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SOME PROBLEMS OF ESTIMATING CAPITAL  
FORMATION, WITH SPECIAL REFERENCE TO  
AFRICAN COUNTRIES

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# Capital Formation Estimates in the context of Economic Policy and Planning

1. It may be said that any economic development plan is basically concerned with the allocation of increased capital expenditures and the analysis of their probable economic effects. Partial plans usually limit themselves to projects for increased capital outlays in specific fields and their success is measured in relation to the extent to which it has actually been possible to realize the planned capital expenditure. Global plans are more sophisticated and determine general goals for the development of the economy as a whole as well as for specific sectors and then set about finding the conditions and requirements necessary to reach these goals. One of the most basic conditions for the success of such plans is also that the implied capital formation expenditures can be met.

2. As a consequence of the fundamental importance of capital formation in the context of economic development planning, it is a main prerequisite for the formulation of a realistic development plan that the present magnitude and composition of fixed capital formation within the framework of national accounts are known. This information is among other things needed to form an impression as to whether increased capital expenditures are feasible within the limits of the capacity of the economy and whether the present allocation of such expenditures by type and by industry conforms to what might be desired. At the stage of implementation of a plan, it is clear that information about actually realized capital formation expenditures and their composition is practically indispensable for measuring the progress of the plan and deciding at which points an extra effort has to be made to fulfil the goals.

3. As complete and detailed data on fixed capital formation as can in any way be provided are needed for these purposes. Given the state of statistical development of the African countries, the question arises

how much information can actually be supplied and how priorities should be determined for the future development of capital formation statistics.

4. A figure for total gross domestic capital formation is needed as a key component of the national accounts. Where an estimate of aggregate domestic product is made available either by the product or by the income approach, an expenditure break-down may be established if an estimate of capital formation exists, since data on imports, exports and government consumption are normally available and private consumption may be obtained as a residual. Most countries which embark on national accounts estimation therefore make an effort to arrive at a figure for gross capital formation, however crude.

5. It should be stressed already at this point, however, that although a rather rough and inexact estimate of capital formation may serve to give an approximate idea about the importance of this item in the structure of the economy for the purposes of economic analysis, economic development planning sets considerably stricter standards. A significant error in the estimates of the level or development of capital formation may in the context of planning lead to very harmful policy decisions.

6. Therefore, before a country has a sufficient and reliable supply of the basic data needed to make capital formation estimates any makeshift estimates ought to be restricted in their use and preferably not published. It is not easy to determine the minimum data requirements for useful estimates, but certainly reasonably accurate foreign trade statistics, government accounts and some domestic production statistics as well as a minimum of miscellaneous data for the estimate of construction expenditures and capital formation in the traditional sector would have to be available. Given a sufficient underpinning of basic data, the ingenuity of the estimators may contribute much towards providing useful estimates. Without sufficient basic statistics, however, any amount of ingenuity will fail in establishing capital formation figures which can be used for practical purposes.

7. Assuming that a reasonable estimate of gross domestic fixed capital formation can be made at all, some classifications follow so to speak automatically since the total will have to be built up from components. For instance, if the estimate of total gross fixed capital formation is based mainly on the commodity flow method, a break-down by type of capital goods can be readily extracted from the work-sheets. If, on the other hand, accounting data have been the chief source of the estimate, a breakdown of gross fixed capital formation by industry of use may be readily derived. Practically always a classification of gross fixed capital formation by government and private is possible, regardless of the method of estimation. Rarely, however, are enough basic data available to obtain all these break-downs at the same time. And cross-classifications by, for instance industry of use and type of capital goods or even government-private and type of capital goods, which would be of great interest for planning purposes, are very rarely found even in statistically highly developed countries, because the detailed basic data required to work them out are not available.

8. Instead of immediately aiming at a more or less complete set of break-downs of gross fixed capital formation which, although desirable for planning purposes, are beyond their present statistical possibilities, the countries of the region would be well advised to concentrate in the first round on building up as firmly based estimates of total gross fixed capital formation as possible, regardless whether some important break-downs will have to be left till a later date. At the same time, however, and as a more long-term goal, plans for the collection of basic statistics needed to obtain as complete a set of capital formation estimates as at all possible may be drawn up. It is very important, in order to arrive at soundly based estimates, that a step-by-step approach is adopted and that not more is attempted at any one time than can be thoroughly done.

9. In the following, an attempt will be made to describe in some detail methods of estimation which may with advantage be applied by the African countries in arriving at fairly advanced estimates of capital formation and to point out some of the difficulties which are likely to be met in applying these methods. For some countries, the methods can only be applied in the future after more basic statistics have been collected, but a description of them may help these countries in deciding which type of basic data should be collected for this particular purpose. As far as concepts are concerned, it is on the whole recommended that the conceptual framework of the SNA<sup>1/</sup> and the intermediate system<sup>2/</sup> is adhered to, but some conceptual questions will also be dealt with, including points of particular interest for the African countries.

10. The main part of the discussion in the following will refer to gross domestic fixed capital formation. This concept is comparable with the other components of national expenditure, such as consumers' expenditures, since in principle it reflects actual transactions at market prices. It represents a measure of the part of the national product which has been used for building up the capital stock and hence a measure of the effective demand for capital goods.

11. For planning purposes, the net concept, i.e. gross fixed capital formation less depreciation would also be of great interest. This concept measures the net increase in fixed assets and thus indicates the increase in productive capacity. Gross fixed capital formation has been given priority here, not only because it is the concept which of necessity has to be estimated first but also because it is extremely difficult to arrive at meaningful depreciation estimates. Even a number of statistically highly developed countries have chosen to use the gross concept alone because they do not consider it possible to arrive at estimates of depreciation which are of sufficiently good quality.

<sup>1/</sup> "A System of National Accounts and Supporting Tables", Studies in Methods, Series F, No.2, Rev.1, United Nations, New York, 1960.

<sup>2/</sup> "Report of the Working Group on the Adaptation of the United Nations System of National Accounts for Use in Africa", United Nations document E/CN.14/221, 15 December 1962.

12. However, since at least some countries of the region may decide to work towards net estimates of capital formation as a future aim, some of the problems connected with depreciation estimates will be discussed in the following in a separate section.

13. Although conceptually an integral part of gross domestic capital formation, the item changes in stocks has a different economic significance from fixed capital formation. It essentially provides a measure of changes in business working capital and is as such a sensitive indicator of short and medium-term economic fluctuations. The measurement of such fluctuations is in the context of economic development planning of secondary importance to the measurement of fixed capital formation. It is also generally recognized that changes in stocks is one of the most difficult items to estimate on the national accounts, not only of statistically less developed countries, but of any country. A separate section will be devoted to the special problems of estimating this item.

## II. Consideration of some points of concept.

14. Gross domestic fixed capital formation is defined in some detail in the SNA and other United Nations studies in methods<sup>1/</sup>. The details of the definition do, however, mainly refer to points of interest for statistically developed countries. A number of refinements are included which are either extremely difficult to apply for African countries or do not appear particularly relevant. On the other hand, the definition is not specific enough on some points of particular interest to the countries of this region. In the following, some of these aspects of the SNA definition will be taken up for discussion.

15. First, a couple of points will be mentioned with regard to the treatment of existing capital where the SNA definition is very difficult to follow in African countries as, for that matter, in practically all other countries too.

<sup>1/</sup> See: "Concepts and Definitions of Capital Formation", Studies in Methods, Series F, No. 3, New York, 1953 and "Methods of National Income Estimation", Studies in Methods, Series F, No. 8, New York, 1955.

16. The SNA requires that in the break-down of gross fixed capital formation by industrial use transactions in existing fixed capital, including land, should be included as capital formation in the sector of purchase and as negative capital formation in the sector of sale.

Basic information needed to make an estimate of transactions in existing fixed capital between sectors is usually extremely scarce or non-existent and very few countries actually follow the definition on this point. It would seem necessary for countries on the whole following the SNA definition, however, to indicate in a note to the table showing fixed capital formation by industrial use that transactions in existing capital are excluded, or to specify them if they are included.

17. As a corollary to the inclusion of transactions in existing fixed capital, the SNA requires that expenditures connected with these transactions, like legal costs, fees and, presumably, (although this is not specifically mentioned) transport and installation costs, should be included in gross domestic fixed capital formation<sup>1/</sup>. The amounts involved are normally very small and a sound basis for their estimation is generally lacking. No great harm would therefore be done if they are disregarded as they in practice are in the estimates of practically all countries of the world.

18. On one point of a certain practical significance the SNA leaves room for a deviation in practice from the definition considered theoretically correct. The countries of this region may, however, prefer to apply the strict definition.

19. The general definition of capital goods in the SNA comprises all durable producers' goods with a life-time of more than one year. In connexion with this definition, the SNA states, however, that to bring it more into line with accounting conventions, items of small value, like hand-tools etc., may in practice be excluded, irrespective of their life-time. If the estimates of capital formation in machinery and equipment are made by the commodity flow method, these items could, at least in

<sup>1/</sup> The value of the existing fixed capital itself would, of course, not be included in capital formation for the country as a whole, since positive and negative amounts cancel out in the transfer between sectors.

...principle, easily be included by the countries of this region. Items of small value are also of considerable importance in the capital formation of these countries and it therefore might lead to a significant underestimation of the total if they are disregarded.

20. There appears to be a certain ambiguity attached to the SNA definition at a couple of points, which it would be very useful to get clarified so that uncertainties with regard to the understanding of the definition and wavering practices on the part of the estimators can be avoided.

21. The SNA states that "a more comprehensive and uniform treatment of capital formation especially in the general area of durable goods acquired by households" would be desirable, but that such an extension is impractical for the time being because of lack of information. Since the acquisition of durable goods by households, aside from dwellings, is in the present SNA definition considered as consumption expenditure, the quotation may be taken to mean that it would be desirable to include more items of capital goods acquired by households as capital formation. Particularly for countries which apply the commodity flow method an extension of the concept of fixed capital formation in this direction would signify a simplification rather than the opposite since it would make it unnecessary to split items like automobiles (and in more refined calculations refrigerators, air-conditioners, gas and electric stoves, etc.) between consumption and capital formation. A clarification of this point appears to be required, so much the more since a widening of the concept of capital formation as presently defined seems to be implied.

22. Also, the definition of work in progress could perhaps be made more clear and the reason for separating out buildings alone for special treatment explained. The SNA states that the value of the change in work in progress in dwellings and non-residential buildings should be considered as fixed capital formation, while changes in work in progress on other durable goods should be included with changes in stocks. This definition seems to imply that the annual expenditures on major

construction projects, like rail and road construction, harbour development, etc. which may take several years to finish, should be reflected in a higher figure for increase in inventories, while gross fixed capital formation should be left unchanged during the years the projects are under way. In the year a particular project is finalized, the total expenditures on the project during the whole period of its construction should consequently be shown as fixed capital formation while the figure for increase in inventories should be decreased by the accumulated amount of expenditures on the project up to the previous year.

23. Such a treatment would undoubtedly be logical, since the useful life of the fixed asset does not start till the year its construction is finished. It would, however, tend to introduce more or less violent fluctuations in the series for gross fixed capital formation, particularly in countries where several large development projects may be under way at the same time. Also, the series for changes in stocks would be very difficult to interpret if changes in work in progress were not specified as a separate component of the series. Perhaps the most important objection against the proposed procedure, however, is that it conflicts with general practice, which is to include the annual expenditures on major construction projects as gross fixed capital formation rather than as changes in work in progress.

24. The SNA definition of capital formation is confined to tangible assets alone or to expenditures on services directly connected with the production or acquisition of tangible capital assets. This concept is the most relevant one for economic analysis. But for certain purposes, a somewhat wider concept is sometimes needed, including a number of items of development expenditures like, for instance, expenditures on long-term research in the form of geological surveys, agricultural and industrial laboratory experiments etc. which are not directly connected with any specific project. Sometimes, also, expenditures on education and health may be considered as the cost of developing human capital and thus as a kind of capital formation expenditures. If items of this kind

are included as capital formation it is absolutely necessary to specify them so that the usual concept of gross fixed capital formation may be derived without difficulty.

25. Finally, the SNA does not contain specific definitions with regard to items of capital formation of particular relevance for the traditional sector of the countries of this region. The general definition of gross fixed capital formation may be said implicitly to cover also this field but questions of detail are apt to arise to which no answer can be found in SNA.

26. For instance, it no doubt follows from the general definition of gross fixed capital formation that expenditures on plantation development should be included. It needs clarification, however, whether such expenditures ought to be considered work in progress at the time they take place and fixed capital formation only from the moment the plantation starts bearing fruit. Similarly, the question arises whether all expenditures during the gestation period, including daily care of the growing trees, should be capitalized or only the initial expenditures on clearing the ground and planting the trees.

27. The general definition that all capital goods with a life-time of more than one year should be included in fixed capital formation implies the inclusion of expenditures on the construction of native huts as well as on road-construction and other projects under community development schemes. For statistical reasons, or even as a matter of concept, objections may, however, be raised against the inclusion of all or some of these items, so that it would have been very useful if the SNA had taken a specific standpoint to these questions.

28. Also, since the major part of constructions of this type takes place with unpaid labour and much of the materials are not purchased but collected by the builders, the question of valuation is difficult. While the SNA recommends that production for own consumption should be valued at the price received by producers for the same or similar commodities

on the market, it recommends, on the other hand, that own-account construction should be valued at the money cost incurred. This means that the value of unpaid labour and materials would not be included at all. In this region, where construction with own labour and materials is very important it is very doubtful whether money costs incurred can be considered an adequate basis of evaluation. This point will be discussed further in the section on estimation of capital formation in the traditional sector.

### III. General about methods of estimation.

29. Before going into detail about methods of estimation, it may be useful to review shortly the main approaches in more general terms.

30. Usually, gross fixed capital formation is estimated by indirect methods, i.e. by combining and elaborating on basic data collected for other purposes. Sometimes these indirect estimates are supplemented with surveys specially conducted to obtain information for particular components. The survey method could, of course, also be used for the complete estimate. This approach is at first sight attractive by its simplicity, but to achieve complete coverage by this method would imply an extensive and costly system of surveys which is beyond the means of most countries. The data obtained by the survey method would also of necessity to a large extent come from company accounts and the adjustment of accounting definitions for comparability and for conformity to the definitions of the national accounts is difficult and labourious.

31. Similarly, concepts and definitions would have to be adjusted extensively if the so-called "accounting method" is applied. This method relies mainly on information published in business and government accounts. Government budgets and accounts, of course, are the main sources for estimates of government capital formation whichever approach is used in estimating total capital formation. A special section of this paper will be devoted to the problems met in estimating government capital formation on the basis of this material. To obtain even an approximately complete estimate of private capital formation on the basis of published business

accounts or income tax returns based on such accounts is not possible in most countries since a large segment of capital formers do not publish or even keep accounts and do not file income tax returns. This method would therefore of necessity have to be supplemented by surveys or indirect methods of estimation for a considerable part of the total.

32. If indirect estimation is applied as the main approach, as it necessarily will have to be in most countries of this region, all relevant basic data available will have to be utilized to the maximum extent in order to obtain as complete and reliable estimates of gross fixed capital formation as possible. The types of basic data available vary from country to country and it is therefore not possible to recommend a fully detailed method of estimation which would be applicable to all or even a group of the countries of the region. The indications in the following sections of methods of estimation which may be suitable for the countries of the region must therefore of necessity be kept in somewhat general terms.

33. In estimating gross fixed capital formation mainly by indirect methods, different approaches have to be used for the various components. For instance, one complex of basic data has to be drawn upon in estimating capital formation in machinery and equipment, another in estimating construction expenditures and still another in estimating capital formation in the traditional sector. An indirect estimate of total gross fixed capital formation is therefore usually built up from a composite of estimates for detailed components with necessary adjustments for partial overlapping or insufficient coverage.

34. Occasionally, one may find indirect estimates of capital formation which are based on savings data. These estimates are usually far from comprehensive since savings data for the whole economy are not available. They mostly represent rough attempts at getting an impression of the magnitude of total capital formation in some sectors of the economy. Since the results which may be obtained by this method are neither detailed nor comprehensive, it at best only represents a makeshift solution of the problem of estimating capital formation.

IV. Timing of the estimates and detail of publication.

35. Even in countries with a limited supply of basic statistics a fair amount of the basic data needed to make indirect estimates of gross fixed capital formation, like for instance, foreign trade statistics and government accounts, are usually available on an annual basis. However, a more complete set of basic data becomes available for the purpose in years with censuses of manufacturing and agriculture or in years when special surveys are made in order to obtain information of particular relevance for capital formation estimates. A special effort should be made to establish benchmark estimates of as high quality as possible for such years. This would in its turn facilitate the establishment of adequate estimates for intermediate years, which could then to some extent be obtained from less complete data, for instance by extrapolating some components for which complete information is not available annually by means of relevant indicators. Most countries have to use such extrapolations particularly for capital formation in building and construction and for capital formation of local government. The choice of appropriate indicators is difficult, but experiments with a number of possibilities for years between two benchmark estimates may help.

36. Unfortunately, the years for which the most comprehensive and accurate capital formation estimates are most urgently needed, as for instance the base years of economic development plans, do not always coincide with the years for which the most ample basic information is available for making the estimates. This is an illustration of the general need to coordinate statistical programmes with the planning effort.

37. When benchmark estimates are made, as complete a set of break-downs of gross fixed capital formation as possible should be established, even if they cannot be kept up for intermediate years. Thus, a break-down by industry of use will not be possible for most countries on an annual basis, but since such a break-down is very useful for purposes of planning and economic development every attempt should be made to establish it for benchmark years. Break-downs by type of capital goods and by type of purchaser would usually be possible also annually, but they may be more detailed for the benchmark years.

38. The break-downs for bench-mark years should in general aim at the detail proposed in SNA and the intermediate system with the variations required by the particular needs of each individual country. In the classifications of gross fixed capital formation by industrial use and by type of capital goods, an item should be added showing capital formation in the traditional rural sector. It is very important that any deviations in detail from the standard contents of the various items in the classifications shown is clearly indicated in notes to the tables. If capital formation in land is shown as a special item in the break-down of capital formation by type of capital goods it would, for instance, add much to the usefulness of the table if the notes indicate clearly whether the item includes other types of land reclamation in addition to land reclamation representing an addition to total land availability to which the item should be limited according to the SNA definition. When a break-down of fixed capital formation by industrial use is shown, it is, similarly, important to know the exact coverage of an item like fixed capital formation in manufacturing, which may or may not cover small scale industries and handicraft, etc.

V. Indirect methods of estimating gross fixed capital formation.

39. It is assumed that most countries of the region will have to rely on a mainly indirect method of estimating gross fixed capital formation, since to gather all information needed by special surveys would be too costly and too difficult to execute, and business accounts or income tax returns cannot be used except perhaps for a limited part of the total and even then leave much to be desired with regard to accuracy because of their limited coverage. The indirect method of estimation will, however, at least for bench-mark years have to be supplemented by direct surveys for some components which cannot be covered in any other way, like, for instance, capital formation in the traditional sector. Information in company accounts may, in spite of its serious limitations, be drawn upon

in establishing a rough break-down of private gross fixed capital formation by industrial use and may also provide a rough check of the indirect estimates on some points.

a) Capital formation in machinery and equipment.

40. In countries whose industrial development is still in its infancy practically all machinery and equipment which is marketed comes from imports. Imports statistics therefore represent the most natural and near at hand source for estimating this component of capital formation. The goods are normally registered in imports statistics at the moment they pass the customs barrier and although, of course, stock changes at the hands of dealers in principle ought to be taken into account, the correspondence between annual imports and purchases of machinery and equipment should be fairly close. Depending on the completeness and accuracy of imports statistics, the registered c.i.f. value of imported machinery and equipment therefore should represent a good starting point for estimating capital formation in this component.

41. The first step of the estimate consists in identifying items of machinery and equipment in import statistics. This ought to be done on the basis of the most detailed classification available. Although in a detailed classification items of machinery and equipment will to a large extent either be shown separately or be grouped together with items belonging to the same category, it will still be necessary to split a number of composite items in the trade classification in order to extract the full range of machinery and equipment. An analysis of the original import declarations is necessary to split the composite items in as reliable a way as possible.

42. Sometimes doubt may arise as to whether a specific item belongs to the category of machinery and equipment or is, for instance, a building material. On the whole, it would be very useful for the statisticians to get the advice of technicians in deciding exactly which items should be considered machinery and equipment, before they start the actual work of extraction. A list may be established in co-operation with the

technicians, covering as fully as possible all items which should fall within the category. In establishing this list, it may be useful to take as a starting point the detailed commodity indexes elaborated for the SITC.<sup>1/</sup> To ensure as high a degree of comparability as possible among the estimates of the various countries of the region, an attempt could be made to standardize these lists between countries.

43. Further complications arise because as capital formation is defined, not all items of machinery and equipment should be considered capital goods. For one thing, all durable goods bought by households, like automobiles, refrigerators, typewriters, etc. are considered durable consumer goods while the same items bought by enterprises are defined as capital goods. Also, the SNA definition of capital formation requires that all minor repairs and all maintenance of existing capital should be excluded and considered as current expenditures. This provision creates particularly great difficulties for the analyst of imports statistics; because not only is it usually difficult to separate parts from finished products in the basic sources but there is also no way of knowing whether a particular imported part will be used in a major repair job, for minor repairs and maintenance, as a component of capital goods assembled in the country or even for the repair of durable consumer goods.

44. Some countries, in dealing with these difficulties adopt the very approximative solution of allocating most of the items which are mainly used for capital formation in their entirety to this heading, and correspondingly for items mainly used as consumer durables or as current inputs. Where this practice is followed, parts are included with capital goods to the extent they in imports statistics are classified together with items allocated in their entirety to capital formation. The justification for the procedure is that the errors made in including respectively too much and too little in capital formation tend to offset each other to a considerable extent.

<sup>1/</sup> "Commodity Indexes for the Standard International Trade Classification" (Preliminary Issue), Statistical Papers, Series M, No. 10, Rev. 2, New York, 1952.

45. This is no doubt true, although the actual degree of balancing out of the errors cannot be known and the method may therefore well lead to systematic over or under-estimation of this component of capital formation. The danger of serious error will, however, be reduced to some extent if imports statistics are analyzed in as full detail as possible before the allocation of items to capital formation is undertaken. The number of composite items may be higher in a more detailed classification, but the total import value they represent is likely to be less. This is because a number of originally composite items will also have been split into "clear" categories of inputs, consumer goods and capital goods. To take advantage of this, it is not enough to stop at SITC groups but the full detail available in country publications should be considered.

46. The estimates would be much improved, however, if at least some items of machinery and equipment which are known to have multiple uses are split. It is a widespread practice, for instance, to divide the imports of passenger cars between private (considered consumer durables) and business use by means of some more or less indirect criterion. Sometimes information on new licences issued is used as the basis for this division or information on the distribution of the existing car park. Percentages obtained from inquiries with dealers could be applied to split other major items which are mostly used as consumer durables but are also bought by enterprises to a not insignificant extent, like refrigerators, gas stoves, sewing machines, etc. Other items like portable type-writers, bicycles, wireless receiving sets etc., although bought by enterprises to some extent, could be considered entirely as consumer durables to avoid complicating the estimates too much. The same goes for the numerous articles of furniture and minor items of durable household goods which are also acquired by hotels, restaurants, etc. but are for the most part bought by households.

47. Special investigations could be made to determine the proportion of parts included with items of finished goods, which is predominantly used for maintenance and other non capital formation purposes. Since the proportion must be assumed to vary significantly from year to year, annual

investigations would be needed or the percentages obtained for one year or for the average of a number of years would have to be accepted as a very approximative measure. Items in the import statistics including only major parts which would be considered capital formation in any case of course need not be investigated in this way. No really satisfactory solution to the problem of estimating the proportion of parts used for repairs and maintenance is possible except on the basis of very thorough and expensive surveys. It would therefore perhaps be justified to include all parts as capital formation in the first round and try to make an approximate over-all adjustment in the final estimate for the over-estimation caused by the inclusion of parts used for other purposes than major repairs.

48. A certain amount of standardization of the estimates at this stage would be possible for countries which use more or less the same classification system for their imports (for instance, a system based on the SITC). Agreement may be reached not only on which items should be considered as machinery and equipment but also to a certain extent on common principles for splitting the items with multiple uses. Any effort in this direction would, of course, mean improved comparability of the estimates among the countries concerned.

49. The more detailed the classification of imports, the easier is the identification of items of machinery and equipment which should be considered capital formation. Any improvements the countries may make in this direction within the framework of the SITC would therefore also be sure to improve their capital formation estimates. The introduction of classifications of imports by end-use in the foreign trade publications themselves would, of course, ease the task of estimating capital formation very much. To be really useful for this purpose, however, the end-use classification would have to be made in the same detail and with the same thoroughness as is required for capital formation estimates.

50. After the c.i.f. value of imports of the various types of machinery and equipment which should be included in capital formation has been determined, additions have to be made to this value in order to arrive at the amount paid by the final purchaser of the capital goods in question. Large errors may be introduced if the additions to the c.i.f. value is not estimated as exactly and as detailed as possible. Sometimes very approximative methods are used, like for instance simply increasing the c.i.f. value by one half, two thirds or another very roughly estimated round fraction. Such methods are clearly not exact enough, since some data are nearly always available or can easily be collected, which would permit a more detailed estimate.

51. One method of finding the percent difference between import value and cost to the purchaser which may lead to a satisfactory result if conscientiously applied is to compare sales prices with c.i.f. unit values for a number of specific items, each representative of a part of the total import value for machinery and equipment. The more heterogeneous the composition of the "basket" of imported machinery and equipment is, the more items would have to be priced to avoid distortions. Since the sales price of the same commodity is often different in various regions of the same country, because of differences in transportation costs, trade mark-ups, etc. it would be necessary to calculate an average sales price for each item and to weigh this average by the approximate quantities sold in each locality. Finally, a rough allowance for installation costs has to be made, since these costs are not included in the sales price to the purchaser.

52. A similar, even more direct, but usually less exact method of estimating the addition to the c.i.f. value for the various types of imported machinery and equipment is to obtain information about the installed cost of representative items through partial inquiries and compare this with c.i.f. values. Such information may be obtained from trade associations and chambers of commerce and the successful application of the method will depend largely on the extent to which these organizations are willing to co-operate.

53. The most thorough method of estimating the final cost to purchasers on the basis of c.i.f. values, however, is to analyse item by item each component of additional cost for each commodity or commodity group. In order to do this, worksheets should be established containing columns for c.i.f. value, customs duties, excise taxes, transport costs, wholesalers' mark-up, retailers' mark-up and miscellaneous costs. To the extent possible, commodities which are assumed to be similar with regard to transport costs incurred per unit of value and which go through the same number of middle-men (wholesalers and retailers or wholesalers alone) may be grouped together, to simplify the work of estimation.

54. It should be possible to estimate customs duties paid for each group of commodities fairly exactly. Sometimes direct information on customs duties paid by commodity or commodity group is readily available either in trade returns or from the customs authorities. In any case, a good estimate should be possible on the basis of the customs tariff. The rates of excise taxes levied on various items of machinery and equipment should also be easily obtainable.

55. Information on transport costs and dealers' margins is not as readily available, and limited special enquiries may be necessary. The freight rates by rail and road for typical items of machinery and equipment from the port of entry to a number of important centres may be used to estimate an order of magnitude for the freight costs for various categories of machinery and equipment. Special inquiries covering representative items would be necessary to establish wholesalers' and retailers' mark-ups. A rough estimate of the proportion of the various groups of machinery and equipment which goes through both of these stages may be obtained from the same enquiries. Miscellaneous costs are composed of installation expenditures for items of heavy machinery and of insurance costs, lawyers' fees and similar minor items. A rough estimate of installation costs for representative items may be obtained from inquiries with factories using heavy machinery. Other miscellaneous costs may either be ignored or fixed at a small percentage of the sum of all other costs.

56. The inquiries required to establish the various percent additions to c.i.f. values need not be undertaken on an annual basis, but as soon as it is known that significant changes have taken place a new inquiry would be necessary. In any case, the enquiries ought to be repeated at no longer intervals than five years.

57. Regardless which method is used in estimating the addition to the c.i.f. value necessary to arrive at the final cost to the purchaser, an allowance should be made for items of machinery and equipment which are imported directly by the user, since no trade mark-ups should be included for these items. Other cost elements like customs duties, transport charges, etc. must, of course, be taken into account also in this case.

The only way of arriving at a reasonably exact estimate of the proportion of machinery and equipment which is imported directly by the user is to go through the customs returns for a number of items which are known to be subject to direct imports to some extent. If this is not possible, resort will have to be taken to rough estimates based on partial information from importers or dealers.

58. Although the major part of the machinery and equipment of the countries of the region is imported, a number of items are also as a general rule home-produced. Even in countries which have practically no industry at all, certain equipment, like ploughs, tools and vehicles is produced in the traditional sector. Capital formation in this sector, however, will be considered as a whole and the methods which may be used in estimating it will be described in a separate section.

59. Information on machinery and equipment produced for sale by domestic industry is contained in censuses of manufacturing wherever available and sometimes in annual production statistics. Bench-mark year estimates of domestic production at ex factory prices based on census data may be obtained by extracting items of machinery and equipment in much the same way as from import statistics. However, while import data are usually considered to cover all imports of machinery and equipment, census figures

normally only cover the production of enterprises down to a certain size. An adjustment for under-coverage is therefore needed. This poses a difficult problem, because there is no way of knowing to what extent the smaller industries actually produce machinery and equipment or only concentrate on current repair work. An adjustment for under-coverage made, for instance, on the basis of employment data and assumed equal productivity in small and large-scale industries will therefore at best only give a very approximative result.

60. The bench-mark year estimates may be extrapolated to other years by means of whatever information is available in annual production statistics. Additions to the ex factory value for trade mark-ups, transportation costs, indirect taxes and other expenses finally have to be estimated in the same way as for c.i.f. values of imports.

61. To obtain as exact an estimate of domestically purchased machinery and equipment as possible the sum of imports and domestic production ought to be adjusted for exports, including re-exports, and changes in stocks. Exports of machinery and equipment are in most countries of the region insignificant or nil, but wherever exports occur they would be registered in foreign trade statistics and it would therefore not present particular problems to obtain the information required. Changes in stocks of machinery and equipment on the hands of importers, producers and dealers, on the other hand, is practically impossible to estimate except by means of a special survey and the item is hardly important enough to warrant this extra expense. It may therefore be justified to omit the adjustment for stock changes at least in the first round.

62. The methods of estimation indicated in the preceding would make it possible to arrive not only at a total for capital formation in machinery and equipment but also at various useful sub-totals by grouping together the detailed basic items of the estimates. Thus, the derivation of capital formation in transport equipment and in agricultural machinery and equipment (excluding items produced by the traditional sector) should

not present serious problems. Although it would be more difficult to identify and isolate the relevant items, a sub-group for capital formation in industrial machinery and equipment may also be attempted. The residual would then be capital formation in other machinery and equipment.

63. Finally, a very particular problem met by some countries with regard to construction equipment imported for a particular job and later re-exported may be mentioned. This equipment remains the property of foreign construction firms, but if the domestic or territorial concept recommended by the intermediate system is adopted, the equipment should still be considered as part of the importing country's capital formation. When the equipment again leaves the country it has to be considered as exports of capital goods. Problems may, of course, arise with regard to the valuation of the equipment both at the importing and exporting stage. Since it would not be subject to customs duty, the value of the equipment when imported would have to be obtained directly from the owner. The export value should equal the import value less depreciation charges.

#### b) Building and Construction

64. This component of fixed capital formation covers residential and non-residential building and other construction and works, i.e. rail, road and harbour construction, airports, gas mains, telephone and telegraph lines, irrigation projects, land clearance etc. If capital formation in the rural traditional sector is treated as a separate component, the own-account building and construction work done by farmers with own labour and materials would be included there and not under the present heading.

65. A major part of the construction work and some of the building is normally undertaken by government. Government building and construction expenditures may be derived reasonably accurately from government accounts and supplementary sources. No corresponding easily accessible sources are available for estimating private building and construction expenditures.

Censuses of building and construction activity are so far not available for any of the countries of the region. Indirect methods of estimation of therefore have to be used and such methods often can only be applied to estimate total building and construction expenditures, government as well as private.

66. The indirect estimates are generally based on information about materials used or building permits issued, sometimes supplemented by data from government accounts or public works departments and occasionally by special surveys for particular components.

67. An estimate of capital formation in building and construction on the basis of data on imports and domestic production of building and construction materials has certain similarities with the corresponding estimate for capital formation in machinery and equipment discussed in the preceding section. Frequently, however, only a selection of building and construction materials is analysed, as for instance cement, bricks, wood and corrugated iron plates. The price to the final purchaser of these materials has first to be determined along the lines indicated in the preceding section referring to machinery and equipment. The most important part of the estimate, however, is to establish ratios between the materials costs and total expenditures on various types of building and construction in different localities. This may be done by direct engineering studies or on the basis of an analysis of accounts of the public works department if government also undertakes the type of building and construction work in question. A ratio between total costs of the selected materials and total building and construction costs will finally have to be obtained, since it is not possible to allocate the materials supply between different types of building and construction. For the same reason, only a total figure for building and construction expenditures may be obtained by this method.

68. It is evident that the method outlined above cannot possibly lead to particularly exact results. There are several reasons for this. First, building materials may sometimes be used for other purposes than building and construction, like, for instance, building of ships and boats or other major equipment. To avoid this problem, the selection of materials considered may be limited to items which are practically exclusively used for building and construction, like cement and bricks. There is no way out of the dilemma that if a wide range of building materials is selected the need for adjustment for other uses increases while if only a couple of main items are chosen the estimates become correspondingly more approximate.

69. Regardless which materials are chosen, an allowance has to be made for minor repairs and maintenance, if the definition of capital formation given in the SNA and the intermediate system is followed. Such an adjustment could probably best be made by obtaining an estimate from a number of contractors about the ratio between expenditures for new building and construction and maintenance and minor repairs in any one year. Nothing better than a very rough adjustment would, however, be possible in this way. An alternative solution, which could be justified for practical reasons and could also be extended to the estimate of capital formation in machinery and equipment would be to omit any adjustment for maintenance and repairs and thus adopt the gross-gross concept of fixed capital formation which deviates from the SNA definition but is applied by a number of statistically developed countries.

70. If fixed capital formation in the traditional sector is estimated independently and by different methods, an adjustment also has to be made for that part of the selected materials which is used in this sector. Although the major part of materials used in the traditional sector is collected or made on the spot, some items, like corrugated iron roofing is purchased.

71. A reasonably accurate estimate of the proportion of the costs of selected materials to total costs of building and construction is extremely difficult to arrive at. The ratio of the costs of different materials to total costs varies widely for projects like house building, road construction, railway construction and the construction of electricity plants, for instance. Because of this, an overall ratio of material costs to total costs for building and construction activity as a whole is apt to be far more inaccurate than, for instance, a ratio confined to building activity alone would have been. However, to estimate the latter ratio it would be necessary to find that part of the supply of selected materials which is used for building alone, and that is an almost impossible task except on the basis of direct surveys.

72. If at all possible, a more detailed approach to the estimate of building and construction expenditures is recommendable, by for instance, estimating residential and non-residential building, public construction and private construction separately. Since, as just mentioned, the materials approach does not lend itself to an estimate of building expenditures alone, a different method has to be found for this component. Estimates based on data compiled from building permits are widely used, since building permit statistics are often available also in statistically less developed countries.

73. To arrive at reasonably exact estimates of building expenditures by means of the permit method, building permit statistics should have wide coverage and there should also be possibilities of following them up, for instance by means of statistics on finished buildings authorized for occupancy. These conditions are not always fulfilled and this sometimes makes the quality of the estimates made by the method dubious. For instance, building permit data are sometimes available for the capital city alone and these data are then often "blown up" to cover the whole country, excluding the rural traditional sector, by for instance, poor population ratios or ratios of the number of existing dwellings from a past housing census. The application of ratios of this kind is based on

the assumption that the trend in house-building is the same in other parts of the country as in the capital city and it is usually all reason to believe that this assumption does not hold true. For the building permit method to be used with confidence from the point of view of coverage it is required that permit data should be available for at least the main urban centres.

74. Follow-up by means of statistics on finished building is desirable for several reasons. First, there is often a time-lag of more than a year between the issuance of the permit and the finalization of a building. This could be allowed for by shifting the data forward the number of months which normally elapse before buildings of various types are finished. Both for this purpose and in general in using this method, building permit data classified by various types of buildings are required. Even if a shift forward of the data is made on the basis of reasonably detailed and reliable information, a check by means of statistics on finished buildings would, however, be advantageous.

75. Furthermore, the realized cost of a building very frequently does not correspond to the forecast shown in the permit. Any adjustment of the original estimate which may be possible by means of statistics on finished building or other sources may therefore be expected to lead to some improvements. Follow-up of the original estimates based on building permits is also necessary because sometimes the permits are not utilized at all. Conversely, some building may be going on without permit, although it legally falls within a category which should require permit. It is likely, however, that the latter building would also escape registration when finalized.

76. Government building may not be covered by permit statistics but could relatively easily be estimated from direct sources, either government accounts or information from the public works department. Sometimes, it may be difficult to separate public expenditures on building from other public construction expenditures. Every attempt, however, should be

made in order to achieve as clear a distinction between building expenditures and other construction expenditures as possible in the break-down of total gross fixed capital formation. A break-down of building by residential and non-residential should also be shown and would not present any particular problems if the building permit statistics are given in some detail.

77. Information about public projects which fall within the category of capital formation in other construction and works is usually available from published sources or can be obtained from the authority in charge of the project. Data on private construction expenditures are, however, extremely difficult to come about even if construction expenditures in the rural traditional sector is disregarded for the moment. Series based on building permits which strictly speaking refer to building expenditures alone are therefore frequently used as approximate indicators of total construction expenditures, or they are used as indicators of total building plus private construction while government construction expenditures are estimated directly. The latter procedure is probably as good as any if no direct information is available on private construction expenditures through direct surveys. Scattered data on the construction expenditures of large private firms from company accounts are not likely to provide a dependable measure of total construction expenditures in the private urban and "organized" rural sector, because of their limited coverage.

78. If a rather make-shift method of estimating construction expenditures like the one indicated above has to be applied, no break-down of total building and construction expenditures is possible except at best by government construction on the one hand and private and government building plus private construction on the other.

79. As already mentioned in the section on some conceptual points (see p.9) the treatment of expenditures on plantation development raises not only practical but also theoretical problems, which it may be of interest to consider somewhat closer even if actual detailed estimates for this

component may not be possible except for a few countries. In this region, large-scale plantation of rubber, coffee and cocoa is found. Funds spent in planting or re-planting with improved varieties may amount to large amounts and should certainly be regarded as capital expenditures. The view-point may be adopted that these projects are, in a way, extensions of land improvement projects or they may be considered as construction of durable capital goods. The total expenditures to be capitalized should cover the initial costs of clearing the land and planting the crops as well as necessary care during the gestation period, which may sometimes cover a large number of years. Expenditures incurred in the years before the planted crops start bearing fruit may be included as changes in inventories, but it would both be easier and conform closer to the ideas of the planters themselves if they are considered as fixed capital formation. An important practical reason for adopting the latter treatment is that it would be very difficult to keep in mind for the national accountant, who may be a different person from the one who made the original estimates, that expenditures included in changes in stocks, say five years ago, should at a certain time be included as fixed capital formation while stock-changes should be decreased correspondingly.

80. Information on the area and cost of large-scale planting and re-planting may sometimes be available in company accounts. If, however, re-planting is done tree by tree on a continuous basis, it would be much more difficult to estimate the costs involved. In this case, the only practicable solution may be to include the cost of re-planting as current operating expenditures.

81. The SNA requires that government capital formation in defense building and construction should be excluded except for permanent family dwellings for military personnel. Sometimes, however, installations originally built for defense purposes are later converted to civilian use because they are no longer adequate or needed for defense. This may be the case with regard to air-strips, barracks and work-shops,

for instance. It would seem reasonable to include these items as capital formation at the moment the transfer of use takes place, regardless whether they are sold to the private sector or used by the government sector itself. At the same time, the value of the items has to be deducted from government consumption expenditures. The question of valuation may be very difficult if no actual sale takes place, but it probably would be advisable to make an ample provision for depreciation during the time the assets have been used for military purposes.

82. It is also sometimes difficult in practice to draw the line between civilian and military building and construction. For instance, an air-port may be used for both civilian and military traffic, but its construction may be based primarily or even exclusively on military considerations. The same may be the case with a road. A rather narrow definition of military construction is perhaps most practical, which would exclude the cases just mentioned. Other border-line cases are military hospitals which to a considerable extent treat civilian patients or military schools which teach subjects of as much use to civilians as to military personnel.

83. Capital formation in building and construction estimated by one of the methods described above together with capital formation in machinery and equipment estimated as described previously constitute together total gross fixed capital formation in the urban and "organized" rural sector. Not unfrequently countries stop at this point and thus leave out capital formation in the traditional sector altogether or include only that part of it which is more or less automatically covered because of the method of estimation applied. Considering the importance of capital formation in the traditional sector in African countries, however, a separate section will be devoted to it. To round off the picture of methods of estimating fixed capital formation in the completely monetized area of the economy, however, a section on government capital formation will be included first.

## VI. Government capital formation

84. Gross fixed capital formation of the government sector covers general government capital formation as well as the capital formation of government enterprises and public corporations. Capital formation of general government i.e. the sector public administration and defense, includes the building of government administrative buildings as well as construction undertaken by the public works department (highways, harbour projects, etc.), but, as already mentioned in the previous section, excludes practically all defense capital formation. The composition of the gross fixed capital formation of government enterprises and public corporations will depend on their field of activity and may cover any type of machinery and equipment and construction activity. Government enterprises are financially integrated with general government and will mainly include public schools and hospitals, postal and telegraph services, railways, etc. Public corporations may be found in practically any branch of industry.

85. The classification of government capital formation by the three sub-groups mentioned is not entirely clear and unambiguous. A specific activity, like for instance the postal services may at one time be the responsibility of general government and later be transferred to a government enterprise so that the line of demarkation between the two is in practice often blurred. Also, one and the same activity may in one country be taken care of by a government department and in another country be the responsibility of a government enterprise.

86. According to SNA, public corporations "include, in the first place, corporations formally established and regulated by public law, their shares being wholly or mainly owned by public authorities and their management mainly chosen by public authorities. In the second place, private corporations should be included if they can be considered to be controlled by public authorities". The concept of control is somewhat vague. Sometimes it may be used as a criterion that government should

own at least 51 per cent of the shares, but there may also be joint government-private enterprises under government control where the government owns less than half of the shares. Also, it is sometimes very difficult to make the distinction between a government enterprise and a public corporation if the latter is evidently under full government both financial and administrative control.

87. The main sources of information on general government capital formation are government budgets and accounts, supplemented by direct information from agencies concerned with particular projects. Budgets and accounts for all levels of government, i.e. central, state and local government, as well as the accounts of extra-budgetary funds should, in principle, be analysed. This means that a great number of published and unpublished documents ought to be gone through and many of them may not be easily accessible.

88. In practice it is inevitable that only the more accessible documents can be analysed annually, like central and state budgets and accounts, while a sample is taken of the other material. Sometimes, local government is omitted altogether because of the difficulty of obtaining information, but this is not a satisfactory solution since it leads to an underestimate of government capital formation.

89. Since practical difficulties make a complete annual estimate of general government capital formation very difficult to achieve, it is so much the more necessary that estimates for bench-mark years are made as complete as possible. All necessary material for making as complete estimates as possible for all levels of government will, however, only become available with a delay of several years and a bench-mark year estimate will consequently have to refer to a year some time in the past. Such estimates may still be very useful, since they provide the basis for a revision of the level of more recent estimates based on less ample information. With regard to the annual movement in the series on general government capital formation there is no other solution than to

assume that the estimates based on less than complete data provide essentially the correct picture.

90. General government budgets and accounts have to be analysed for national accounts purposes not only in order to arrive at an estimate of general government capital formation but also to derive government consumption and various transfer items on government appropriation account. A complete reclassification of the budgets and accounts is therefore required, from which general government capital formation is obtained as one partial result.

91. Frequently, no distinction is made between current and capital expenditures in the original documents and even if a distinction is made it may differ from that required for national accounts purposes. Usually, therefore, a great many composite items have to be split in order to arrive at the capital formation component. To do this is frequently even more difficult than to split the items of import statistics, since the items on the budgets and accounts are defined with accounting purposes in view and may cover transactions which are widely dissimilar in economic nature. For instance, the total expenditures on particular programmes are sometimes shown in one sum, which covers a mixture of current and capital expenditures on goods and services, as well as transfer items, and no adequate clue may be provided in the published documents on how to split up this total. The only solution then is to consult the budget authorities directly about the composition of the item.

92. Even if such consultations are held with regard to the contents of quite a number of items, however, there will still be many left which of necessity will have to be split in a more arbitrary fashion. The statistician then has to rely largely on his subjective ideas about an item's composition, based on whatever information is provided in explanatory notes in the original documents. If this work is conscientiously done, the result may be expected to represent a fair approximation of the truth. Considerable knowledge and experience are, however,

required of the estimators to ensure a good result. The dangers of this procedure are illustrated by the seemingly paradoxical fact that sometimes significantly different figures for the various components of government expenditures are obtained if budgets and accounts once analysed are gone through again by other persons.

93. The practical work of extracting items of fixed capital formation as well as other items of government expenditure from budgets and accounts is made more difficult if the classifications used in the original documents are changed frequently. The statistician then cannot make a coding of the various items to be extracted from the accounts of one year and leave the actual extraction work for several future years to clerical personnel. Instead, he will be forced to do much of the extraction work himself each year. A reasonably permanent well-founded classification system for government budgets and accounts is therefore very important for national accounts work.

94. A number of United Nations Workshops on Budget Reclassification and Management have been held at the Economic Commission level, one of which took place in Addis Ababa in 1961. One of the main purposes of these Workshops is to advocate an economically more meaningful classification of government budgets and accounts. To the extent the classification principles of the United Nations Manual<sup>1/</sup> is applied by the countries either to the budgets and accounts themselves or as a supplementary re-classification, the work of the national accountant in extracting capital formation and other relevant items is made much easier. As a matter of fact, the items required according to national accounts definitions may often be found ready-made in the re-classified accounts, so that a minimum of compilation work will be necessary. Usually, however, the countries who apply the classification principles of the Manual start with the central government budgets and accounts alone, so that even for these countries the problems of extracting items of capital formation from local government budgets and accounts will still remain serious for some time to come.

<sup>1/</sup> Manual for Economic and Functional Classification of Government Transactions, United Nations, New York, 1958.

95. The fiscal year generally does not coincide with the calendar year so that an adjustment is required for data on fixed capital formation of general government to bring them in line with corresponding figures for the private sector which are usually on a calendar year basis<sup>1/</sup>. If the fiscal year starts on July 1, the average of the figures for two adjoining fiscal years are often taken to represent a calendar year. If it starts on another date a rough adjustment of this kind is more difficult to make and the fiscal year data are then usually taken to represent the calendar year to which they conform most closely. A really thorough adjustment for the difference in timing would only be possible if the government budgets and accounts were available on a quarterly basis, but this is usually the case for some selected items only.

96. Another problem arises because government accounts are usually kept on a cash basis, i.e. they reflect amounts actually paid out, while the national accounts figures should refer to an accrual basis, i.e. show the value of work done and commodities acquired during a period. Adjustments for prepayment or deferred payment may sometimes be made in the estimates of government capital formation for major construction projects, but on the whole such adjustments are extremely difficult to make and are therefore omitted. Similarly, adjustment for the fact that some government accounts, although they nominally refer to a period of twelve months, may include payments made during the first few months of the following fiscal year, is very difficult.

97. In the government budgets and accounts of some countries, maintenance and repairs of important items are shown separately. However, a distinction between normal repairs and maintenance, which should be included as government consumption, and major repairs which should be considered as capital formation is usually not made. No clue about the proportion in which the total may be split is usually available and the

<sup>1/</sup> Sometimes the whole system of national accounts is kept on a fiscal year basis, so that the figures for the private sector have to be adjusted while the data for government are left unchanged.

choice in practice is therefore either to include it as a whole in capital formation, or to consider it in its entirety as consumption expenditures. The latter might perhaps be the most reasonable solution, since normal repairs and maintenance are likely to constitute the major part of the item.

98. General government capital formation financed by foreign aid and capital items received as gifts under foreign aid programmes should also be included. One problem in this connexion is to obtain the necessary basic information, since these items sometimes are not included on the ordinary accounts and have to be looked for in the statements of foreign aid agencies. With regard to the inclusion of capital items received as gifts, a conceptual point of some theoretical interest may be mentioned. Sometimes, the donor country includes such gifts as government final expenditures and not as exports in its national accounts. From the point of view of world national product it would then lead to double-counting if the same items are again included under another component of final expenditure, namely capital formation, in the receiving country. Regardless how this may be, however, there is no doubt that it is in the interest of the receiving country to include these items on its national accounts as capital formation, so that as complete a picture of its gross fixed capital formation as possible may be obtained.

99. Gross fixed capital formation of general government is usually first derived on a preliminary basis from budget estimates and is later revised when final estimates or closed accounts become available. The preliminary estimates based on budget data may sometimes diverge very significantly from amounts actually spent. It is not possible to establish any reliable relationship between budgetary estimates and final expenditures based on previous experience since there normally does not exist a definite pattern in this respect. The only really acceptable solution is therefore as soon as possible to replace the estimates based on budget data by firmer figures from the closed accounts.

100. In some countries, the auditor-general's report on actual expenditures includes considerably less detail than the budget. Here again there is no reason to assume that a reliable result could be expected by breaking down an item of the closed accounts in the same ratio as the budget figures for the same year or even on the basis of experience over a number of years. It may be preferable instead to use the data on final estimates for a previous budgetary year which are often contained in the current budget documents and which are classified in the same detail as the original budget figures.

101. As far as provincial and particularly local government is concerned, it has already been mentioned that there is little possibility of gathering all the documents necessary to obtain complete coverage on a current basis. In addition, the expenditure classification frequently differs for the various levels of government and often is not standardized for the various units of local government so that it takes a long time to analyse whatever material is at hand. For these reasons any budgetary or other relevant documents which become available will have to be utilized as fully as possible in estimating gross fixed capital formation for the levels below central government even if they do not contain the latest revised information.

102. Gross fixed capital formation of government enterprises and government corporations is usually derived from their special accounts. Sometimes, the information for government enterprises is included in the central government account and has to be extracted from this. It will then often be necessary to investigate further with the responsible ministry to obtain all the details desired. The principles used in separating current from capital expenditures in the special government enterprise and corporation accounts may, as is the general rule for accounting data, differ from what is required for national accounts purposes, so that difficult adjustments become necessary. Aside from this, the problems met in extracting capital formation from these accounts will depend on how numerous they are and on how promptly they appear.

103. Because of the nature of the source material (one account for each unit), gross fixed capital formation of government enterprises and government corporations may be easily classified by industry of use.

As is generally the case with capital formation figures derived from accounts, however, a classification by type of capital goods would be much more difficult. Information may be available which makes possible a broad grouping by construction expenditures and expenditure on other fixed capital, but to arrive at a more detailed break-down would usually involve

arbitrary splitting of too many items. The same difficulties are met if a classification by type of general government gross fixed capital formation is desired, while a classification of capital formation by level of government may be obtained without difficulty. However, the total gross fixed capital formation outside the traditional sector

has been estimated as described in the preceding sections, private fixed capital formation in the "organized" sector may be obtained by deducting government gross fixed capital formation from this total. Since the coverage of the estimate of government fixed capital formation may be expected to be better than the coverage of the estimate of the total, the danger arises that private gross fixed capital formation arrived at as a residual could be significantly under-estimated.

105. In addition to the classification by government-private, total gross fixed capital formation in the "organized" sector may also easily be classified by type of capital goods if estimated as mentioned in the preceding sections. Because of the difficulty of classifying government capital formation by type, it is usually not possible to arrive at a cross-classification by government-private and type of capital goods.

106. A classification of total gross fixed capital formation by industry of use may be attempted by supplementing the break-down for the government sector by the result of an analysis of private company accounts. It is recognized that an industry break-down of gross fixed capital formation in the private "organized" sector based on company accounts

alone could only be a very rough estimate. However, even a rough estimate may be justified considering the importance of having some information about the industrial distribution of capital formation and the practical impossibility of achieving anything like exact figures except on the basis of an expensive direct survey.

107. Government capital formation and capital formation financed by government may differ considerably from each other. Sometimes important projects take place in the private sector of the economy with financial support from the government in the form of loans and grants, but for national accounts purposes this is, of course, still private capital formation. Conversely, the government sector may sometimes borrow funds from the private sector to finance its own capital formation which it could not otherwise have realized.

#### VII. Capital formation in the traditional sector.

108. The traditional rural sector, where monetary and non-monetary transactions intermingle, contributes a very significant part of the national product of many African countries and for this reason alone an estimate of the annual fixed capital formation needed to create this product would be of considerable interest. So far, however, the problems connected with working out such estimates have perhaps not received the attention they deserve, mainly because basic information in this field is very scarce or practically non-existent. For some countries of the region, estimates of the value of the annual building of native huts have been made and for others partial estimates of other types of fixed capital formation in this sector have also been attempted. However, for many countries, the major part of the construction of equipment and vehicles, the digging of ditches and wells, as well as capital formation through community development schemes, etc. in the traditional sector have been more or less disregarded. Some countries completely exclude capital formation in this sector from their estimates.

109. The most dynamic industries are outside the traditional sector, and it is therefore natural that the main interest in countries which are trying to accelerate their economic development will be focussed on these. Both for this reason and because of the formidable difficulties in obtaining the necessary basic data for the traditional sector, it was therefore to be expected that priority should be given to estimates of fixed capital formation in the "organized" sector. It is important to bear in mind, however, that agricultural development necessarily must play an important part in general economic development, and that agriculture also undoubtedly for a long time to come will remain within the traditional sector. Compared with the present situation, great progress may take place in agriculture simply through the exchange of the very primitive equipment now used for improved, but still, from a modern point of view, primitive equipment. Improved irrigation, vehicles and tools combined with improved methods of cultivation may lead to something similar to a technical revolution in the agricultural sector but the capital items involved may still be chiefly manufactured by the farmers themselves. If at all possible it would, of course, be very important to obtain an economic measure of a transition of this type in the form of reasonably accurate figures on gross fixed capital formation with the most relevant items specified.

110. The problem of scarcity of data can only be taken care of in a truly satisfactory way through direct surveys of capital formation in the traditional sector. Independent surveys covering only this field would probably not be necessary and would also be too costly. Instead, agricultural and household sample surveys could include questions also on own-account capital formation. Great care should be shown in formulating the questions and deciding on the coverage of the investigation, since annual surveys will not be possible because of the cost involved and the changes between bench-mark years should therefore be registered as accurately as in any way possible.

111. The question of valuation is particularly important because capital formation in the traditional sector is composed of a mixture of items, some of which are paid for in money, while others are not paid for but have a market price and others again are not subject to sale on any market. The solution adopted by SNA and also widely used in household surveys is to register capital formation done by the farmers themselves at the money cost involved, thus omitting the value of all labour and materials not actually paid for. This would lead to a considerable under-valuation of capital formation in the traditional sector, and a somewhat closer approximation to the actual value should be possible. For instance, family labour and free labour provided by neighbours for community development projects may be valued at the prevailing rate for day-labour in the neighbourhood and some collected materials may be given an imputed value equal to the sales value of similar materials in neighbouring markets. If no similar materials are sold on the market and consequently no value can be imputed to the materials used however, the problem is clearly insoluble and it would not be justifiable to ascribe an arbitrary value to them. In this case their value might instead be considered as embodied in the labour costs of providing them.

112. If a valuation of capital formation in the traditional sector along the lines described above is desired in a survey, very clear and explicit instructions would have to be given to the enumerators. Since much of the capital formation in the traditional sector takes place simultaneously with the daily work, a special problem in connexion with the estimate of labour costs also arises because it is difficult to find out the number of man-days actually used for a particular project. Wood and straw for the building of huts may be gathered over a long period of time in connexion with the herding of animals etc. Some standard estimates of the quantity of labour needed for a number of specific projects may, however, be worked out and applied in individual cases.

113. In connexion with the problem of valuation of fixed capital formation in the traditional sector, it should also be noted that if capital formation in the "organized" sector is estimated from the materials side it is very difficult to take account of and exclude items which are purchased by farmers and used for own-account capital formation. There is therefore a danger of double-counting when capital formation in the traditional sector is obtained by special surveys, but this is practically certain to be outweighed by under-valuation on other accounts. Also, it may be considered as a good thing that even if no effort at all is made to include capital formation in the traditional sector, part of it will be implicitly included if the commodity flow method is used in estimating capital formation in machinery and equipment and the materials method in estimating building and construction in the "organized" sector.

114. Analogous with dwelling construction in the "organized" sector, the building of native huts may be said to be less closely connected with general productive activity than other capital formation. The argument has been put forward that in the traditional sector where it is difficult to distinguish production from consumption in general, only construction and works which are clearly directly connected with production should be included as capital formation and house-building should therefore be excluded. Even if this solution is not accepted, however, it would be useful if the building of huts is shown as a separate component of capital formation in the traditional sector, because of its different economic significance.

115. If no direct survey of fixed capital formation in the traditional sector is available, attempts are sometimes made to estimate the value of dwelling-construction by indirect methods. Starting-point is then often taken in a rather rough estimate of the number of existing dwellings of various types usually based on more or less approximative data on the population living in each type. The annual replacement needed is then estimated on the basis of an assumption about the average life-time of the

dwellings and a net annual increase is assumed corresponding to the population increase. An estimate of the number of dwellings of different types constructed annually is thus arrived at. The building costs for each unit are finally estimated by means of a more or less detailed analysis of labour and materials cost involved for each major type of building. The weakness of estimates of this type often lies more in the estimate of number of huts constructed than in the valuation of their building costs. Only sample surveys conducted on a strictly scientific basis could be expected to yield a reasonably correct figure on the number of new constructions. On the other hand, since very many units are usually involved the margin of error connected with even a very thorough investigation of building costs for representative units may also lead to a large absolute error in the value estimate.

116. A very rough indirect estimate of the value of land-clearance by peasants may also be possible if some data on new land brought under cultivation are available. The value of the clearance of one acre of land could then be estimated on the basis of man-days needed and the wage rate for agricultural labourers in the region. In spite of its rough nature an estimate of this kind would be useful as a supplement and check of data obtained through an eventual survey which might not be representative enough as far as land-clearance is concerned.

117. Similarly, a very approximative idea about the size of capital formation in tools and equipment in the traditional sector may be arrived at on the basis of a rough estimate of the value of existing tools and equipment on a typical farm, combined with a guess about its average life-time. Such an estimate, however, could not take into account the effect of an eventual replacement of traditional tools by improved types and therefore would be of very limited interest.

118. Finally, it should be noted that draught animals constitute a valuable and important part of the traction equipment on traditional farms. It is therefore reasonable to include the increase in the stock of such animals in gross fixed capital formation of the traditional sector. However, here again the problem of obtaining the necessary information for making a reasonable estimate is overwhelming and cannot be satisfactorily solved except through direct surveys.

#### VIII. Increase in inventories

119. The concept of total gross domestic capital formation includes in addition to gross fixed capital formation the net increase in inventories on the hands of producers and dealers. The SNA recommends to include in the concept of net increase in inventories also changes in stocks of live-stock, as well as changes in work in progress on projects of fixed capital formation except with regard to dwellings and non-residential construction. Increase in natural resources due to growth, as for instance, of forests and standing crops, are on the other hand recommended excluded.

120. Some questions arising from the recommendation to include all work in progress except in building construction as increase in inventories was discussed earlier in this paper (see p. 7). The consistency of including increase in livestock in increase in inventories and thus in national product but excluding, for instance, increase in forests or plantations is perhaps also doubtful. In both cases the value increase is partly due to natural growth and partly to input of factors of production. No doubt the amount of inputs required for rearing animals, in the form of feed and care, is normally higher than the amount of inputs needed to ensure a profitable natural growth of forests and plantations, which usually only consists in some labour input for minimum of necessary care. On the other hand, animals may sometimes be grazing in fields where their feed is growing wild and they may here also need only a minimum of care.

There therefore appears to be no sharp distinction between the two cases, which should call for a different treatment in the national accounts.

121. It is generally recognized that comprehensive and accurate estimates of the net increase in inventories are extremely difficult to achieve even in statistically highly developed countries. To evaluate the net increase in the value of raw materials and finished goods held by enterprises and dealers would require the registration of stock changes for a very wide range of commodities. Since it is a question of variations in the level of inventories, the omission of commodities which do not contribute an important part to total production may still lead to significant errors in the estimates, if it should so happen that the inventory variations were concentrated on these commodities. There is no possible way of concluding from the variations in inventories of a number of commodities what the variations in the total would be except if a very extensive and carefully drawn sample is used, which is actually based on an extensive analysis of the whole spectrum of commodities.

122. It is widespread practice to derive private consumption as a residual, after the other components of domestic expenditure have been estimated separately and are deducted from total domestic product as obtained by the value added method. If no separate estimate is made for net increase in inventories, it is then assumed that the residual includes this component as well as private consumption. Actually, however, some inventory changes may be included also in the other components of domestic expenditures. Thus, if gross fixed capital formation in machinery and equipment is estimated by the commodity flow method, and no specific adjustment is made for inventory changes of capital goods these changes are included in the figures for fixed capital formation, which then refer to imports and production rather than sales during the year in question.

123. Even if a component for inventory changes is included in the expenditure break-down, its degree of coverage is usually not known.

Consequently, an unknown amount of net inventory increase will still be included with the other expenditure components. Nevertheless, it may be very useful to show figures for net increase in inventories with less than complete coverage, provided it is clearly indicated how they are estimated and which specific items they do include.

124. For countries of this region, data on changes in the inventories of items of particular importance to the economy, like prominent export products, may sometimes be available. These figures could then be shown under the item net increase in inventories on the national accounts, with appropriate footnotes explaining the exact contents of the item. In general, in developing estimates of net increase in inventories each country ought, on the whole, to concentrate first on commodities of strategic importance for its economic development.

125. Whether items like net increase in live-stock, or in work in progress, etc. should be included as net increase in inventories will to a large extent depend on whether they are included in value added on the production side. If they are so included, they must also form part of one of the components on the expenditure side, either gross fixed capital formation or net increase in inventories. It should be clearly indicated in footnotes to the tables whether and where these items are included.

126. In spite of the difficulties connected with estimates of net increase in inventories, the countries ought to make an effort to estimate this item with as large a coverage as in any way possible. It is useful to bear in mind that to arrive at satisfactory estimates of gross fixed capital formation and private consumption, it is essential to have at least some idea about the extent to which the figures ought to be adjusted for changes in inventories. In using the commodity flow method for their estimates of the distribution of available resources by various uses, the countries should therefore take care to obtain as detailed and comprehensive estimates of inventory changes as possible.

IX. Depreciation allowances

127. As indicated in the first section of this paper (see p.4) estimates of net fixed capital formation, i.e. gross fixed capital formation less allowances for the consumption of fixed capital would also be of great interest for planning purposes, since this concept gives a measure of the increase in productive capacity brought about by the capital formation activity. The difficulties connected with making reliable estimates of depreciation allowances are, however, formidable and it was therefore thought preferable for the present purpose to concentrate on the description of estimating gross fixed capital formation as a first priority. This is natural also because the gross estimates necessarily will be arrived at first in the process of estimation.

128. However, some countries of the region already now make an estimate of total depreciation in order to arrive at figures on net domestic product, in spite of the difficulties involved. It is likely that more countries may wish to extend their estimates in this direction in the future, and that also estimates of depreciation allowances for some major sectors, at least, may be required for the purposes of development planning. In order to form an opinion as to whether reliable depreciation estimates will be feasible in the region in the near future, it may therefore be useful to point out some of the problems connected with such estimates.

129. The SNA defines depreciation allowances as provisions for the consumption of fixed capital designed to cover wear and tear and foreseen obsolescence of all fixed capital as well as accidental damage to it. These allowances are meant to cover the annual cost of using fixed capital and should reflect amounts needed to keep the existing capital stock intact rather than the writing down of the original money costs of the capital equipment, as is usually shown on company accounts.

130. To arrive at reliable figures for depreciation allowances according to the national accounts concept at replacement costs the national accountant therefore generally cannot rely on information in company accounts, but has to make his own indirect estimate. A good estimate even of total depreciation alone according to the replacement cost concept would require information about the value of the existing capital stock at constant prices cross-classified by type of asset and by age composition.

131. Classification of the existing capital stock by type of asset is needed because the various types of assets have a different economic life-time. For the purposes of depreciation estimates an average normal economic life-time has to be established for each type of asset and annual depreciation may then be distributed evenly over this life-time. When estimates at replacement cost are required, the depreciation is often in practice calculated by deducting the same percentage each year, determined by the life-time of the asset, from the depreciated replacement cost of the stock of assets in question.

132. To arrive at depreciated replacement cost of the capital stock a distribution by age of each type of capital goods in quantity terms or in constant prices of today is required. Quantities distributed by year of acquisition may be valued directly at replacement prices if an exact counterpart of the capital goods in question exists at present. Sometimes, however, it would need considerable judgement and technical knowledge to establish a reasonable replacement value for out-of-date models or for types of capital goods which no longer exist. The best way to solve the problem in these cases is probably to establish equivalents on the basis of functions fulfilled by the capital goods in question.

133. For groups of capital goods with approximately the same life-time which have a more or less exact counterpart at present, original purchase values distributed according to the year of acquisition may be inflated to current replacement cost by means of appropriate price indexes,

whereupon the necessary number of years depreciation may be deducted to arrive at depreciated replacement cost.

134. A distribution by age of each type of capital goods may, of course, also be of great help in estimating the average economic life-time of the various types of assets and in determining how large a proportion of existing assets of various types are already fully depreciated. Particularly in countries at an early stage of economic development the latter may be important since fixed capital is frequently used considerably beyond its optimal economic life-time.

135. Estimates of depreciated replacement costs are needed annually for depreciation estimates. Detailed and thoroughly established benchmark year estimates could, however, be used as a starting point for several subsequent annual estimates of depreciated replacement values. An adjustment for the general change in replacement costs for each age group of existing capital assets by means of appropriate price indexes would, however, still be required, as well as adjustments for an extra year of depreciation and capital formation.

136. If depreciation allowances are required by sector of industry, a further break-down of the capital stock by industry of use and by age would be needed to make replacement cost estimates. The detailed information about the capital stock classified from all the angles needed to make complete depreciation estimates is, however, rarely available even in statistically highly developed countries.

137. It may in this connexion be of interest to review shortly a somewhat simplified method of estimating depreciation at replacement cost which does not require quite as much detailed information as the method previously outlined. However, the basic data needed to apply this method will also only rarely be available in statistically less developed countries.

138. The essence of the method is to estimate depreciation over a relatively long period of years, as, for instance, a decade by deducting net capital formation during this period, obtained by comparing the value of the capital stock at the beginning and the end of the period, from gross capital formation. The total depreciation figure for the whole of the period may then be distributed on the individual years either according to the size of the capital stock, if this is known, or according to the degree of its utilization, i.e. the annual fluctuation of production in the industry in question. The justification for this procedure is that a direct estimate of net capital formation which covers a relatively great number of years and is derived from a comparison of the capital stock at the beginning and the end of the period may be expected to be fairly accurate and as a matter of fact more accurate the more years it covers. The basic assumption is that the relative absolute error of estimates of the value of the capital stock at two points of time will be about the same regardless whether the interval between the two points of time is one or ten years. The trick is then that the relative error of the two estimates in the latter case will be spread over ten years instead of being concentrated on one. This does, however, presume that relatively good basic information for estimating the value of the capital stock is available over a considerable period of time.

139. Both the value of the capital stock at the two points of time and gross capital formation during the period will have to be estimated at constant prices of a convenient year. Net capital formation and depreciation will then consequently also be expressed in the prices of this year. After the distribution of depreciation on the individual years of the period has been made, it will be necessary to inflate the annual depreciation figures to current values (corresponding to the replacement value) by means of appropriate price indexes, like, for instance, the indexes which were previously used to deflate gross capital formation to constant prices.

140. Although estimates of depreciation and net capital formation are important for many purposes, figures on gross capital formation are of greater significance for countries which are just starting their economic development. The existing capital stock is relatively small in these countries and is to a large extent concentrated in buildings and equipment in the traditional sector. The gross capital formation being undertaken as economic development gets under way will largely reflect investments in new and more productive types of assets and it may well be argued that to spend significant resources in trying to correct these gross estimates for depreciation of traditional capital will not yield economically particularly meaningful results.

X. Estimates at constant prices.

141. In the preceding sections of this paper the discussion has been implicitly referring to estimates of capital formation at current prices. In general, what has been said is also valid for estimates at constant prices since the statistical sources of the two sets of estimates of necessity will have to be more or less the same. Therefore, only a few short remarks will be included in the following about the special problems of estimating capital formation at constant prices.

142. Depending on the basic material available, there are two main methods of arriving at constant price estimates of the various items of capital formation. The method which a priori must be expected to give the most exact results consists in evaluating quantity data at the prices of a selected year. This method is applicable to estimates of capital formation in machinery and equipment by the commodity flow method to the extent it is possible to analyze imports and domestic production by individual commodities, and to estimates of building expenditures by the permit method. For building permits, the method can be used only if information on number of buildings or square meters built is available in addition to value data. A price per unit or square meter in the base year may then be derived and applied to the

quantum figures for other years.

143. For that part of the estimate of capital formation in machinery and equipment by the commodity flow method which is based on commodity groups and not on individual commodities, appropriate price indexes have to be used in deriving figures at constant prices. The problem here is that these price indexes as a rule will have been worked out for other more general purposes than the deflation of this component of capital formation and that they are not available at the group level. Sometimes only an overall index approximately applicable to capital formation in machinery and equipment is available and this index may then have to be applied in deflating the total of this component, including that part which is classified by individual commodities.

144. Also for all components of capital formation which are derived from accounting statistics and special surveys, including government capital formation, capital formation in the traditional sector, net increase in inventories and depreciation price indexes have to be used for deflation. The choice of appropriate indexes is here even more difficult than for machinery and equipment, since it is less likely that indexes approximately applicable to these components are available. Sometimes, the wholesale price index for the capital goods component therefore has to be used or the implicit index for other components of capital formation already deflated. As far as government capital formation is concerned, the question of consistency with the deflation of total capital formation also arises, which may have been based partly on different price indexes and partly by valuing quantities at constant prices.

145. As a general rule, it may be said that the more detailed the price indexes are that can be used for deflating capital formation and the more directly they refer to the component concerned, the better the result will be. Since it is only rarely possible to work out price indexes especially for the purpose of deflating capital formation, however, rather makeshift solutions may have to be applied for a long time to come.

## XI. Summary and conclusions

146. Estimates of gross fixed capital formation classified in as great detail as possible are very important for economic development planning. Also estimates of net increase in inventories and of depreciation and net fixed capital formation are important for these purposes, but may be given second priority. The basic statistics available for estimating the latter magnitudes are, as a general rule, even more scarce than the material which may be used to estimate gross fixed capital formation.

147. To be of use for planning purposes, the estimates of capital formation must have a high degree of reliability in order to avoid that harmful policy conclusions are drawn on the basis of them. Estimates with a higher margin of error of total fixed capital formation as a component of gross domestic expenditure may still be useful for purposes of economic analysis.

148. Many countries of the region at present do not have a sufficient supply of basic statistics to make possible estimates of gross fixed capital formation in the detail ideally required. In building up their capital formation statistics, the countries are well advised in adopting a step-by-step approach. Components and break-downs for which enough basic data are not yet available to make good estimates therefore ought to be given second priority to those which can be firmly established on the basis of available material. At the same time, plans may be drawn up for gathering the data necessary to extend the estimates.

149. In general, indirect methods of estimation is likely to be more suitable for the countries of the region than an extensive application of direct surveys which are costly and can only be carried out at long intervals, or a heavy reliance on private company accounts or tax statistics, which are known to have a very insufficient coverage. Thus, capital formation in machinery and equipment may be estimated by the commodity flow method and expenditures on building and construction by

the permit method or on the basis of materials used. It is necessary, however, to supplement the indirect methods by direct surveys on some points in order to achieve as full coverage as possible. For instance, capital formation in the traditional sector and part of capital formation in building and construction can only be covered by such surveys. Accounting statistics of course have to be used in estimating government capital formation and private company accounts may have to be relied upon in deriving a classification of gross fixed capital formation by industrial use because of lack of other information.

150. Both in using foreign trade and domestic production statistics for estimates of capital formation in machinery and equipment and in applying government budgets and accounts for estimates of government capital formation, the national accountants need to show great care in analyzing the available material and should consider it in as great detail as possible. Arbitrary splitting of items should be kept down to a minimum, but will still be unavoidable in numerous instances. The important thing is that all available information is utilized to the maximum extent and that, when items still have to be split arbitrarily, good judgement is used.

151. Capital formation in the traditional sector, which is important in the region, may be considered as a separate component of gross fixed capital formation. Since sufficient current information is not available for annual estimates for this component, bench-mark year estimates based on direct surveys will have to suffice. Special surveys for this purpose alone may not be necessary, but relevant questions may be included in more general agricultural and household surveys. Very rough indirect estimates of various components of capital formation in the traditional sector may also be possible but such estimates could never be accurate enough to make possible an analysis of the development over time.

152. Also for the other components of gross fixed capital formation, estimates for bench-mark years for which particularly ample information is available may be made more thoroughly and in greater detail than for other years. This would guarantee as exact a measure of the level of fixed capital formation as possible. The movements over intermediate years may be relatively faithfully registered by the annual estimates based on less complete information.

153. Estimates of net increase in inventories are difficult, if not impossible, to make complete. An effort should be made, however, to provide such estimates for as many commodities as possible, since adjustment for stock changes is also required in arriving at good estimates of consumption and capital formation. Also, it is useful to have figures for net increase in inventories of commodities of strategic importance for the development of the economy.

154. It is doubtful whether reliable estimates of depreciation will be possible for the countries of the region in the near future. Although estimates of net fixed capital formation and net domestic product are of interest they therefore of necessity may have to be given a relatively low priority.

155. The importance of attaching ample notes and exhaustive methodological descriptions to the estimates can hardly be stressed too much. Also, as much detail as at all possible should be shown. This will help the user both in interpreting the figures correctly and in forming a justified opinion about the quality of the estimates.

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143. For that part of the estimate of capital formation in machinery and equipment by the commodity flow method which is based on commodity groups and not on individual commodities, appropriate price indexes have to be used in deriving figures at constant prices. The problem here is that these price indexes as a rule will have been worked out for other more general purposes than the deflation of this component of capital formation and that they are not available at the group level. Sometimes only an overall index approximately applicable to capital formation in machinery and equipment is available and this index may then have to be applied in deflating the total of this component, including that part which is classified by individual commodities.

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145. As a general rule, it may be said that the more detailed the price indexes are that can be used for deflating capital formation and the more directly they refer to the component concerned, the better the result will be. Since it is only rarely possible to work out price indexes especially for the purpose of deflating capital formation, however, rather makeshift solutions may have to be applied for a long time to come.

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148. Many countries of the region at present do not have a sufficient supply of basic statistics to make possible estimates of gross fixed capital formation in the detail ideally required. In building up their capital formation statistics, the countries are well advised in adopting a step-by-step approach. Components and break-downs for which enough basic data are not yet available to make good estimates therefore ought to be given second priority to those which can be firmly established on the basis of available material. At the same time, plans may be drawn up for gathering the data necessary to extend the estimates.

149. In general, indirect methods of estimation is likely to be more suitable for the countries of the region than an extensive application of direct surveys which are costly and can only be carried out at long intervals, or a heavy reliance on private company accounts or tax statistics, which are known to have a very insufficient coverage. Thus, capital formation in machinery and equipment may be estimated by the commodity flow method and expenditures on building and construction by