inventories in subsequent periods should be separated into two components. One component should express the increase (or decrease) in the value of inventories which is due to quantitative changes and the other component should show the increase in value due to changes in prices during the year. In the interest of consistency, the estimates made separately for these two components for the purposes of the national accounts should be used also in the statistics of tangible assets.

C. Valuation of natural resources

6.14 Natural resources, being non-reproducible, are not depreciated, so that their gross and net values are the same. Nevertheless, they are frequently wasting assets, which are used up in the course of exploitation. The value in any given year, therefore, should reflect only what remains for future use. BSH deals extensively with problems arising in the valuation of natural resources. It recommends that natural resources should be valued where possible at the market prices realized in actual sales of similar assets during the reference year. Where this is not possible, use of the capitalized value of expected future income is proposed. In countries with market economies, this principle of valuation is appropriate for valuing natural resources as a component of national wealth but it may be less appropriate for use in measuring productive capacity. In countries with centrally planned economies, market values are in general not available and alternative methods must be found. The sections below discuss these problems for each broad group of non-reproducible tangible assets.

1. Valuation of land

6.15 The same basis of valuation of land as recommended in BSH, namely market prices, is also proposed for the statistics of tangible assets. In making such valuations, however, care should be taken to ensure that the market prices applied are relevant to the use of the land in question. Sales involving conversion of farm land to urban use, for instance, should not be used in valuing land that remains in agricultural use. In some countries, also, the land laws contain stipulations for the selling of land which may have the effect of altering its market value from the actual economic value. In centrally planned economies where land is sold very rarely or in instances where market values are inappropriate, the capitalized value of income may be used as an alternative.

6.16 As was noted in paragraph 5.17 above, the value of land should exclude plantations, vineyards and other improvements. The latter should be valued like other reproducible fixed assets at replacement cost.

6.17 The value in constant prices of land which remains in the same use in principle cannot change. However, shifts of land to different uses and changes in the quantity of land as a result of reclamation, landfill etc. should be taken into account.

2. Valuation of timber tracts

6.18 BSH proposes that timber tracts should be valued and classified together with the underlying land and that the most appropriate method of valuation is the capitalization of future income to be expected from them. Unlike in the case of vineyards, orchards and other plantations, in the case of timber tracts it appears preferable as a general rule to classify them with the underlying land on the ground that separation is both difficult and of doubtful meaning. While expenditures on afforestation are part of fixed capital formation in both SNA and MPS, it does not appear to be practical in the statistics of tangible capital assets to separate the value of the part of forests that is due to natural growth from that attributable to man's efforts.

6.19 As an alternative to capitalized future income, tree farms and other planted forests may be valued at replacement cost. The replacement cost should include both the cost of the actual planting or afforestation and the cost of care during the expected lifetime of the trees. This method treats growing trees similarly to any other growing crop not yet harvested and requires a separate estimate of the value of the underlying land.

3. Valuation of subsoil assets

6.20 Since sales of subsoil assets are less frequent than land sales, the usual method of valuing subsoil assets is to discount the expected net proceeds from sales of extracted minerals. The discount rate used should be the rate of return expected by investors in mining enterprises. Because wasting assets are involved, it is customary to provide for a sinking fund to amortize the capital invested during the expected life of the mine or well. It is recognized that it is difficult to make reliable forecasts of future proceeds because they involve estimates of future prices, quantities and costs. The conceptual and practical problems involved are discussed by Bain 3/ in connexion with the valuation of subsoil assets in the United States.

6.21 As was noted in paragraph 2.6, the stock of tangible capital assets should include only those subsoil assets that can be exploited economically at present levels of technology and present prices. The quantity and value of assets which meet this criterion may fluctuate either because of changes in prices or developments in technology. A price change may influence quantities as well as prices; the price and quantity effects should, in principle, be isolated. It should be noted that changes in government regulations or tax rules may also have a significant effect on the amount of subsoil assets that can be exploited economically. It is recommended that both the opening up of new reserves and the change in the value of existing reserves resulting from changes in technology or prices should be accounted for at the time the changes take place. As a consequence the time series at both current and constant prices may fluctuate widely.

3/ F. Bain and others, "Subsoil wealth", Studies in Income and Wealth, vol. XII New York, (National Bureau of Economic research, 1950).

Chapter VII

RECONCILIATION ITEMS

A. Classification of the items

7.1. Chapter VII of BSH contains detailed definitions and a classification of the items comprising the changes between the opening and closing stock of assets. The present chapter will discuss the application of these concepts, classifications and definitions to statistics of the stock of tangible capital assets.

7.2 The difference between the opening and closing stocks at current prices of the gross value of tangible assets may be divided into three major parts. The first includes the increase due to gross capital formation, which corresponds to the same item in the national accounts. By definition, this change refers to reproducible goods only. The second major part comprises the withdrawals of reproducible assets from the stock as a consequence of scrapping. It seems reasonable also to include in this second major part the assets scrapped due to unforeseen events. All other items of the difference, which are generally not connected with the normal process of capital formation but rather may be considered capital gains or losses, are included in the third major part.

7.3 It is suggested that the reconciliation items within the three major parts should be broken down into groups and subgroups according to the requirements of economic analysis and the possibilities of statistical computation. The proposed more detailed classification is shown in table 5. The reference codes in the table are from table 8.2 of BSH. The codes indicate conceptual correspondence of the items, not necessarily the same valuation.

B. Contents of the items shown in table 5

1. Changes between opening and closing stocks at current prices

7.4 Sales and purchases of used fixed assets should be shown separately in order to obtain estimates of total stocks broken down by industries. In principle, it would be desirable to account for the used assets gross of depreciation and not at the actual price of purchase. However, very frequently only the purchase value - which more closely approaches the net value - is known. If the purchase value is used, the difference between the gross and net value will disappear from the closing stock of the assets. Transfers of assets without payment, e.g. between two state enterprises, should be included in item A.2. It is suggested that the value of useful materials gained from scrapped fixed assets should also be included in item A.2, since these materials do not originate from current production. It should be noted that the used assets included in item A.2 are still in working order; capital goods which have no useful life remaining are shown under item B.

7.5 Item B.1, assets discarded because of normal wear and tear, covers alll those capital goods which in the period under review are withdrawn from use for this reason. It is very difficult to determine the time of withdrawal exactly since it

Table 5. The items of changes between the opening and closing stock of gross value of tangible assets

Classification of elements of change	Codes in BSH[a/]
A. Gross capital formation (in reproducible assets)	
1. Newly produced or imported goods	
2. Net sales of second-hand goods	2.5 + 2.6
B. Retirements and scrapping (of reproducible assets)	
1. Due to normal wear and tear	-
2. Due to unforeseen losses	13.3.1 + 13.3.2
C. Revaluation and other reconciliations	
1. Revaluation	13.1
a. Due to price changes	
b. Due to changes in valuation methods etc.	
2. Quantitative changes in natural resources (in value terms)	
a. Natural growth less depletion of timber etc.	13.4.1
b. New finds less depletion of subsoil assets	13.4.2
c. Losses in natural resources in catastrophes and natural events	13.4.3
3. Statistical adjustments	
a. Changes in classification of establishments according to kind of economic activity	13.5.1 + 13.5.2
b. Changes in classification of assets according to type	13.5.3
c. Changes in attribution of assets to users from owners [b/]	-
d. Statistical discrepancies and discontinuities	13.7

a/ Table 8.2.

b/ This item is relevant only for explaining the change between opening and closing stocks according to kind of activity. See para. 7.11.

often occurs that obsolete assets are kept in reserve for a certain period of time before their final dismantling. As a general principle, assets should be considered as discarded when they are actually scrapped.

7.6 Item B.2., decrease due to losses, in SNA comprises only unforeseen losses while in MPS it covers all types of losses. SNA regards all foreseeable losses as normal depreciation and this principle should also be followed in the statistics of tangible assets. This difference between the two systems has no influence on the total item referring to retirement and scrapping of reproducible fixed assets, which represents the sum of retirement and scrapping due to normal wear and tear and due to losses.

7.7 Item C.1.a, revaluations due to price changes, shows the effect of changes in the prices used for valuation. Since scrapped assets are deducted from the stock at the replacement cost of the year under review, revaluation should refer to the opening stock. Increase due to capital formation will be included automatically at the prices of the period under review.

7.8 Item C.1.b, revaluations due to changes in valuation methods etc., consists of correction items which reflect the impact of changes in valuation methods. If changes in the methods of valuation alter the data significantly, the whole time series should be recalculated, so that this item will contain only minor changes affecting particular years or a few types of assets. The difference between the gross value and the sales price of used assets bought or sold may be accounted for in this item.

7.9 Item C.2, includes only the value of the physical increase or decrease in natural resources. New discoveries will be indicated here, as will the changes in the stock of subsoil assets due to changes in the profitable level of exploitation. Changes in value due to price revaluations should be taken into account under revaluation (item C.1) so that changes in price and quantity may be clearly distinguished from each other. Special care should be taken to obtain separate data on the value of afforestation, which should be included in fixed capital formation (item A.1), while only the value of natural growth should be included in item C.2.a.

7.10 The contents of the items on statistical adjustments (C.3) are largely self-explanatory. In the item for changes in the classification of assets by type, small differences of classification only should be included. If there are major changes in classification, it is desirable to reclassify the retrospective data.

7.11 In the item for reclassification of assets from the owner to the user (item C.3.c), only those assets should be considered that are newly leased in the period under review or the leases of which are discontinued. This is because assets which need reclassification in respect of leases established in former years will already have been allocated to the users' opening stocks. It should be noted that this item is required only when the reconciliation of opening and closing stocks is being carried out for different kinds of activities. It is not needed when the reconciliation is made at the level of the economy as a whole.

2. Changes in opening and closing stocks at constant prices

7.12 Starting from the items of changes at current prices, two steps of computation are necessary in estimating the gross value at constant prices. First the value under the item for revaluation (C.1) should be omitted, which means that changes in the value of the opening stock due to price changes and other changes in valuation will not be taken into account. As a second step all other items of change expressed at current replacement cost should be deflated to the price level of the base year. The reconciliation items should then reflect only the quantitative changes in the assets in the subsequent years. If these deflated items, in accordance with their sign ("+" or "-"), are added each year to the opening stock of the base year or deducted from it, time-series for the gross value of the stock at constant prices are arrived at. The computation can also be made in the opposite way, e.g., if the method of perpetual inventory is used the estimates of the stock data are first made at constant prices and then, by the help of price indexes, the values at current prices are computed as a second step.

Chapter VIII

TABULATION OF THE STATISTICS

A. Purpose of the tables

8.1 Annex I of the present publication contains table forms for statistics of tangible assets. These tables have three major purposes: (1) they outline the scope of data which it is desirable to gather and compile within the framework of the statistics of tangible assets and thus may serve as a basis for a programme of development for this field of statistics; (2) they show how the statistics of tangible assets are linked to the basic systems of flow accounts; and (3) they offer suggestions on the form of presentation of data.

8.2 The methodological part of the present document and the table forms attempt to outline the information that may be expected from the statistics of tangible assets in a future period, taking into account the relative importance of the data. In reviewing the present situation it can be stated that many countries have made considerable steps forward in their estimates of national wealth and the stock of tangible assets. The estimates made so far are, however, often characterized by a high level of aggregation of assets and by incomplete coverage. In countries with centrally planned economies the statistics on the stocks of fixed assets and inventories are generally well developed. In these countries, however, the problems connected with estimates of the value of natural resources remain to be solved so that these assets can also be included in the scope of the statistics. Improvement is generally needed in the methods of estimation of inventories.

B. General structure of the tables

8.3 The first 11 tables shown in annex I accommodate the basic data to be gathered. Two kinds of statistics are shown in these tables. Some of the tables show the opening and closing stocks of assets by type and the components of their change for the country as a whole. Others show allocations of assets by kind of economic activity and sector.

8.4 The last table is a work-sheet table which links the statistics of tangible assets to the corresponding data of BSH by means of reconciliation items. This makes it possible to check the data in the two sets of statistics and to present them in a consistent manner.

8.5 The tables which refer to the nation as a whole are equally suitable for use by countries applying either SNA or MPS. The tables which contain classifications by industries and sectors are given in two variants: the A variant adopts the classification of SNA, the B variant that of MPS.

8.6 Most of the tables can be used for data both at current and constant prices. The format of the tables is identical for these two cases. It is indicated in the heads of the tables whether it is proposed that they be compiled only at current prices or at both current and constant prices.

C. Tables

1. Tables for the nation as a whole (tables A.1-A.4)

8.7 Tables A.1-A.4 present the stock of all tangible assets available in the country classified by type as well as a breakdown of the changes between the opening and closing stocks classified in the same way. The first three tables refer to reproducible tangible assets and the fourth to non-reproducible tangible assets. The primary aim of these tables is to show the total value of the various types of assets, to classify them according to their role in production and to facilitate the computation of suitable indicators needed for measuring capital inputs and for other purposes. Time-series of the data shown in these tables will indicate the development of the capital stock over time as well as structural changes in this stock. In addition, the data on the stock of inventories will make it possible to draw conclusions about their turnover. Data on uncompleted construction projects, if compared with data on complete construction, make it possible to assess the average duration of the projects.

8.8 Both gross and net values are proposed to be shown in tables A.2 and A.3. A comparison of the two values (e.g. in table A.2) indicates the age of the assets in an indirect way. In table A.3, the distribution by age of the fixed assets is presented. Such estimates are useful even if the data are derived by the perpetual inventory method and are computed on the basis of a roughly estimated life expectancy.

8.9 Tables A.1, A.2 and A.4 show the components of the change between the opening and closing stock of assets. These data are directly related to SNA and MPS and integrate the statistics of tangible assets into the frame of national accounts in a broader sense.

2. Tables for classes of economic activity (tables A.5-A.10)

8.10 In tables A.5-A.10, the stock of assets is classified by kind of economic activity. Only the major groups of assets and main kinds of activity are indicated in these tables but, if data sources permit, it would be useful to compile the tables in more detail.

8.11 In table A.5B producers are classified into "productive" and "non-productive" spheres. This is a basic distinction in MPS and is based on whether the output of the various kinds of activities are of a material or non-material nature. This distinction is not called for in SNA.

8.12 In these tables data at gross value are used most often. However, it would also be useful to show net values (table A.6) in order to make possible a comparison of the average degrees of consumption of fixed capital among industries. Information on net values also facilitates studies of productivity and other similar analyses.

8.13 Table A.8 deals with the rate of utilization of fixed assets in various industries. Some comments on the classification of assets according to rates of utilization were given earlier in paragraph 4.15. The first column is for unused assets while the next three show to what extent assets are used for multiple shifts. In principle, it would be desirable to present a distribution of the time worked by the assets themselves and not by the establishments where they are located. In some countries data are gathered in industrial censuses on shifts worked for both production and employment. The classification by rates of utilization will usually be relevant only for certain industrial activities - such as manufacturing, mining, gas and electricity production. It is not applicable to assets used by government and in service activities.

8.14 In table A.9, fixed assets are classified by size of establishment. The size groups of establishments are presented in terms of number of persons engaged. They may also be classified on the basis of value added or gross output.

8.15 Table A.10 shows the distribution of non-reproducible assets by kind of economic activity. Resources like agricultural land, land underlying buildings, timber tracts, subsoil assets and fisheries, that are actually being exploited should be allocated to the kind of activity of the user. Unexploited reserves of subsoil assets, historical monuments and land not being utilized in production should be classified as "assets not attributed to users".

3. Tables for institutional sectors (tables A.11A and A.11B)

8.16 Only one table each is provided for the countries using SNA and MPS, respectively, for the classification of reproducible assets by institutional sectors. An important feature of these tables is that they combine the classification by sectors with that by industries. Reference has already been made to the important differences this cross-classification may highlight with regard to capital-output ratios. The statistical units of the classification should be establishments, classified by at least major divisions of kind of activity.

4. BSH reconciliation table (table A.12)

8.17 This table is intended for internal statistical work to reconcile the balance-sheet data with the statistics of tangible assets. Assuming that the data defined according to BSH are already available, a start can be made from the figures shown with an asterisk. Then, steps forward should be made in two directions. First, the net value of the fixed assets of each sector should be divided vertically among the establishments belonging to the sector and the establishments should be classified according to kind of economic activity. Secondly, proceeding horizontally, the gross value of the assets for each group of establishments should be estimated. Then, by adding the items for lease and hire, the gross value of the fixed assets used by the establishments is obtained. The same table frame may be used for corresponding estimates relating to land or other natural resources.

D. Use of the tables in compiling and presenting data

8.18 The data called for in the tables of annex I below may be arranged in various ways. The presentation of data in the tables, the scope of the assets covered and the classification by type and kind of economic activity or by other criteria all depend on how detailed the available information is and the method of estimation applied. The tables in the annex refer to a cross-section for a given period of data on the magnitude of the stock of tangible assets and their components. The tables therefore may be interpreted as ways of presenting the results of a complete inventory for a bench-mark year.

8.19 If data on tangible assets for a number of years are called for, it may be more suitable to present the tables in another form. In order to accommodate time-series, the tables should be split into parts, each referring to a relevant section of a table. For instance, for each component of tangible assets, the opening stocks and the components of change from year to year may be shown for a series of consecutive years. In the case of three-dimensional data where, e.g., the types of assets, the groups of industries and the periods of time are combined, the arrangement of the data depends mainly on the purpose to be served. For instance, if attention is focused on the change within individual industries, it is necessary to prepare separate tables for each industry. For purposes of comparing the industries with each other, separate tables may be made for each group of assets, for instance, the stock of machinery and equipment in the different industries at the beginning of consecutive years.

8.20 Even modest estimates of the stock of tangible assets require relatively large data inputs and the sets of figures will be multiplied during the process of compilation. Since the degree of reliability of data gathered from different sources varies considerably a careful scrutiny of the figures is required in order to establish which data may be considered "official" and published and which data should be treated as background information and left in the filing cabinet.

Chapter IX

SOURCES AND METHODS OF GATHERING AND COMPILING THE STATISTICS

A. General

9.1 The present chapter deals with the sources and methods of gathering and compiling statistics on the stock of tangible assets. The discussion is based first of all on the experience of countries that have already made notable advances in estimating the stock of tangible assets. In addition, suggestions are made on the types of statistical surveys that would be useful as a basis for reasonably firm estimates.

9.2 In the discussion below it will be taken into consideration that chapter IX of BSH treats data sources and their use in making balance-sheet estimates. The same basic information and methods of estimation can also be utilized for the statistics of tangible assets, since a comprehensive compilation of balance-sheet data is not possible without estimates of the stock of tangible assets. Therefore, in order to avoid repetition, the present document only supplements the relevant recommendations of BSH and elaborates some questions from the point of view of the statistics of tangible assets. 1/

9.3 Estimates of the stock of tangible assets cannot be based in any country on a single data source and method of compilation. As in estimates of the flow accounts, use should be made of all relevant information on stocks and flows which is available in the economic statistics of a country, in central registers, in reports gathered by different authorities for taxation or other purposes, in the records of special state organs, e.g. forest supervisng authorities, and in the records of insurance companies etc. In areas not covered by these sources, primary information should be gathered for the statistics of tangible assets. The application of various types of sources and of a many-sided approach to estimation is necessary for two reasons. First, different sources may have to be used for different sectors or for selected types of assets, in order to make the estimates complete. Secondly, if different sources are used for the same item, the control and reconciliation of estimates on the basis of more than one source will increase the reliability of the estimates.

1/ Reference may also be made to chapter 3 of The Measurement of Capital, which describes methods of estimation used by member countries of OECD.

9.4 The methods of estimation may be divided into two main groups, the direct and the indirect approach, as is done in BSH. This distinction refers mainly to differences in the character of the data sources. However, in order to organize the estimation of a complete set of data on tangible assets, in practice a slightly different procedure seems to be more appropriate. Section B, below, discusses the major approaches to estimation from this point of view.

B. Main approaches

9.5 The principal methods that have been used by countries in estimating the stock of tangible assets are described in the following paragraphs. The methods are applied in combination in the estimates of many of the items. The choice of a particular method or combination of methods, of course, depends on the circumstances of a country. It may be said, however, that for statistics of fixed assets the perpetual-inventory method is most widely used in countries with market economies. Book values, although useful in countries with centrally planned economies, are of very limited application in other countries.

1. Perpetual-inventory method

9.6 In a number of countries the perpetual-inventory method is used to extrapolate bench-mark estimates of the stock of fixed assets and in some cases even to build up the bench-mark data. Ideally, relatively detailed statistics on annual gross fixed capital formation and expected lifetimes of use as well as annual price indexes, classified according to type of fixed assets and according to kind of economic activity of establishments, are needed for this purpose. The rationale of the perpetual-inventory method and the preconditions of its use are dealt with in BSH and illustrated in a work-sheet table there.

9.7 It is of great importance that the data estimated by means of the perpetual-inventory method should be checked by independent direct estimates carried out after certain intervals, say every 5 or 10 years, because one of the most important criteria taken as a basis for the method, namely the expected lifetime of the assets, is in general based on loose assumptions. Errors in estimating asset lives may significantly affect the estimates of the stock of fixed assets. Estimates by the perpetual-inventory method of the stock of the various industry groups also serve as a check on totals arrived at in other ways. It may be very difficult to divide the yearly investment in each type of fixed assets separately among industries. The reliability of estimates made by means of the perpetual-inventory method may be checked relatively easily for industries where estimates in quantity terms are available from direct inquiries for a large part of the assets. However, a direct inventory for at least one bench-mark year is required for non-reproducible tangible assets, since these assets exist for an indeterminate period.

9.8 In some countries, detailed data on gross fixed capital formation for a retrospective period long enough to apply the perpetual-inventory method may not be available. In these circumstances a rough estimate should be made of the capital in the first year for which capital formation figures are available. By adding the gross fixed capital formation to, and deducting the retirements from,

that stock, the reliability of the data will increase from year to year as the share of assets existing at the beginning of the computations becomes gradually less and less important. If it is not possible to make even a rough estimate of the initial stock, the countries concerned should concentrate their efforts on the development of statistics on gross fixed capital formation in order to establish the preconditions for the use of the perpetual-inventory method at a later stage.

9.9 The data on capital stock for the different industries estimated on the basis of the perpetual-inventory method do not quite correspond to the concepts required for the statistics on tangible assets. For instance, SNA requires that gross fixed capital formation by industry be recorded on an ownership instead of a user basis. There are also differences in the valuation of purchased second-hand durables. Therefore, the estimated data on the capital stock of industries should be adjusted by means of additional information on the value of leased assets and the turnover of used assets.

2. Special inquiries

9.10 Comprehensive inquiries on assets are expensive and complicated even when they are conducted on a sample basis or confined to specific sectors or types of assets. However, partial censuses are often possible for assets like ships, aircraft, motor vehicles, railway rolling-stock and residential housing, and where replacement costs can be approximated on the basis of second-hand market values. Because of both reporting errors and theoretical differences, the census method of estimating asset replacement costs will usually result in values different from those generated by the perpetual-inventory method.

9.11 Since other approaches do not in general provide sufficient information for estimates of the total stock of assets according to the concepts and classifications proposed in the chapters above, special inquiries are often needed to obtain the missing data. Special inquiries are often needed to measure parameters such as the expected useful life of the various types of assets, survival curves, costs per unit of quantity of investments, methods of estimating depreciation used in business accounting etc. The scope, size and frequency of special inquiries depend on the degree of detail and the reliability of the data otherwise available and, of course, on the possibilities of conducting such special sample surveys.

9.12 In undertaking a statistical inquiry on the stock of fixed assets, it should be borne in mind that the respondents, even with the greatest goodwill and willingness, cannot supply data which fulfil all the requirements of the statistics. The current replacement cost of a machine purchased 10 or 20 years ago, which at the time of inquiry is no longer manufactured, is often impossible to conceptualize. Consequently, it is better to ask concrete questions that can be answered unambiguously by the respondents, e.g., the year of purchase of the assets, their original purchase price, their size and capacity, their condition, the materials used in their production etc. If such data are available and if centrally established norms are applied to them, the value of assets may be estimated in a consistent, even if somewhat arbitrary, way. The use of this method is particularly recommended for small- and medium-sized establishments.

3. Use of data on assets expressed in terms of quantity

9.13 Data expressed in quantity terms are often available for a relatively wide range of tangible assets. The most important of these are natural resources such as land, timber tracts and mineral resources; the stock of dwellings and its distribution by size and other characteristics; agricultural machinery by type; number of livestock by kind and age; floor-space of barns for livestock; rolling-stock of railways; number of automobiles, trucks, aeroplanes and ships; number of hospital beds. Data are available in most countries on the length of the road system, on flood protection and irrigation dams and on their qualitative composition. All these represent a significant part of the stock of tangible assets and information on these assets is generally available from statistics collected for purposes other than statistics on tangible assets.

9.14 Serious difficulties arise in the transformation of these quantitative data into value aggregates. The most appropriate method is perhaps to organize investment statistics in such a way that they supply, in as much detail as possible, data on quantities as well as on the relevant costs of investmemts in the year under review. In general, the unit values that can be computed from these data provide an appropriate starting point for the valuation of the components of the stock of fixed assets.

9.15 Quantity data may be used for estimates of the stock of fixed assets for a bench-mark year, which constitutes a starting point for estimates made for later years by the perpetual-inventory method. For such estimates, the use of relatively rough methods may be accepted.

4. Use of book values

9.16 In countries with market economies, balance-sheets of enterprises which show the book values of tangible assets are compiled by most corporate enterprises and are submitted to the tax authorities and regulatory bodies and sometimes to statistical authorities. Unfortunately book values of fixed assets are rarely usable for the statistics of tangible assets. As noted earlier in paragraph 6.5, companies in some market economies are beginning to use replacement cost for valuing these fixed assets. In general however, the principles and rules prescribed in regulations concerned with the contents and valuation of balance-sheet data differ considerably from what is wanted for this purpose. It is also uncertain to what extent the rules are actually followed. The book values may sometimes be useful in establishing lower limits for the estimates although the regulations in general permit considerable under-estimation of the actual value of the assets. This situation may of course improve as uniform accounting laws are introduced and as more countries adopt replacement cost valuation.

9.17 As a result of their drawbacks, book values should be used to only a very limited extent for estimates of the stock of fixed assets in market-economy countries. If balance-sheet data are used they should be adjusted in order to arrive as closely as possible at current replacement costs. Several methods may be used to establish the degree of correction needed. Small sample surveys may be undertaken in order to investigate the difference between book values and current replacement costs. Another method is to compare current values shown in

fire-insurance reports to book values of the insured assets. The degree of the necessary correction is, however, most frequently estimated on the basis of consultations with accountants, representatives of industrial associations or other experts.

9.18 Book values are more useful for estimates of inventories than for estimates of fixed assets in market-economy countries. Inventories may in business accounts be valued on the principles of "first in, first out", "last in, first out" or average over the period, while market values are wanted for the statistics of tangible assets in order that they may be consistent with the flow accounts. Recording on the basis of "last in, first out" gives a good approximation to market values especially if additions to and withdrawals from stocks are not too infrequent. Recording in terms of "first in, first out" gives the poorest approximation to market values. However, if the inventories have been built up during the last few months and prices have risen only moderately, it may not be worth while to adjust the book values for the purposes of the statistics of tangible assets even where the "first in, first out" method of inventory valuation is used.

9.19 In countries with centrally planned economies, book values are the basis for estimates of the value of all tangible reproducible assets. Enterprises and other corporate institutions compiling balance-sheets generally cover about 80-90 per cent of the total stock of assets in these countries. The concepts, classifications and values applied in the balance-sheets are centrally regulated and they are usually in accordance with the requirements of statistics of tangible assets. In periods of relatively great changes in the prices of assets or after a longer period (say 8-10 years), a general revaluation of the assets in the individual enterprises is requested. In the period between two general revaluations, the values shown in the books will differ somewhat from current replacement costs but if price changes have not been significant the book values may be satisfactory even without correction. The availability of detailed price indexes, however, makes it possible to estimate continuously the value of the stock of assets at current and constant prices.

5. Other methods

9.20 Two other approaches deserve a brief mention: the use of insured values and stock exchange data. Information on the insured values of fixed assets may be obtained from insurance companies - a convenient source at least for countries where most insurance business is conducted by resident companies. However there are several problems with such data. Often only the more important pieces of equipment and buildings are insured; in periods of rapid inflation it is common to find that assets are undervalued in the sense that they are insured for less than their current replacement cost; finally, assets are usually insured at their net (i.e., depreciated) values whereas a gross valuation is generally preferred for statistics on tangible assets.

9.21 The value of an enterprise may be estimated by its current stock-exchange value, i.e. the number of shares issued times the sales price of those shares on the chosen date. The market value of the enterprise's financial assets may then be deducted to arrive at the estimated value of the stock of tangible assets owned by the enterprise. Clearly this method is limited to countries where there are active stock exchanges and even then there are other problems. Share values are influenced by a number of unquantifiable factors such as the degree of risk involved, the existence of "goodwill", differences in entrepreneurial skill, and the general climate of business.

9.22 However while the use of insured values and stock-exchange values are open to various objection, they should not be completely ruled out in view of the many problems that affect even superior methods. Despite their drawbacks both methods can sometimes be used to provide a broad credibility check on capital stock estimates derived by other methods, or to obtain an initial estimate for a perpetual inventory model.

C. Priorities of the statistics

9.23 The development of statistics of tangible assets into a relatively comprehensive and consistent system will in the majority of countries require a considerable period of time and may be divided into several stages of work. Therefore it may be useful to outline briefly what priority should be given to the various components of the statistics. First priority should be accorded to fixed assets. Fixed assets usually constitute the major part of the stock of tangible assets and they play the most important role for growth, structural changes and increases in the efficiency of production. Luckily, it is less difficult to make estimates for fixed assets than for the other components of tangible assets.

9.24 Second priority may be given to estimates of the stock of inventories. A considerable part of the total stock of inventories is covered in the books of enterprises and may be revalued to the required price level.

9.25 The component of natural resources for which estimates are most urgently needed is land. In many countries land owners are taxed on the basis of the assessed values of their land. While these are not generally equal to market values, there is often a fixed relationship between them. Special inquiries could then be made to determine the average ratio between assessed values and market values, so that the assessed values of land could be adjusted to market values. The second or third order of priority may be given to estimates of the value of other natural resources. Also here it is important to determine and estimate suitable unit prices. It would then be possible to adjust figues gathered on assessed values for property taxes to market values.

9.26 First priority should be given to estimates of the tangible assets of agriculture and manufacturing. These industries are the main sources of productivity increase and growth. In manufacturing it is more possible than in other industries to influence the combination of capital and labour in a manner which increases the efficiency of the whole economy. In countries with developed economies, estimates of the stock of agricultural assets deserve attention because of the high capital intensity of the industry and in less developed countries they deserve attention because of the industry's importance.

9.27 After estimates have been made for these two major industries, it seems reasonable to use the possibilities presented by the availability of statistical sources and to include in the estimates those areas in which the stock of assets can be estimated with the relatively highest reliabiltiy, e.g., housing, transport and communications, electricity, gas and water, general government etc.

9.28 The orders of priority indicated above should be applied after estimates for the country as a whole are already available. The generally used methods render it easier to make reliable estimates for the country as a whole than for the individual industries. After estimates of total stock by types of assets have been made, the distribution of the various assets among industries becomes possible.

Annex I

TABLES FOR STATISTICS OF TANGIBLE ASSETS

Basic tables for the nation as a whole

Table A.1. The gross value of reproducible tangible assets of the nation at the beginning and at the end of the year and their linkages, by type of assets

(a) At current prices
(b) At constant prices

Type of assets	Opening stock (gross value)	Gross capital formation	Retirements and scrapping	Reconciliation items: Revaluations due to price changes	Reconciliation items: Other changes	Closing stock (gross value)
I. Fixed assets in use						
a. Construction						
1. Residential buildings						
2. Non-residential buildings						
3. Other construction						
SUB-TOTAL						
b. Machinery and equipment						
1. Transport equipment						
2. Agricultural machinery and equipment						
3. Other machinery and equipment						
c. Breeding stock, land improvements and the like						
1. Breeding stock, draught animals and the like						
2. Plantations, land improvements and the like						
SUB-TOTAL						
TOTAL FIXED ASSETS						
II. Uncompleted construction						
III. Inventories						
a. Goods-producing industries						
1. Materials and supplies						
2. Work in progress						
3. Livestock, except breeding stock and the like						
4. Finished goods						
b. Wholesale and retail trade						
c. Other industries						
d. Government stockpiles						
TOTAL INVENTORIES						
of which:						
a. Energy carriers						
b. Ferrous metal materials						
c. Non-ferrous metal materials						
d. Cereals						
TOTAL REPRODUCIBLE TANGIBLE ASSETS						

Table A.2. The net value of reproducible tangible fixed assets of the nation at the beginning and at the end of the year and their linkages, by type of assets

(a) At current prices
(b) At constant prices

Type of assets	Opening stock (gross value)	Accumulated depreciation	Opening stock (net value)	Gross fixed capital formation	Consumption of fixed capital	Retirements less accumulated depreciation	Reconciliation items: Revaluations due to price changes	Reconciliation items: Other changes	Closing stock (net value)
Fixed assets in use									
a. Construction									
1. Residential buildings									
2. Non-residential buildings									
3. Other construction									
SUBTOTAL									
b. Machinery and equipment									
1. Transport equipment									
2. Agricultural machinery and equipment									
3. Other machinery and equipment									
SUBTOTAL									
c. Breeding stock, land improvements and the like									
1. Breeding stock, draught animals and the like									
2. Plantations, land improvements and the like									
SUBTOTAL									
TOTAL FIXED ASSETS									

Table A.3. The gross value of fixed assets of the nation by type and age at the beginning of the year

(At current prices)

Type of assets	Gross value of assets by actual age in years									
	1-5	6-10	11-20	21-30	31-40	41-60	61-80	81-100	101 and more	Total
Fixed assets in use										
a. Construction										
1. Residential buildings										
2. Non-residential buildings										
3. Other construction										
SUBTOTAL										
b. Machinery and equipment										
1. Transport equipment										
2. Agricultural machinery and equipment										
3. Other machinery and equipment										
SUBTOTAL										
c. Breeding stock, land improvements and the like										
1. Breeding stock, draught animals and the like										
2. Plantations, land improvements and the like										
SUBTOTAL										
TOTAL FIXED ASSETS										

Table A.4. The value of non-reproducible tangible assets of the nation at the beginning and the end of the year and their linkages, by type

(a) At current prices
(b) At constant prices

Type of assets	Opening stock	Reconciliation items: Price revaluations	Reconciliation items: Value of quantitative changes	Reconciliation items: Statistical adjustments	Closing stock
I. Land					
a. Urban land					
b. Cultivated land					
c. Other land					
SUBTOTAL					
II. Timber tracts and forests					
III. Subsoil assets and extraction sites					
a. Coal, oil and natural gas reserves and sites					
b. Metallic mineral reserves, mines and sites					
c. Other mineral reserves, mines and sites					
SUBTOTAL					
IV. Inland fisheries					
V. Historical monuments					
TOTAL NON-REPRODUCIBLE TANGIBLE ASSETS					

Basic tables for classes of economic activity

Table A.5A. The gross value of reproducible tangible assets by kind of economic activity of user at the beginning of the year

(a) At current prices
(b) At constant prices

Kind of economic activity according to SNA	Types of assets						
	Construction	Machinery and equipment	Breeding stock, land improvement and the like	Total fixed assets in use, gross	Uncompleted construction	Inventories	Total
a. Industries							
1. Agriculture, forestry and fishing							
2. Mining and quarrying							
3. Manufacturing							
4. Electricity, gas and water							
5. Construction							
6. Wholesale and retail trade, restaurants and hotels							
7. Transport, storage and communication							
8. Finance, insurance, real estate and business services							
9. Community, social and personal services							
SUBTOTAL							
b. Producers of government services							
91. Public, administration and defence							
92. Sanitary and similar services							
93. Social and related community services							
94. Recreational and cultural services							
Other (specify)							
SUBTOTAL							
c. Producers of private non-profit services to households							
93-94. Social, recreational and related services							
Total reproducible tangible assets attributed to users							
Total reproducible tangible assets not attributed to users a/							
TOTAL REPRODUCIBLE TANGIBLE ASSETS							

a/ Roads, dams etc. (see paras. 5.28-5.30).

Table A.5B. The gross value of reproducible tangible assets by kind of economic activity of user at the beginning of the year

(a) At current prices
(b) At constant prices

Kind of economic activity according to MPS, table 3.1	Type of assets						
	Construction	Machinery and equipment	Breeding stock, land improvement and the like	Total fixed assets in use, gross	Uncompleted construction	Inventories	Total
	a. Productive sphere						
09. Industry							
10. Construction							
11. Agriculture							
12. Forestry							
13. Transport							
14. Communications							
15. Trade							
16. Other branches of material production							
SUBTOTAL							
	b. Non-productive sphere						
23. Housing and public utilities							
24. Education, culture and art							
25. Health services, social welfare and sports							
26. Science and scientific services							
27. Finance, credit and insurance							
28. General government							
29. Other branches of non-material activity							
SUBTOTAL							
Total reproducible tangible assets attributed to users							
Total reproducible tangible assets not attributed to users a/							
TOTAL REPRODUCIBLE TANGIBLE ASSETS							

a/ Roads, dams etc. (see paras. 5.28-5.30).

Basic tables for classes of economic activity (continued)

Table A.6A and A.6B. The net value of fixed (reproducible tangible) assets in use by kind of economic activity at the beginning of the year

(a) At current prices
(b) At constant prices

Kind of economic activity	Type of fixed assets: Construction	Machinery and equipment	Breeding stock, land improvement and the like	Total net value	Net value in percentage of gross value
A.6A: The same categories as those in table A.5A for countries using SNA					
A.6B: The same categories as those in table A.5B for countries using MPS					

Table A.7A and A.7B. The gross value of reproducible tangible assets at the beginning and at the end of the year and their linkages, according to kind of economic activity

(a) At current prices
(b) At constant prices

Type of assets and major classes of economic activity	Opening stock (gross value)	Gross capital formation: New goods	Gross capital formation: Net purchases of second-hand goods	Retirements and scrapping	Reconciliation: Revaluations due to price changes	Reconciliation: Other changes	Closing stock (gross value)
I. Agriculture							
a. Fixed assets in use							
1. Construction							
2. Machinery and equipment							
3. Breeding stock, land improvement and the like							
SUBTOTAL							
b. Uncompleted construction							
c. Inventories							
TOTAL REPRODUCIBLE TANGIBLE ASSETS							
A.7A: Major divisions of kind of economic activity in table A.5A for countries using SNA							
A.7B: Major branches of kind of economic activity in table A.5B for countries using MPS							

Table A.8A and A.8B. The gross value of fixed (reproducible tangible) assets at the beginning of the year by kind of economic activity and shifts worked a/

(At current prices)

Kind of economic activity	The gross value of fixed assets by number of shifts worked				
	0 b/	1	2	3	Total
A.8A: Selected activities within "industries" for countries using SNA					
A.8B: Selected activities in the "productive sphere" for countries using MPS					

a/ The classification could be by average number of shifts worked during the previous year, quarter, month etc. or by the number of shifts being worked at the time of the survey.

b/ This column contains the value of unemployed fixed assets.

Table A.9A and A.9B. The gross value of fixed (reproducible tangible) assets by kind of economic activity and number of persons engaged in the establishment at the beginning of the year a/

(At current prices)

Kind of economic activity	The gross value of fixed assets of establishments by number of persons engaged							
	1-5	5-20	21-100	101-500	501-1000	1001-5000	5001 and more	Total
A.9A: The same categories as those in table A.5A for countries using SNA								
A.9B: The same categories as those in table A.5B for countries using MPS								

a/ Other size measures which may be preferable in some cases include: value added, gross output and the total value of tangible assets in use by the establishment.

Table A.10A and A.10B. The value of non-reproducible tangible assets by kind of economic activity at the beginning of the year

(a) At current prices
(b) At constant prices

Kind of economic activity	Land				Timber tracts and forests	Subsoil assets	Fisheries	Historical monuments	Total
	Urban	Cultivated	Other	Total					
A.10A: The same categories as those in table A.5A for countries using SNA									
A.10B: The same categories as those in table A.5B for countries using MPS									

Table A.11A. The gross value of reproducible tangible assets by sectors and major divisions of economic activity at the beginning of the year

(a) At current prices
(b) At constant prices

Institutional sectors broken down by establishments classified according to kind of economic activity (according to SNA)	Type of assets						
	Construction	Machinery and equipment	Breeding stock, land improvement and the like	Total fixed assets in use	Uncompleted construction	Inventories	Total
I. Non-financial corporate and quasi-corporate enterprises							
1. Agriculture, hunting, forestry and fishing							
a. Private							
b. Public							
Same classification by kind of economic activity as in table A.5A.a							
II. Financial institutions							
III. Unincorporated non-financial enterprises							
Same classification by kind of economic activity as in table A.5A.a							
IV. General government							
Same classification by kind of economic activity as in table A.5A.b							
V. Private non-profit institutions serving households							
Same classification by kind of economic activity as in table A.5A.c							
VI. Fixed assets not attributed to users							
TOTAL REPRODUCIBLE TANGIBLE ASSETS							

Table A.11B. The gross value of reproducible tangible assets by sectors and major balances of economic activity at the beginning of the year

(a) At current prices
(b) At constant prices

Sectors and major branches of economic activity (according to MPS)	Type of assets						
	Construction	Machinery and equipment	Breeding stock, land improvement and the like	Total fixed assets in use	Uncompleted construction	Inventories	Total
I. State sector							
Same classification by kind of economic activity as in table A.5B.a and b							
II. Co-operative sector							
Same subclasses as for state sector, where relevant							
III. Social organizations							
Same subclasses as for state sector, where relevant							
IV. Personal plots of employees							
V. Personal plots of members of co-operatives							
VI. Private sector (producing units)							
Same subclasses as for state sector, where relevant							
VII. Households (dwellings)							
VIII. Fixed assets not attributed to user							
TOTAL REPRODUCIBLE TANGIBLE ASSETS							

Table A.12. Links between aggregates of fixed assets owned by institutional sectors and fixed assets used by establishments at the beginning of the year

(At current prices)

Institutional sectors broken down by establishments classified classified according to kind of economic activity	Value of fixed assets owned			Value of leased and rented fixed assets (+) or (-)			Value of fixed assets used		
	Net a/	Accumulated depreciation	Gross	Net	Accumulated depreciation	Gross	Net	Accumulated depreciation	Gross
Non-financial corporate and quasi-corporate enterprises	*								
1. Agriculture, hunting, forestry and fishing									
2. Mining and quarrying									
3. Manufacturing									
4. Electricity, gas and water									
5. Construction									
6. Wholesale and retail trade									
7. Transport and communication									
8. Finance, insurance, real estate and business services									
9. Community, social and personal services									
Financial institutions	*								
Unincorporated enterprises	*								
Subclasses as for non-financial corporate and quasi-corporate enterprises									
General government	*								
Subclasses as in table A.5A.b									
Private non-profit institutions serving households	*								
Subclasses as in table A.5A.(c)									
Fixed assets not attributed to users a/				x	x	x	x	x	x
TOTAL FIXED ASSETS									

a/ For asterisk, see para. 8.17.

Annex II

TABLES REFERRED TO IN THE TEXT

MPS table 2.1. The balance of production, consumption and accumulation of the global product (material balance)

Row number		Sources of material goods							Utilization of material goods																		
		The global product produced on the territory of the country				At purchasers' prices	Imports	Total	Intermediate material consumption									Final consumption				Net capital formation				Exports	Total
		At producers' prices	Transport charges and trade margins						In industry	In construction	In agriculture	In forestry	In transport	In communication	In trade	In other branches of material production	Total	Consumption of the population			Other categories of final consumption	Total final consumption	Fixed assets	Stocks	Total	Losses		
			Goods transport	Trade	Total													Personal consumption	Consumption of goods in institutions rendering cultural services, amenities and social welfare services to the population	Total								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
01	Total for the national economy as a whole																										
02	Industrial goods																										
03	Output of construction																										
04	Agricultural products																										
05	Forestry products																										
06	Passenger transport																										
07	Output of communications																										
08	Products of other branches of material sphere																										
09	Total of means of production																										
10	Industrial goods																										
11	Output of construction																										
12	Agricultural products																										
13	Forestry products																										
14	Output of communications																										
15	Products of other branches of material sphere																										
16	Total of consumer goods																										
17	Industrial goods																										
18	Output of construction																										
19	Agricultural products																										
20	Passenger transport																										
21	Output of communications																										
22	Products of other branches of material sphere																										

MPS table 5.1. The indicators of national wealth

Row number		At the beginning of the year	At the end of the year	Increase during the year
		1	2	3
01	State (national) property			
02	Fixed assets:			
03	Productive			
04	Non-productive			
05	Including housing			
06	Stocks			
07	Materials and supplies			
08	Work in progress			
09	Finished products			
10	Merchandise			
11	State reserves			
12	Co-operative and collective farm property			
13	Fixed assets:			
14	Productive			
15	Non-productive			
16	Including housing			
17	Stocks			
18	Materials and supplies			
19	Work in progress			
20	Finished products and merchandise			
21	Property of the population (by social categories)			
22	Fixed assets			
23	Productive			
24	Non-productive (housing)			
25	Durable goods in households			
26	Stocks of agricultural products in personal plots			
27	Total: (01+12+21)			
	Plus lands and forests			

Indicators of national wealth (for use with MPS)

1. Tangible assets in material sphere

1.1. Fixed assets.

1.11. Buildings and installations.

1.12. Power plants and installations.

1.13. Operating machines and equipment.

1.14. Transportation means.

1.15. Livestock.

1.16. Perennial plantations.

1.2. Material circulating assets.

1.21. Reserves of basic materials.

1.22. Work in progress.

1.23. Finished goods.

1.24. Livestock: youngsters and fattening livestock.

2. Tangible assets in non-material sphere

2.1. Fixed assets.

2.2. Material circulating assets and reserves.

3. Durable consumer goods held by households

4. Tangible assets on the territory of the country (1+2+3)

5. Tangible assets of the country in other countries

6. Overseas tangible assets in a given country

7. Financial claims to other countries including monetary reserves

8. Financial liabilities

9. National wealth (4+5+6+7-8)

Source: Basic Methodology of Computing the Indicators of National Wealth (Moscow, Council for Mutual Economic Assistance, 1972).

10. Reproducible tangible assets

10.1. Stocks

10.1.1. Goods-producing industries

Agriculture, forestry and logging, and fishing; mining, manufacturing, and electricity, gas and water supply; and construction.

10.1.1.1. Materials and supplies

All materials, components, parts and supplies acquired for extracting, processing, fabricating, assembling, repairing, etc. commodities and for construction works; coal, oil and other fuels purchased for consumption; stocks of fertilizers, insecticides, seeds, feeds and similar goods of agricultural producers; greases and other lubricants; purchased non-durable containers, factory packaging, office and other supplies.

10.1.1.2. Work in progress

Goods that have been partially processed, fabricated or assembled by the goods-producing establishments but that are not usually sold, shipped or turned over to other establishments without further processing. Partially completed construction works are excluded.

10.1.1.3. Livestock, except breeding stock, dairy cattle and the like

Livestock raised for slaughter; all chickens and other fowl; and other livestock except those enumerated in 10.2.7. below.

10.1.1.4. Finished goods

Commodities of the goods-producing establishments, which are ready for sale or shipment by these units, including items which are usually sold by the units in the same form as when purchased. Construction works are excluded.

10.1.2. Wholesale and retail trade

Goods acquired by units classified to wholesale and retail trade for sale or for use as fuels and supplies.

10.1.3. Other industries

Stocks of coal, oil and other fuel and of repairing and maintenance supplies of the transport, communication, financial and other industries n.e.c.; non-durable containers, packaging, office and miscellaneous supplies; all other stocks of these industries.

10.1.4. Stocks of government services

Stocks of government services in strategic materials, grains and other commodities of special importance to the nation.

10.2. Fixed assets

10.2.1. Residential buildings

Buildings, completed and uncompleted, which consist entirely or primarily of dwellings. Included are permanent fixtures such as fixed stoves, central heating, air conditioning, lighting, plumbing and water-supply facilities, and all other fixed equipment customarily installed in dwellings. Hotels, autocourts and similar buildings operated for purely transient occupancy are considered to be non-residential structures.

10.2.2. Non-residential buildings

Buildings and structures, completed and uncompleted, which are entirely, or primarily, for industrial or commercial use. Examples of non-residential buildings are factories, warehouses, office buildings, stores, restaurants, hotels, garages, farm buildings such as stables and barns, and buildings for religious, educational, recreational and similar purposes. Also included are fixtures, facilities and equipment which are integral and unmovable parts of the structures.

10.2.3. Other construction works

Non-military works, completed and uncompleted, such as the permanent ways of railroads, roads, streets, sewers, bridges, viaducts, subways and tunnels, harbours, piers and other harbour facilities, car parking facilities, airports, pipelines, canals and waterways, water-power projects, dams, dikes and irrigation and flood control projects, aqueducts and sanitation projects, athletic fields, electricity transmission lines, gas mains and pipes, telephone and telegraph lines etc. Includes the cost of laying out the necessary streets and sewers but excludes groundwork within the building line, which should be included in residential or non-residential buildings, as the case may be.

10.2.4. Land improvement and plantation and orchard development

10.2.4.1. Land improvement

Outlays on all land reclamation and land clearance, irrespective of whether it represents an addition to total land availability or not; irrigation and flood control projects and dams and dikes which are part of these projects; clearance and afforestation of timber tracts and forests; and the transfer costs of transactions in land, farms, mineral deposits and concessions, timber tracts and forests, fishing grounds and concessions, and similar natural resources.

10.2.4.2. Plantation, orchard and vineyard development

Expenditure on planting and cultivating, until they yield crops, of orchards, rubber plantations and other new holdings of fruit-bearing and sap-bearing plants which take more than a year to become productive.

10.2.5. Transport equipment

Completed ships, aircraft, railway and tramway rolling stock, tractors for road haulage, trucks, moving vans and the like, motor vehicles, carts and waggons acquired by industries, government services for civilian use and private non-profit services. Transport equipment acquired for military purposes is excluded.

10.2.6. Machinery and equipment

10.2.6.1. Agricultural machinery and equipment

Agricultural machinery and equipment such as harvesters, threshers, ploughs, harrows and other cultivators, and tractors other than for road haulage.

10.2.6.2. Other

Durable goods not elsewhere classified to the fixed assets of resident producers. Included are power generating machinery; office machinery, equipment, furniture and furnishings; art objects, metal working machinery; mining construction and other industrial machinery; cranes and fork-lift equipment; durable containers; equipment and

	instruments used by professional men; and equipment, furnishings and furniture for use by hotels, boarding houses, restaurants, hospitals, research institutions, schools and other services. Items of small value, such as hand tools, office desk equipment and furnishings, may be excluded on practical grounds if the customary accounting procedure is to treat them as current expense.
10.2.7.	Breeding stock, draught animals, dairy cattle and the like
	Breeding stock, draught animals, dairy cattle, sheep llamas, etc. raised for wool clipping.

BSH table 5.2. Classification of non-reproducible tangible assets according to type

11. Non-reproducible tangible assets

11.1. Land

11.1.1. Land underlying buildings and works

Land on which are erected buildings and works included under items 10.2.1. through 10.2.3. in table 5.1 above. Included are access roads to farms, yards of farm residential structures and the like. In the case of residential buildings it is necessary to impose a limit to the size of private gardens surrounding dwellings; if no limit is prescribed for local taxation purposes, any excess of land over 0.5 hectares should be included under item 11.1.3. below.

11.1.2. Cultivated land

Land on which agricultural or horticultural activities are carried on for commercial or subsistence purposes, including all plantations, orchards and vineyards. Land forming a part of a farming enterprise but not access roads, farmyards etc., which should be classified to item 11.1.1. Private gardens and plots not cultivated for subsistence or on a commercial basis should be included under item 11.1.3., except that a limited area surrounding dwellings should be classified to item 11.1.1.

11.1.3. Other

Privately owned amenity land, parklands and pleasures grounds; private gardens and plots not cultivated for subsistence or commercial purposes, and the excess area above a certain limit of private gardens surrounding residential buildings.

11.2. Timber tracts and forests

All timber having a commercial value in forests, timber tracts, woodlands and copses and the underlying land.

11.3. Subsoil assets and extraction sites

11.3.1. Coal, oil and natural gas reserves and sites

Anthracite, bituminous and brown-coal deposits and shafts and open-cast mines; petroleum and natural gas reserves, wells and fields.

11.3.2. Metallic mineral reserves, mines and sites

Ferrous, non-ferrous and precious metal ore deposits, mines and other extraction sites.

BSH table 5.2. Classification of non-reproducible tangible assets according to type

11.3.3. Other non-metallic mineral reserves, mines and sites

Stone quarries and clay and sand pits; chemical and fertilizer mineral deposits, mines and other extraction sites; salt deposits, mines and extraction sites; deposits, mines and other extraction sites in the case of quartz, gypsum, natural gem stones, asphalt and bitumen, peat and other non-metallic minerals other than coal and petroleum.

11.4. Fisheries

Stocks of fish and the associated works in the case of fish ponds and farms, cultivated oyster and pearl beds, and other fisheries. Only commercially run fisheries in inland waters (rivers and lakes) and inshore when separated from the open sea by a barrier should be included.

11.5. Historical monuments

Buildings, statues and other structures of historical or major cultural interest which have been the subject of a transaction in the capital finance accounts.

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