

CHAPTER 21

DOMESTIC CAPITAL FORMATION

Coverage

21.1 Gross capital formation (GCF) refers to the aggregate of gross additions to fixed assets (i.e., fixed capital formation) and increase in stocks of inventories, hereinafter referred to as change, in stocks during a period of account. Fixed assets comprise construction and machinery and equipment (including transport equipment and breeding stock, draught animals, dairy cattle and the like). Construction for military purposes (other than construction or alteration of family dwellings for military personnel), defence equipment, durable goods in the hands of the households and increase in the stocks of defence materials are excluded from the scope of capital formation. However, capital outlays of defence enterprises on ordnance and clothing factories are included.

21.2 Construction activity covers all new constructions, alterations and repairs of buildings, highways, streets, bridges, culverts, railroad beds, railroads, subways, airports, parking areas, dams, drainages, wells and other irrigation sources, water and power projects, communication systems such as telephone and telegraph lines, land reclamations, bunding and other land improvements, planting and cultivating new orchards, tea, coffee and rubber plantations, afforestation projects and all other types of heavy construction. Activities of the special trade contractors such as carpenters, plumbers, plasterers and electricians relating to construction projects, and assembly and installation at site of prefabricated integral parts into bridges, storage and warehousing facilities, etc. are also included.

21.3 Machinery and equipment comprises all types of machinery like agricultural machinery, power generating machinery, manufacturing, transport equipment, furniture and furnishings. Also included are increments in livestock in respect of breeding stock, draught animals, dairy cattles and other animals raised for wool clippings. Additions to livestock other than these are accounted for under change in stock.

21.4 The estimates of GCF for the economy as a whole, include all relevant items of new capital goods which are produced domestically (exclusive of exports) and new and second-hand imported goods. According to SNA, imports should include the outlays in foreign countries of the embassies, consulates and other extra-territorial establishments of the government of the given country on new fixed assets reduced by the net sales of their second-hand and scrapped assets. Similarly, the net outlays of foreign embassies, consulates and other diplomatic bodies located in a country, on fixed assets produced within the country are to be recorded in the exports and not in the gross fixed capital formation (GFCF) of the given country. The fixed capital outlays of international agencies located in the country are to be treated in an identical manner. Due to want of data, it has not been possible to account for these. The estimation, therefore, follows the domestic concept, whereby, only additions to stocks of fixed assets and inventories within the geographical boundary of the country have been taken into account. Accordingly, the GCF refers to gross domestic capital formation (GDCF).

21.5 Additions to non-reproducible* tangible assets such as land, mineral deposits and the natural growth of standing timber or crops have not been included in GCF. However,

* For details of Reproducible and Non-reproducible Tangible Assets, reference may be made to Appendix 22.1.

outlays on improvement of land and development or extension of mining sites, timber tracts and plantations are part of capital formation. The outlays on incompleting construction works incurred during the period are included in the estimates of fixed assets. Inventories consist of materials and supplies, work-in-progress and finished products and goods in the possession of producers and dealers. Stocks of strategic materials, grains and other commodities of special importance to the nation in the possession of government are also included in the estimates of change in stocks.

21.6 The estimates of GFCF for the country are prepared both by type of assets viz., construction and machinery and equipment and by industry of use. Estimates of change in stocks are generally prepared on the basis of inventories held by industries except for foodgrains for which the total stocks in private and public sectors are measured irrespective of their being held by producers or traders. To the extent possible estimates of change in stocks are prepared separately for public and private sectors. The estimates by industry of use are compiled separately for public and private sectors for the same industry groups for which the estimates of GDP by the industry of origin are prepared.

METHODOLOGY AND SOURCE MATERIAL

Domestic Capital Formation by Type of Assets at Current Prices

21.7 The estimates of GDCF by type of assets are prepared separately for construction, machinery and equipment and change in stocks. The commodity flow approach is followed for preparing the annual estimates of pucca construction works* as well as for machinery and equipment. The estimates of kutcha construction are prepared using the expenditure approach.

Construction

21.8 As mentioned above the estimates of domestic capital formation in construction are compiled separately for pucca construction and kutcha construction i.e., labour intensive construction works undertaken using materials like reeds, mud, etc., which either have very little economic value or are freely available. The total expenditure on new construction, is the aggregate of the values of both material inputs and factor income in the form of payments to labour as well as to capital (i.e., rent, interest, profits etc.). But the total value of output of construction undertaken during the year is estimated inclusive of new construction including major repairs and replacements (herein after referred to as new construction) and current repairs and maintenance. In order to obtain the estimates of domestic capital formation it is netted for the expenditure on current repairs and maintenance.

21.9 The value of output of pucca construction is worked out at the aggregate level and its break up into new construction and repairs & maintenance by institution is not attempted by Commodity Flow Approach (CFA) for want of requisite data. On the other hand the new construction component of kutcha construction is estimated separately for each of the institutional sectors, i.e. public sector, private corporate sector and households as explained in the chapter on Construction. In order to work out the estimates of fixed capital formation for pucca construction, the current repairs & maintenance component will have to be estimated and subtracted from the value of output of pucca construction. The estimates of current repairs & maintenance by institutions are attempted following the

* For details of the value of output of construction, reference may be made to the Chapter 9 on 'Construction'.

expenditure approach. This approach, incidentally, also provides the estimates of fixed capital formation by type of institutions as discussed in the following para.

21.10 In case of public sector, the estimates of expenditure on new construction and repairs and maintenance are obtained by analysing the budget documents and annual accounts of public sector enterprises/companies. Such estimates for private corporate sector are based on RBI studies of sample joint stock companies and the estimates for the co-operative societies are based on the data obtained from the NABARD. The estimates of expenditure on new pucca construction and repairs & maintenance in case of household sector have been prepared in three parts - (i) rural residential buildings, (ii) urban residential buildings, and (iii) rural/urban non-residential buildings and other construction works (repair & maintenance only) and are based on the data thrown up by RBI's survey entitled AIDIS, 1981-82. As the whole of the expenditure on construction estimated on the basis of AIDIS, 1981-82 does not comprise pucca construction, ratios⁺ based on NSSO reports and other sources are used to estimate the components of pucca construction. Although the point estimate of new construction for rural/urban non-residential buildings and other construction works is also available in the report on AIDIS, 1981-82, the estimate for this category is derived as residual i.e., by deducting the independent estimates of expenditure on new construction and repairs and maintenance of three institutional sectors as detailed above from the estimates of total value of construction accounted in commodity flow approach. This is done in order to keep the value of construction obtained following commodity flow approach intact. The procedure for estimation for other years has been discussed in Chapter 9 on 'Construction'.

21.11 Similarly, in respect of labour intensive kutcha construction works, independent estimates of expenditure on new construction and repairs and maintenance are obtained for the same categories as for the accounted pucca part. In respect of public sector, the estimates of expenditure on kutcha new construction are based on the analysis of budget documents and relate, besides afforestation and reforestation, to soil conservation and area development, capital expenditure on 'other construction comprising bunding, field drains, kutcha bridges etc. in the case of irrigation and expenditure on roads & buildings and 50 per cent of other construction in the case of forestry. In the case of private corporate sector, kutcha construction covers expenditure on tea, coffee and rubber plantations. Expenditure towards repairs and maintenance for these two categories is assumed to be nil. For the household sector, the estimates of expenditure on new construction and repairs and maintenance are based on the results of RBI's decennial survey AIDIS, 1981-82. As stated earlier, ratios contained in the NSSO reports are used to estimate the components of kutcha construction separately for residential buildings, non-residential buildings and other construction works. The estimates in respect of public and private corporate sectors are based on current data for each year. However, in case of household sector the estimates of expenditure on new construction and repairs and maintenance based on the results of AIDIS, 1981-82 are moved backward and forward with suitable quantum and price indicators detailed in chapter 9 on Construction to obtain the corresponding estimates in other years.

Machinery & equipment

21.12 The estimates of (at current prices) in machinery and equipment are prepared by the commodity flow approach. Various items of machinery and equipment domestically produced, imported, exported and re-exported are classified into (i) capital goods; (ii) parts of capital goods; (iii) partly capital goods and (iv) parts of partly capital goods. The total

⁺ For the ratios, sources and indicators used, reference may be made to Chapter 9 on 'Construction'.

availability of the items classified under (i) is taken for capital formation. In the case of parts of capital goods, on the basis of ASI data and details from users, 50 per cent of the value is taken as capital formation and the rest treated as intermediate consumption. The proportions of partly capital goods* attributable to capital formation are given in Table 21.1. Similarly, half of the proportions applicable to partly capital goods are applied to parts of partly capital goods for estimating fixed capital formation.

21.13 The detailed ASI factory sector report 1983-84 giving itemwise data on industrial production is used for estimation of capital formation in machinery & equipment. For the later years for which summary results of ASI are available, the estimates are worked out on the basis of the proportions of capital goods etc., in the production estimates at three digit level of NIC-1970 obtained from the detailed classification. For other years, for which ASI results are not yet available, these estimates are carried forward with the help of value of output at two digit level of NIC-1970.

21.14 The contribution of unregistered manufacturing to GCF in machinery and equipment is obtained by applying the similar proportions of the detailed ASI sample sector 1973-74 to the value of output in unregistered manufacturing at two digit level of NIC-1970.

21.15 From the estimates of the aggregate production of machinery and equipment in the case of ASI factory sector, the estimates of change in stocks of such goods are deducted to obtain the net availability.

21.16 To the ex-factory value of capital goods produced domestically, the amount of excise duties, imports and import duties are added. From the total thus obtained, the value of re-exports is deducted to obtain the availability of capital goods. The value of capital goods so obtained is then marked up for trade, transport and other charges to obtain the value at purchasers' prices. Trade, transport and other installation charges have been estimated for 1980-81 on the basis of data collected from leading manufacturing firms in the country. From the total value at purchasers' prices thus obtained, the value of exports is deducted to obtain the value of capital formation at site.

21.17 For estimating the value of additions to livestock taken to form part of fixed assets, all livestock excepting bulls and bullocks over three years not in use for breeding or work, cows over three years not in use for work or breeding purposes, young male & female stock, goats under one year, female goats of one year and above and not in milk, pigs and poultry are taken into account. As the annual data on livestock population are not available, these are estimated by interpolation and extrapolation at the state level using geometric rate of growth determined from the data on ILC 1977 and 1982. For working out the estimates of capital formation, the number of livestock thus obtained have been evaluated at the average wholesale prices obtained for various categories from the DES of States.

21.18 The estimates of change in stocks are prepared by industry of use and are discussed under Domestic Capital Formation by Industry of Use under Change in Stocks.

Domestic Capital Formation by Type of Institutions

21.19 The estimates of domestic capital formation separately for construction, machinery and change in stocks for the public sector & private corporate sector are also prepared by expenditure approach on the basis of analysis of budget documents and annual reports of

* These proportions are based on the data obtained from the AIDIS-1981-82.

enterprises. These estimates of public sector plus private corporate sector by type of assets are subtracted from the corresponding estimates to arrive at the estimates for household sector as a residual.

Domestic Capital Formation by Industry of Use

21.20 An independent set of estimates of GFCF for each of the industrial categories are prepared primarily following the expenditure approach. The estimates of change in stocks on the other hand are prepared only by the industry of use. The estimates of fixed capital formation & change in stocks are aggregated at the industry level to prepare the estimates of GCF by industry of use.

Fixed capital formation

Agriculture and allied activities

21.21 The estimates of GFCF are prepared separately for public, private corporate and the household sectors. Data on improvement of land and irrigation works and flood control projects, laying of new orchards and plantations and purchase of agricultural machinery and implements in the public sector are obtained by analysing the budget documents and annual reports. The estimates of capital expenditure in respect of tea, coffee and rubber plantations which are mainly in the private corporate sector are prepared on the basis of data on area on extensions and replacements as available in the annual reports of Tea, Coffee and Rubber Boards.

21.22 As regards the estimates of fixed capital formation in the household sector, the same are prepared separately for (a) construction and (b) machinery & transport equipment for the bench mark year 1981-82 on the basis of such data available from AIDIS, 1981-82 for the households engaged in farm business. In case of construction, the estimates have been moved backward and forward to other years with the combined index of agricultural production and industrial production superimposed by cost index of rural/urban non-residential buildings and other construction works. In case of machinery & transport equipments, the bench-mark year estimates have been moved backward and forward with the help of value of products of industry group 'Manufacture of agricultural machinery and equipment, and parts'. Estimates of increment in livestock treated as fixed assets are obtained independently from data on number of livestock available from the ILC 1977 & 1982 and price data as described earlier.

Forestry & logging

21.23 The forests are mainly owned by the public sector. Only about 5 per cent of the forests are owned by the private sector. The estimates of GFCF in the public sector are obtained by analysing the budget documents and annual reports of the non-departmental enterprises. In respect of private forests no data are available. As such the estimates of the public sector are marked up by 5 per cent to account for the private forests.

Fishing

21.24 The estimates of GFCF in public as well as household sector are prepared separately. In the public sector the same are obtained from the analysis of the annual accounts of the non-departmental enterprises. For the household sector, the estimates are prepared as net additions to the estimates of capital stock. The estimates of capital stock for the years 1976-77 & 1981-82 at 1980-81 prices have been worked out using the data

on fishing boats etc., available from ILC 1977 & 1982 and the prices of mechanised and non-mechanised boats and fishing gears collected from various states. The estimates of capital stock for other years have been arrived at by interpolation/ extrapolation and that of GFCF at 1980-81 prices as annual additions. The estimates at current prices have been obtained by superimposing the average index of wholesale prices of (i) timber, (ii) diesel engine and (iii) nylon/terene and mixed cotton.

Mining and quarrying

21.25 The estimates of GFCF in the public sector non-departmental enterprises are obtained from the analysis of the annual reports of such enterprises. In respect of the private corporate sector, the estimates are made available directly by the RBI on the basis of their studies of sample joint stock companies published annually in their publication entitled 'Finances of Public and Private Limited Companies'.

Registered manufacturing

21.26 The estimates of GFCF are obtained from the annual data available from ASI, duly adjusted for non-response on the basis of industrywise data on employment. However, ASI data do not cover defence establishments (e.g. ordnance and clothing factories). Information relating to the departmental enterprises are received from Ministry of Defence. For non-departmental enterprises, the estimates of fixed capital formation are obtained from the analysis of accounts of these enterprises. For the years for which ASI results are not available, the estimates for the latest year based on ASI are moved with the help of value of output in registered manufacturing excluding defence establishments and are revised as and when ASI results become available.

Unregistered manufacturing

21.27 The estimates of GFCF for 1980-81 have first been prepared separately for construction and machinery & transport equipments using data contained in the Report No.205, 'Some Results on Small Scale Manufacturing in Rural & Urban Areas, 23rd Round: 1968-69' (NSSO, 1975) and results of the 'Survey of Small Scale Industries in the Unorganised Sector in Urban Areas, 1971-72 (mimeographed) (CSO, 1975)'. The 1980-81 estimates so arrived at are then moved to later years with the help of value of output of 'Manufacture of machinery, machine tools & parts except electrical machinery' and with the help of gross value added in unregistered manufacturing for construction.

Construction

21.28 The estimates of GFCF in respect of public sector are obtained by analysing the annual reports/budgets. For the private corporate sector, the estimates are made available by the RBI directly on the basis of their studies of sample joint stock companies. In case of household sector, the estimates for the bench-mark year 1981-82 have been prepared using the capital output ratio worked out from the analysis of reports of some of the public & private joint stock companies engaged in construction. The GFCF so obtained is split up into construction and machinery & equipment on the basis of the share of these two types of assets as observed in the reports of public and private joint stock companies. The estimates of machinery & equipment are moved to later years with the help of value of products and by-products of 'Manufacture of machinery, machine tools and parts except electrical machinery' and estimates for construction are moved with the index of value of pucca construction other than residential buildings.

Electricity, gas & water supply

21.29 The estimates of GFCF in the public sector are obtained by analysing the budget documents and annual reports. In respect of private corporate sector, the estimates are made available by the RBI on the basis of their studies of sample joint stock companies.

Railways

21.30 Estimates of GFCF for railways have been obtained by analysing the budget documents. These refer to transport services only and exclude capital employed in railway workshops and manufacturing units and construction activities undertaken by the railways. The latter are included in the respective industrial sectors.

Transport by other means

21.31 The estimates of GFCF for air transport are compiled by analysing the annual reports of Air India, Indian Airlines, Vayudoot, Helicopter Corporation of India and International Airport Authority of India (IAAI). For capital employed in aerodromes other than those controlled by IAAI, the estimates are obtained by analysing the budget documents of the Department of Civil Aviation. Estimates in the case of shipping companies are based on the analysis of annual reports of major shipping companies and Shipping Corporation of India. Estimates of GFCF in respect of Port Trusts are based on the analysis of their budgets. For mechanised road transport, the value of transport equipments in the bench mark year is prepared on the basis of registered public vehicles and prices per unit of different types of vehicles. These estimates are moved to other years using data on value of registered vehicles. The estimates of GFCF in non-mechanised road and un-organised water transport for the bench mark year have been obtained by projecting the estimates of capital stock based on data contained in Report No.105, 'Tables with notes on Household, Non-mechanised Transport and utilization of Working Animals, 15th Round: 1959-60' (NSSO, 1966) with the help of value added at 1980-81 prices in non-mechanised road and un-organised water transport. These estimates have then been adjusted for price changes with the help of wholesale price index of transport equipments.

Storage

21.32 The estimates of GFCF in storage are obtained by analysing the annual reports of central and state warehousing corporations. For the registered part of the storage, the estimates are based on the reports of ASI factory sector. In respect of un-registered part, the estimates for the year 1983-84 are obtained from Enterprise Survey Report, 1983-84. The estimates so obtained are then moved backward & forward with the estimates of GFCF of storage obtained from ASI.

Communication

21.33 The estimates of GFCF in communication have been obtained by analysing the budget documents.

Banking & Insurance

21.34 The estimates of GFCF in respect of public sector comprising RBI, nationalised banks, financial corporations and insurance companies are obtained on the basis of analysis of their annual reports. Private sector consists of private banks, financial joint stock companies and the cooperative societies. The estimates of GFCF in respect of

private banks are compiled from the Statistical Tables Relating to Banks in India (RBI). For financial joint stock companies, the estimates are obtained directly from RBI. In case of cooperative societies, the estimates are compiled from 'Statistical Statements relating to Cooperative Movement in India (NABARD)'.

Trade

21.35 For estimation of GFCF the sector has been divided into (i) public sector, (ii) joint stock companies, (iii) cooperative societies, and (iv) household. GFCF in public sector is based on the analysis of annual reports etc., of the statutory corporations engaged in trade. Estimates of GFCF in respect of joint stock companies and the cooperative societies are made available by the RBI and the NABARD respectively. For the household sector, the estimates of GFCF for the bench-mark year 1981-82 have been prepared using the capital output ratio based on Finances of medium & large private limited companies. The 1981-82 estimates for the household sector are moved to other years with the help of value added from un-organised trade.

Hotels & Restaurants

21.36 The estimates of GFCF in respect of the public sector are based on the analysis of annual reports of the enterprises engaged in the activity. As regards the estimates of joint stock companies, the same are made available by the RBI. In respect of the household sector, the estimates of GFCF for the year 1981-82 have been prepared using the capital output ratio based on the analysis of joint stock companies by the RBI, which have been moved to other years with the help of value added from un-organised hotels & restaurants.

Real estate, ownership of dwellings & business services

21.37 The estimates of GFCF in respect of ownership of dwellings in public sector are based on the analysis of budget documents. In respect of real estate companies, the estimates of GFCF have been prepared by the RBI based on their studies of joint stock companies. For the household sector, estimates for the year 1981-82 both for rural & urban residential buildings have been prepared on the basis of data contained in AIDIS-1981-82, which have been carried forward & backward with the combined index of annual additions in the number of residential buildings and the cost of housing.

Public Administration and Defence

21.38 The estimates of GFCF in respect of roads & bridges, vehicles, public buildings etc., are based on the analysis of budget documents. Adjustment has been made for additions to plant and machinery used in Public Works Departments (PWDs) on the basis of data on expenditure on plant and machinery in these departments.

Other services

21.39 The estimates of GFCF in other services are prepared separately for public sector, private corporate sector and household sector. In case of public sector, the estimates are compiled by analysing the budget documents and annual reports. For the private corporate sector, the estimates are made available by the RBI. In case of household and non-household sectors, the bench mark estimates of GFCF for the services like unrecognised educational institutions, medical and health and other community services have been prepared on the basis of data available in the report of the Enterprise Survey, 1983-84 (CSO.1987) which have been moved to other years with the help of GFCF of the

respective groups in the public sector. The estimate of GFCF for educational institutions (recognised) are obtained from the annual publication 'Education in India'. For the years for which such data are not available, the estimates are carried to other years with the help of GFCF in education of the public sector and are revised when actual data become available.

Change in stocks

21.40 The estimates of change in stocks are estimated separately for public sector, private corporate sector and household sector within each industry. The methodology for the estimation of change in stocks is as follows:

Agriculture and allied activities

21.41 The estimates of change in stocks in agriculture sector have been prepared separately for (i) public sector (ii) plantations in the private corporate sector, (iii) household sector and (iv) livestock. The estimates of public sector are based on data available from budget documents and annual reports. The estimates of change in stocks in respect of coffee and rubber plantations in the private corporate sector are prepared on the basis of data on stocks and prices at the beginning and end of the year collected from the respective Boards. The change in stocks have been obtained as difference of the stock at the end and at the beginning of the year. The change is first obtained in quantitative terms for different years. It is then multiplied with the constant (1980-81)/current prices of the year to arrive at constant/current price estimates. The additions to livestock other than fixed assets are accounted under change in stocks. The categories of animals which form part of increase in livestock other than fixed assets are bulls and bullocks over three years not in use for breeding or work, cows over three years not in use for breeding, young male and female stock, goats under one year, female goats of one year and above and not in milk, pigs and poultry. As the annual data on livestock population are not available, these are estimated by interpolation and extrapolation at the state level using geometric rate of growth determined from the quantitative data from ILC 1977 and 1982. The changes in number of livestock thus obtained for different years have been evaluated at the corresponding average wholesale prices obtained for various categories from the DESs. The constant price estimates are obtained by multiplying the change in number of livestock for different years by the 1980-81 prices.

Forestry and logging

21.42 Forests come mainly under the public sector. In the absence of any information for the private sector only the public sector estimates as obtained from budget documents have been taken.

Mining and quarrying

21.43 The estimates of change in stocks in respect of the minerals covered exclusively in the public sector are based on the analysis of annual accounts of public sector undertakings. However, estimates in respect of other minerals are based on RBI analysis of joint stock companies.

Registered manufacturing

21.44 The ASI reports directly provide estimates of change in stocks in case of registered manufacturing. For the years for which ASI results are not available, the estimates for the

latest available year are moved to other years with the help of gross value of output in registered manufacturing excluding defence establishments. Data on change in inventories for the other defence establishments which produce goods for civilian use are collected independently and combined with the ASI results.

Unregistered manufacturing

21.45 The estimates of change in stocks in unregistered manufacturing are based on the proportion of GVA to inventories. The proportion of value added to inventories has been worked out utilising the data available from Report No.280/6, 'Tables with Notes on Survey of Self Employed Households in Non-agricultural Enterprises'-Detailed Results for All-India, 29th Round: 1974-75 (NSSO, 1978), Survey of Small Scale Industries in the un-organised sector in Urban Areas, 1971-72, mimeograph (CSO, 1975) and Special Tabulation of census of Small Scale Industries undertaken by DCSSI in 1977. This proportion of inventories to GVA has been used to prepare the estimates of inventories in un-registered manufacturing.

Construction

21.46 The estimates are built up on the basis of analysis of balance sheets of construction companies in the private corporate and public sectors.

Electricity, gas and water supply

21.47 For estimating change in stock in electricity under-takings, data for public sector are obtained from the budget documents/reports of electricity boards, departmental enterprises and municipal undertakings engaged in generation and distribution of electricity. For the private sector, the estimates are based on analysis of joint stock companies by RBI.

21.48 The estimates of water supply relate only to public sector and are based on data available in budget documents.

21.49 In case of gas sub-sector, estimates of stocks have been assumed to be nil.

Railways

21.50 In case of Government railways, stocks consist of 'Miscellaneous Advances Revenue' and credits under suspense under the current Account. In the capital Account, stocks consist of stores, suspense and some expenditure on works. For working out change in stocks for railway transport, the change in stocks under the manufacturing activities is netted out.

Transport by other means and storage

21.51 The change in stocks in the overall road and water transport activities are estimated on the basis of the ratio of change in stocks to GVA for each year observed in the public road and water transport corporations. Estimates of change in stocks of air transport have been obtained from the analysis of the accounts of air transport corporations. In the case of storage, only the estimates of public sector obtained from their accounts, have been taken.

Communication

21.52 In case of communication, stocks consist of general stores, factory stores, manufacturing suspense account, civil engineering stores and purchases. There are also some recoveries in communication under the stores suspense (general factory and civil engineering stores) and manufacturing expense. As in the case of railways, for working out change in stocks for communication, the change in stocks under manufacturing activities is netted out.

Banking and Insurance

21.53 The estimates of change in stocks in the private sector are based on RBI analysis of joint stock companies. The estimates of change in stocks of banking & insurance in the public sector relate only to non-departmental commercial undertakings and are based on analysis of their annual accounts.

Trade

21.54 Estimates of change in stocks in the trade sector have been prepared separately for foodgrains and other commodities and for public and private sectors. The estimates for public sector relate only to non-departmental enterprises and are based on the analysis of their annual accounts. For private trade in commodities other than foodgrains, the estimates are worked out separately for registered and un-registered establishments. The estimates for registered establishments have been prepared separately for (i) joint stock companies, (ii) co-operative societies, and (iii) household enterprises. The estimates in respect of joint stock companies are based on the analysis of annual accounts of private trading companies published by RBI and those in respect of co-operative societies and household enterprises are prepared on the basis of data available from the Statistical Statements Relating to Co-operative Movement in India (RBI) and data on bank advances to household trading establishments available in the Banking Statistics (RBI) supplemented with the information available in RBI Bulletins.

21.55 In case of household trade in commodities other than foodgrains, the estimates of stocks for the year 1969-70 have been arrived at on the basis of data contained in Report No. 221, Tables with Notes on Some Features of Household Non-Registered Trade, 24th Round : 1969-70 (NSSO, 1975). The estimates are moved to other years on the basis of advances of the banks to partnership firms and others.

21.56 The estimates of stocks of food grains with the private traders are now based on the method followed by Prof. Dandekar in his recent work "Agriculture, Employment and Poverty" -a paper presented at the Conference organised by the Centre for Asian Development Studies, Boston University, October 1986, which takes into account the stocks of foodgrains with the public. According to this, consumption of foodgrains has been subtracted from the net availability with the public to arrive at the estimates of stocks. Quantitative changes in stocks of cereals and pulses have been evaluated for different years with the corresponding prices. The salient features of this method are that it assumes that the stocks with the public in a bad agriculture year say, 1979-80, are negligible and per capita consumption of foodgrains during any two consecutive bad years is almost of the same order.

21.57 An examination of the estimates of change in stocks from the ASI vis-a-vis the manufacturing enterprises under joint stock companies in the private sector, public sector enterprises and cooperatives showed wide fluctuations due to the fact that the ASI follows

the establishment approach which captures only the stocks with the factories, whereas the stocks of the public sector enterprises, joint stock companies and cooperatives are based on enterprise approach which cover all activities in which an enterprise is engaged. To account for the stocks of trading establishments which form part of the manufacturing enterprises, the difference between the stocks of manufacturing enterprises obtained by analysing the annual accounts of such enterprises and the stocks of manufacturing establishments obtained from ASI reports have been added.

Hotels and Restaurants

21.58 The estimates of change in stocks in hotels and restaurants in the private sector are based on the results of analysis of joint stock companies by RBI. The estimates for the public sector have been obtained from the analysis of the accounts of the non-departmental commercial enterprises.

real estate

21.59 The estimates of stocks in real estate are based on the analysis of joint stock companies by RBI.

Public Administration & Defence

21.60 The change in stocks in administrative departments of the government is obtained as a result of economic and purpose classification of the annual budget documents/accounts of public authorities. The stocks held by the administrative departments are in the nature of (i) policy stocks like food, fertilisers etc., and (ii) work-stores under the Civil Works Departments which mainly consist of cement, bricks, steel etc. The policy stocks are given in the budget documents in the form of purchases and sales during the year and the net purchases during the year are classified as change in stocks. In the case of work-stores, suspense accounts are maintained by the government and in the appropriate heads of account, formation of the stock is shown against the suspense appearing in the expenditure side, while the withdrawals from out of these stocks during the year are shown against the 'receipt and recoveries' of capital accounts of the detailed demands for grant. The purchases during the year minus withdrawals are treated as change in stocks.

21.61 For arriving at the estimate of change in stocks in the case of public administration and defence, the change in stocks relating to activities like education, medical and health, water supply, sanitary services and construction are subtracted from the total change in stocks for all administrative departments.

21.62 The change in stocks for the administrative departments in general and public administration and defence in particular arrived at following the procedure discussed in paragraph 21.61 works out to be negative year after year. This abnormality was examined in detail and discussions were held with the officers of Ministry of Finance as well as CPWD to find out the possible reasons for the negative stock as on date and particularly during the year. Both the Ministry of Finance and CPWD clarified that procurement of stocks of inventories are shown in the suspense accounts under the expenditure account and withdrawals are shown under recoveries. As such, the procedure followed by CSO thus far, was in order. However, they were not able to assign any reason why the stocks of the inventories on a particular date could be negative and that also year after year. The issue was, therefore, further discussed with other knowledgeable people in these fields. They felt that normally stocks of all raw material at least for one month at any point of

time are scrupulously maintained. For instance in the case of thermal power station, the minimum stock of coal required for one month is always maintained. The issue was subsequently discussed in the Third Meeting of the Advisory Committee on National Accounts held in September 1988. They advised that it would be necessary to estimate change in stocks independently. The Committee also recommended that the change in stocks for a year in the administrative departments be estimated by taking 1/10th of the fixed capital formation during the year and necessary adjustments made wherever necessary. Based on the recommendations of the Advisory Committee the stocks have been estimated as 1/10th of the fixed capital formation during the year.

Other services

21.63 In the absence of any reliable data for the household sector, only the estimates of change in stocks in the public and private corporate sectors as obtained from analysis of budget documents, annual reports of non-departmental enterprises and joint stock companies of RBI have been taken.

Errors and Omissions

21.64 The estimates of total capital formation for each of the industry groups are obtained by aggregating the corresponding figures of fixed capital formation and change in stocks. A separate independent estimate of total capital formation by type of assets is also obtained by adding the above total estimate of change in stocks to the total measure of fixed capital formation in construction and machinery and equipment. Two independent estimates of capital formation thus obtained differ in the aggregate. Also the estimates of total saving plus net capital inflow from abroad and the estimate of total domestic capital formation do not tally. Using the measure of saving as the controlling total, domestic capital formation by type of assets is adjusted for the difference and this difference is treated as 'errors and omissions'. For measuring the rate of capital formation, total domestic capital formation adjusted for 'errors and omissions' is used. Using this series of domestic capital formation (i.e. total by type of assets adjusted for errors and omissions) as controlling total, the estimated total capital formation by industry of use is adjusted for any difference that might still exist. Such differences are shown at the aggregate level.

Estimates at Constant Prices

21.65 Estimates of the value of output from construction at current prices are adjusted to obtain the corresponding constant price figures. Appropriate deflators for different types of construction specially prepared for the purpose and separate indicators for machinery and equipment are used to obtain these estimates. The deflators for construction are prepared separately for (i) general 'pucca' construction excluding residential buildings, (ii) rural residential buildings, (iii) urban residential buildings, (iv) rural and urban non-residential buildings and other construction works not covered by the commodity flow method and (v) plantations and afforestation outside the household sector. The weights allotted to price indices of different inputs for various kinds of construction works are given in Table 21.2. The value of all constructions other than residential buildings covered in the commodity flow method is deflated by the index of cost of 'general pucca construction excluding residential buildings'. The values of construction of rural and urban residential buildings are deflated by the indices of cost of construction of rural and urban buildings respectively. The value under other two categories are deflated by the corresponding indices. The sum of various components thus obtained gives the total value of construction at 1980-81 prices.

21.66 The estimates of machinery and equipment are deflated separately for domestic production and net imports. The estimates of domestic production component of machinery and equipment are deflated separately for (i) machinery other than electrical, (ii) electrical machinery (iii) transport equipment, (iv) other equipment and (v) livestock treated as fixed assets. While the first three groups are deflated by EA's index number of wholesale prices for the relevant groups, 'other equipment' is deflated by the index for 'machinery & transport equipment' and change in livestock is evaluated at base year (1980-81) prices. Net import of machinery and transport equipment is deflated by the index of unit value of imports for respective groups.

21.67 For preparing constant price estimates of GFCF by industry of use, corresponding figures at current prices separately for each industry group are deflated. To the extent data are available, each component of capital formation is deflated separately by relevant price index number. These include construction cost indices of "pucca/kutchra" construction, EA's index of wholesale prices of machinery, transport equipments and prices of livestock by categories. In case where it is not possible to use independent indices of prices for each component of capital formation (e.g. in registered manufacturing sector), the total capital formation in the sector is deflated by a composite index constructed using the proportions of capital formation in construction and machinery and equipment at current prices in the bench mark year.

21.68 Estimates of increase in stocks in foodgrains at 1980-81 prices are prepared by evaluating at base year prices the quantity of change in stocks in different years. In the case of mining and agricultural commodities other than foodgrains, implicit price indices of value of output in mining and agriculture (excluding foodgrains) respectively have been used to deflate the current price estimates. The estimates of increase in stocks held by electricity undertakings are deflated with the help of EA's index number of wholesale prices of electrical goods. Index number of cost of material inputs used in general 'pucca' construction is used to deflate the estimates of change in stocks in the construction sector and EA's indices of wholesale prices of all commodities are used to deflate the estimates of change in stocks of manufacturing, trade, public authorities and 'others' covering airways, shipping companies, road transport, real estate and storage.

Quality and limitations of Data base

21.69 The methodology described above suffers from a number of limitations due to the paucity of data, which are briefly described in the following sub-paras.

- i The estimates of capital formation in machinery and transport equipment are, to a large extent, dependent on the figures of domestic production and imports of machinery and equipment. Broadly, statistics of domestic production as given in ASI factory sector reports for different categories of machinery and equipment can be considered to be dependable. Estimates, however, are quite deficient in regard to domestic production in unregistered manufacturing sector. The estimates of capital formation by type of assets suffer from another limitation. The proportions used for estimating the production of capital goods out of partly capital goods and part of capital goods are based on data on household durable goods as obtained from AIDIS, 1981-82.
- ii Estimates of GFCF by industry of use have been prepared mainly following expenditure approach. A critical evaluation of the estimates in the context of data base shows that for a large percentage share of the aggregate capital formation (about 70 per cent) originating in organised industry groups like registered

manufacturing, electricity and public sector, the estimates are based on direct annual data. For the remaining sectors, the estimates are based on either benchmark estimates or analysis of balance sheets of selected companies in the corporate sector. The estimates for these industry groups, therefore, need to be based on more satisfactory information and current data in order to improve their reliability.

- iii The estimates of change in stocks in registered household trading establishments are prepared on the basis of bank advances and, therefore, these estimates may not be very reliable. The estimates of change in stocks of foodgrains in trade and small scale manufacturing are also unsatisfactory mainly because of non-availability of data.

TABLE 21.1: Proportions of partly capital goods treated as capital goods

Partly Capital Goods Groups in machinery & equipment*	NIC-1987	Percentage used
(1)	(2)	(3)
1. Wood furniture	276, 277 & 279	73
2. Carpets	263	24
3. Tyres & tubes	300	77
4. Other rubber products	302	69
5. Steel furniture	342	73
6. Metal utensils	345	27
7. Refrigerators	355	59
8. Sewing machine	359	69
9. Type writers	358	79
10. Electrical goods	363, 364	74
11. Radio & T.V.	365, 366	5
12. Motor vehicles (cars)	373, 374	36
13. Motor cycles, scooters & cycles	375, 376	69
14. Photographic goods	381	26
15. Watches & clocks	382	34
16. Musical instruments	386	85

* Based on AIDIS, 1981-82, Special tabulation by the RBI for NAD of CSO.

TABLE 21.2 : Weights allotted to different inputs in the preparation of deflators for various types of construction

Inputs	Type of construction				
	General pucca construction excluding residential buildings	Rural residential buildings	Urban residential buildings	Rural & urban residential buildings and other construction works (unaccounted)	Others*
(1)	(2)	(3)	(4)	(5)	(6)
1. Cement	11	4	11		
2. Iron & steel	13	4	7		
3. Bricks	16	21	18		
4. Logs & timber	21	36	27		
5. Paints & varnishes	3		7		
6. Glass & glass products	2		2		
7. Lime	1	4	1		
8. Electrical goods	3		3		
9. Rural construction works	2	31		4	
10. Urban construction works	28		24	29	
11. Rural unskilled labour				67	100

* Construction under the category 'others' covers plantations and afforestation and other kutcha construction outside household sector.