

CHAPTER XX

DOMESTIC CAPITAL FORMATION

Coverage

20.1. Gross capital formation refers to the aggregate of gross additions to fixed assets (i.e., fixed capital formation) and increase in stocks during a period of account. Fixed assets comprise construction and machinery and equipment (including transport equipment and breeding stock, drought animals, dairy cattle and the like). Construction for military purpose (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.

20.2. The estimates of gross capital formation 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 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 where by only additions to the stocks of fixed assets and inventories of the country within the geographical boundary of the country have been taken into account.

20.3. 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 gross capital formation. However, outlays on improvement of land and development or extension of mining sites, timber tracts and plantations are part of capital formation. Increments in livestock in respect of breeding stocks, drought animals, dairy cattle and other animals raised for wool clipping are treated as fixed capital formation. Additions to livestock other than these are accounted for under change in stocks. Incomplete construction works are included in the estimation of fixed assets but partly finished machinery and equipment lying with the producer are counted as inventories. Inventories consist of materials and supplies, work-in-progress and finished pro-

ducts 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 capital formation.

20.4. Construction activity covers all new constructions, alterations and repairs of buildings, highways, streets, bridges and culverts, railway road-beds, railroads, subways, airports and parking areas, dams, drainages, wells and other irrigation sources, water-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 the site of prefabricated integral parts into bridges, storage and warehouse facilities, etc. are also included in this group.

20.5. Estimates of gross fixed capital formation for the country are prepared both by type of assets viz., construction and machinery and equipment (separately by public and private sectors) and by the 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 for the industry groups under the NIC-1970, for which the estimates of gross domestic product by the industry of origin are available, separately for public and private sectors.

Methodology and Source Material

Domestic Capital Formation at current prices by type of assets

20.6. The estimates of domestic capital formation 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 those categories of construction works which are undertaken with the use of the specified construction materials as well as for machinery and equipment.

Construction

20.7. Domestic capital formation in construction is estimated in several stages as it becomes

necessary to cover not only construction activity measured by the commodity-flow method but also labour intensive capital works undertaken using materials like roads, mud, etc. which either have very little economic value or are freely available. Also, by definition, the total value of new construction, constituting domestic capital formation is the aggregate of the values of both material inputs and factor income payments in the form of payments to labour as well as to capital (i.e. rent, interest, profits etc). Besides, readily available material does not allow a direct exclusive measure of the value of new construction. It becomes necessary, therefore, to estimate the total value of construction undertaken during the year and net the same for expenditures on current repairs and maintenance to obtain the construction component of domestic capital formation.

20.8. The estimates of total value of construction works are, therefore, prepared separately for (i) works undertaken with the use of specified construction materials; and (ii) labour intensive construction. In the case of the former it is possible to obtain annual estimates of total value of construction by the commodity flow approach. In the case of the latter, such construction is undertaken in the public and private corporate sectors only to a very limited extent and is generally confined to the household sector. In the case of public sector, such labour intensive construction relates to afforestation and re-afforestation and the data on such expenditure are available from the annual budget documents. In the case of private corporate sector, such construction cover tea, coffee and rubber plantations and annual data on extensions, replacements and replantations are available independently. In the case of households, such construction relates to residential and non-residential buildings and other construction works. Because of the limitations of data, these estimates have to be prepared first for a bench mark year separately for different categories using the expenditure approach and for other years thereafter using relevant indicators. The estimates for residential and non-residential buildings are further broken down by rural and urban areas. The estimates for the bench mark year under different categories are generally prepared by the ratio method using the survey results. The ratio method implies the use of proportion which labour intensive construction forms either to the total value of construction under similar categories or to the accounted part, i.e., construction with the use of building materials of economic value. In other words, this requires that the total value of construction (accounted and unaccounted) is prepared independently by the chosen categories and also that the total value of construction obtained by the commodity flow method is split up into similar categories so that the corresponding estimates of labour intensive construction can be obtained. Having obtained such estimates for the bench mark year, the total value of labour intensive construction works for other years are

obtained by carrying forward the total for the bench mark year by the relevant indicator.

20.9. The annual current price estimates of the above two categories of construction are added to obtain the annual current value of total construction. From this total value, the estimates of expenditure on repair construction and construction for defence purposes are deducted to obtain the estimates of gross capital formation in the form of construction.

Total value of construction: commodity flow approach

20.10. The commodity flow approach envisages estimation of domestic production of commodities used in construction and adjusting them for inputs in other industries, changes in stocks, imports and exports for obtaining estimates of net availability for construction purposes. For evaluation of commodities used for construction at prices paid by the builders at the site of construction, information on prices, transport costs, dealers' margins and indirect taxes are made use of. For measurement by commodity flow approach the value at site in each accounting year, of five basic construction input materials viz., cement, iron and steel products, timber and round-wood, bricks and tiles and permanent fixtures and fittings are considered in detail.

20.11. Cement is produced only in the organised sector and the data on total despatches of cement to States/union territories for consumption are available by categories of rate contract 'other than rate contract' and free sale from the *Cement Production and Despatches* (annual, Cement Controller of India). This publication also gives information on prices of cement including Free on Rail and retail-sale price of cement in each State/union territory. From the data on total quantity of cement despatched, the cement available for construction is determined by excluding the estimated quantity of cement used for intermediate consumption in other industries and adjusting for imports. The estimated quantity is then evaluated with the help of appropriate prices. The total value of cement used in construction obtained as above is marked up arbitrarily by 2 p.c. to take account of the transportation costs from the point of purchase to the site of construction. Steps involved in the estimation of the value of cement used in construction are presented in Appendix 20.1.

20.12. Iron and steel products taken into account as being used in construction consist of items like heavy structurals, light structurals, heavy rails, fish plates, corrugated sheets, bars and rods, sleepers, railway track material and iron and steel structurals comprising bridge work, fabricated structural for building or transmission towers, sluice gates fabricated out of rolled section, gates and grills, shutters including rolling shutters etc. The value of these goods are taken from the ASI-census and sample sector reports. An adjustment is made for non-response in the ASI-census sector on the basis of the total num-

ber of workers employed in responding and non-responding factories. From the total value of products, the value of such products used as inputs in other industries are excluded to estimate the value of products used for construction purposes. The ASI reports for the sample sector contain information for only industry groups upto three-digit level of NIC-1970 and item-wise break-up of the value of products is not available. Accordingly, the proportion of iron and steel used in construction to the total production reported in the census sector are worked out at the 3 digit level and applied to the total value of products given in the corresponding group of the sample sector to derive the estimated value of iron and steel products (of the sample sector) used in construction. The detailed ASI data are, however, available only upto 1969-70 and thereafter only for 1973-74. For the years for which only summary ASI data are available, the estimates have been prepared by applying to the total value of products and by-products of the industry group the ratio of the value of iron and steel goods used in construction to the total value of products and by-products of the relevant industry groups obtained from the latest available detailed results. For the recent years for which ASI results are not yet available, the estimates have been carried forward with the help of changes in the production of finished steel and relevant index of wholesale prices for iron and steel products.⁶⁸

20.13. The estimates of iron and steel goods produced in the unregistered manufacturing sector, used as input in construction, are based on the values of corresponding output of unregistered manufacturing units. The proportions of the value of output of iron and steel goods used in construction to the total value of output as available from the detailed results of the sample sector of ASI for 1973-74 have been applied to the relevant value of output in the unregistered manufacturing sector. As the item-wise details of output of the sample sector have been tabulated only for 1973-74, the proportions obtained for 1973-74 have been used for the subsequent years also.

20.14. The aggregate value of domestic supply of iron and steel products available for construction thus estimated is exclusive of indirect taxes and duties and trade and transport margins. To arrive at the value of construction at site, adjustment has been made on this account. The share of import duties attributable to imports of steel products used in construction is worked out on the basis of the proportion of iron and steel goods used in construction to the total iron and steel imported. Adjustment for trade, transport and other charges has been made on the basis of information obtained from the Railway Board, sales tax data obtained from State Governments supplemented by the information collected by the CSO from a number of engineering companies dealing in iron and steel pro-

ducts and the input and output data available from the ASI Reports. The adjustment factor is estimated to be 15 p.c. of the total value. The detailed procedure of estimation of the value of iron and steel used in construction is given in Appendix 20.2.

20.15. Direct data on the production of timber and roundwood are not separately available. Instead, information is available on production of industrial wood comprising mainly timber and roundwood. Data on the proportion of timber and roundwood in the production of industrial wood are available for the period 1960-61 to 1962-63 and 1964-65 from the DESAg. As similar information for the years beyond 1964-65 are not available, the proportion worked out for 1964-65 (i.e. 99.81 p.c.) has been used for the subsequent years. From the total quantity of timber produced, timber used as railway sleepers is deducted to obtain the quantity of timber available for other uses. The quantity of timber utilised for making railway sleepers is obtained from the Railway Board. Of the residual quantity of timber, 48.5 p.c. is taken as having been used in construction. Roundwood used in construction is taken to be 38 p.c. of the total quantity produced. These proportions have been worked out on the basis of information contained in the *Timber Trends Study for the Far East, Country Report for India, 1958* (The Inspector General of Forests). The total quantity of timber used in construction has been evaluated using all-India average prices issued quarterly by the National Buildings Organisation (NBO) in *Prices of Building Materials and Wage Rates for Building Labour* (mimeographed). In the case of roundwood, statewide data on prices are available only for 1970-71. For evaluating the quantity of roundwood used in construction, the all-India average price for 1970-71 have been moved to later years with the help of *E.A.'s index of wholesale prices for log and timber*. The total value thus obtained is adjusted for trade & transport margin to obtain the value at the site of construction. Information on trade and transport margin for railway sleepers is obtained from the headquarters of the Northern Railway and for timber and roundwood used in construction (other than railways) from the *Timber Trends Study* and directly from the dealers. Details of calculation are presented in Appendix 20.3.

20.16. Estimates of the quantity of bricks and tiles are prepared on the basis of information on despatches of coal used for brick burning published in the *Monthly Review of Coal Production and Distribution* (Coal Controller) supplemented by information collected from the Office of the Coal Controller on despatches of coal by road for brick burning. On the basis of unpublished information collected from various kiln owners, average quantity of coal needed for producing one lakh of bricks and tiles has been estimated. This proportion is

⁶⁸ Simple average of the EA's wholesale price indices of structural plates and sheets, bars and rods, rails and sleeper bars.

used to determine the total quantity of bricks and tiles produced in the organised sector. The output of bricks in the organised sector is evaluated at all-India average prices regularly collected and published by NBO along with the prices of timber etc. As in the case of iron and steel goods used in construction, the production of bricks and tiles in the unregistered manufacturing sector has been estimated by applying the proportion of the value of output of bricks and tiles to the total value of output in the major group 32 (NIC-1970) obtained from the results of ASI sample sector for 1973-74 to the total value of output of this group in unregistered manufacturing sector. Besides small scale industries, a large number of rural households produce bricks for own use. In the absence of any other data, their contribution has arbitrarily been assumed to form 50 p.c. of the value of bricks and tiles produced in the unregistered manufacturing sector. The total value thus obtained is marked up by 25 p.c. for trade and transport charges on the basis of information obtained from a large number of kiln owners and also sales tax data from the state authorities. Steps involved in the preparation of the estimates of bricks and tiles used in construction are described in Appendix 20.4.

20.17. Data on value of production of a large number of fixtures and fittings of permanent nature, such as fans and blowers, insulators, electric cables and wires, water meters, home service meters, sanitary fittings, etc. used in construction are collected from the reports of the ASI and from DGTD. For the years for which ASI data are not available, DGTD data are used. Trade and transport charge is estimated to be 35 p.c. It is added to the value of output to arrive at the value at site. Details of estimation are shown in Appendix 20.5.

20.18. The estimate of the value of building materials other than those considered above is based on the information contained in the NSS Report No. 187-Pilot Enquiry on Building Construction (Urban), 22nd Round, 1967-68 (N.S. S.O., 1970) and supported by the data available from the RBI Report on Survey of Building Activities for the years 1955-56 to 1957-58 (RBI Bulletin, April, 1960). The details of the procedure of estimation are given in Appendix 20.6 For subsequent years the proportion is adjusted for relative movement of prices of other construction materials⁶⁹ as compared with the prices of five basic materials otherwise covered.

20.19. The total value of construction covered by the commodity flow approach is obtained as a sum of the material inputs (including consumption of fixed capital) and factor income payments (i.e., compensation of employees, rent, interest, profits and dividends which, by definition, is equivalent to domestic product etc). Sufficient data do not exist to enable an independent estimation of the factor income payments. Therefore, using the information available in Central Public Works Department (CPWD) and NBO and other survey results the proportion of factor income payments, to total cost of material inputs is determined for the year 1970-71. The main sources used for the purpose are unpublished material from CPWD, *Indices of Building Materials Prices, Wages of Building Labour and Building Cost* (NBO, May, 1973), *RBI Report on the Survey of Building Activities*. (*RBI Bulletin*, April 1960) details available at the headquarter offices of Eastern, Southern and North Eastern Railway Zones and the results of the analysis of the balance sheets of construction companies in the corporate sector for the years 1971-72 to 1974-75 undertaken by the CSO. The total value of building materials used for construction (estimated above) is inflated by this proportion to obtain the corresponding total value of construction. To take account of the differential movement of prices of construction materials and labour income, the base year ratio of factor incomes to material inputs (60 p.c.) is adjusted for relative movements in the index of wages of construction workers and the composite index of prices of construction materials to obtain the corresponding rates in other years. The composite index of prices of construction materials is prepared using the price indices of the basic construction materials⁷⁰ viz. cement, iron and steels, bricks, timber and round wood and fixtures & fittings with the corresponding values of inputs in the base year (1970-71) as weights. The index of wages of construction workers is obtained as the weighted index of rural and urban areas with the corresponding values of construction in the two areas in the base year as weights. For the present exercise, carpenters, masons and unskilled labour are taken to comprise construction workers and the wage rates of such workers in the two areas are averaged to obtain the corresponding rural and urban wage rates/indices.

Rural residential houses

20.20. Estimates for rural residential housing have been prepared using the results of the AIDIS (RBI, 1977). The survey report gives

⁶⁹ Simple average of the price indices of (i) paints and varnishes, (ii) sheet glass, (iii) lime, (iv) tiles, (v) RCC home pipes, (vi) plywood, (vii) bolts and nuts, (viii) switch board panels, (ix) pipes and tubes, (x) refractory bricks, (xi) road dressing material, (xii) water fittings, (xiii) iron wire galvanised telegraphic, (xiv) electric lamps/fitting and (xv) electric lifts. The price indices of items (i) to (x) are available from EA's Revised Index Numbers of Wholesale Price and of remaining from DGS&D's Index Numbers of Purchase Prices.

⁷⁰ The price index of cement is based on the prices of cement available from the publication *Cement Production and Despatches* (Cement Controller of India). For bricks and timber the price indices have been prepared on the basis of NBO prices, for fixtures and fittings it is weighted average of the EA's wholesale price indices of (i) electric fans, (ii) insulators, (iii) cables and wires, (iv) sanitarywares, and (v) house service meters, the weights being the value used in construction in the base year (1970-71).

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estimates of value of capital stock of residential buildings as on 30th June, 1971 and capital formation in residential buildings for the year 1971-72. It has been assumed that for residential buildings, two-thirds of the expenditure on repairs and replacement represents replacement expenditure which has been treated as capital formation. The estimated consumption of fixed capital (which has been assumed to be 2 p.c. of the total value of capital stock each year) has been deducted from the estimated gross capital formation for 1971-72 to arrive at the estimate of net capital formation in that year. The annual estimate of net capital formation for subsequent years is obtained by adjusting the level for each previous year (beginning 1971-72) by combined index of net annual addition in the numbers of rural residential buildings (based on 1961 and 1971 population census data on rural occupied dwellings) and cost of construction of rural houses.

20.21. The estimates of annual expenditure on repairs and maintenance have been prepared using the proportion of repairs and maintenance to wealth available for 1971-72 from AIDIS to the annual series of wealth of rural residential buildings, i.e., their current capital value. The estimate of wealth in rural residential buildings for 1970-71 based on the data contained in AIDIS has been carried forward to later years by the perpetual inventory method using series of net capital formation arrived above and the index of cost of construction of rural houses.

Urban residential houses

20.22. The method of capitalisation of rental income has been adopted for estimating the value of urban residential house property for the year 1961-62. Data for various municipalities and municipal corporations on capital value and annual letting value of residential buildings have been collected from the 'Municipal Year Book' of Maharashtra State for the year 1964-65. The ratio between the annual letting value and capital value was obtained as 5.4 p.c. from 55 municipalities for which comparable data were available. It is assumed that this rate holds good for all municipal and urban areas in the country except for the corporations of the four big cities of Calcutta, Bombay, Delhi-New Delhi and Madras. For the four cities this ratio has been taken to be 7.5 p.c. of capital value. These two ratios then have been combined in the proportion of population in urban areas (other than four cities) and in the four big cities according to the 1961 population census to obtain an overall estimate. This works out at 5.7 p.c. This ratio is applied to gross rental⁷¹ for the year 1961-62 to obtain the gross value of urban dwellings. Consumption of fixed capital at the rate of 1.67 p.c. is deducted to obtain the net value of urban dwellings in 1961-62.

20.23. The estimated value of urban dwellings in 1961-62 has been moved to 1970-71

with the help of the annual growth rate in the number of urban dwellings, worked out on the basis of data collected from municipalities each year duly superimposed by the index of cost of construction of urban houses to estimate the value of urban dwellings in 1970-71. For the subsequent years, the value of urban dwellings has first been prepared at 1970-71 prices to work out net capital formation at 1970-71 prices. The estimates of consumption of fixed capital and 'repairs and maintenance' in respect of urban dwellings have been prepared assuming respectively the rates of 1.67 p.c. and 0.5 p.c. of the opening value of wealth of urban dwellings in each year. The estimates of net capital formation, repairs and maintenance and consumption of fixed capital in respect of urban dwellings at 1970-71 prices have then been converted to current prices with the help of the index of cost of construction of urban houses.

Other construction works including non-residential buildings

20.24. The estimates of the value of residual component of household construction consisting of rural and urban non-residential buildings and other construction works, have been prepared separately for the accounted (commodity flow) and unaccounted (labour intensive) parts. The accounted part of such construction is obtained by deducting from the total estimate of construction under commodity flow approach. Such construction activities are undertaken by government administration, public sector undertakings, private joint stock companies, cooperative societies and rural and urban residential buildings.

20.25. Estimates of value of construction in government administration and public sector undertakings are based on information provided in the budgets of the central and State governments, local authorities, port trusts and annual accounts of non-departmental enterprises. Repair construction for government administration and departmental enterprises is estimated on the basis of data on repairs and petty works contained in the budget documents of the central and State governments and local bodies. In case of non-departmental commercial undertakings use is made of the information contained in the annual accounts of these companies.

20.26. Estimates of fixed capital formation in private joint stock companies engaged in manufacturing and electricity industries are based on data published annually in ASI and in the *Public Electricity Supply-All India Statistics* (CEA) respectively. For the rest of the joint stock companies, the estimates are based on the results of the studies of the finances of sampled joint stock companies published annually by RBI. The sample results are blown up for the population estimates using the ratio of the total paid up capital of all companies⁷² to the sampled

⁷¹ Estimated independently for purposes of measuring rental income of residential buildings (c.f. Chapter XII).

⁷² Excluding manufacturing and electricity, gas and water supply.

companies (Appendix 19.1). The estimates of gross fixed capital formation are based on the annual changes in the value of the stock of assets. These estimates of fixed capital formation have been allocated between 'construction' and 'machinery' in proportion to the estimates for the two categories as obtained from the results of the sampled joint stock companies. 'Capital works in progress' and 'expenditure during construction' have been allocated between 'construction' and 'machinery' in proportion to gross expenditure under these categories. Construction by the private banking companies, are estimated on the basis of annual data given in the *Statistical Tables Relating to Banks in India (RBI)*. Similarly, annual data published in the *Statistical Statements Relating to Cooperative Movement in India (RBI)* are used to prepare estimates for the cooperative societies and those published in the 'Insurance Year Book' for insurance companies. Repair expenditure in each case is determined on the basis of details available in annual reports.

20.27. For the bench mark year 1970-71, the estimates of rural non-residential buildings and rural and urban other construction works have also been prepared independently. The estimates of rural household non-residential building construction (new and repairs and maintenance) have been prepared using the results of AIDIS. The survey report gives estimates of gross capital formation in and repairs and maintenance of rural non-residential buildings during 1971-72. As in the case of residential buildings, two-thirds of the expenditure on repairs and replacements has been treated as capital expenditure. In the absence of any other relevant indicator, the AIDIS estimates of capital formation and repairs and maintenance in rural non-residential buildings have been moved to 1970-71 using a combined indicator of gross value added in agriculture and allied activities, unregistered manufacturing, unorganised transport and other services at 1970-71 prices, assuming that such construction activity is influenced by the overall performance of unorganised sectors of the economy. This is then brought to current prices with the help of the index of cost of construction of rural houses.

20.28. Rural and urban other construction works include reclamation of land, bunding and other land improvement, digging of wells, development of other irrigation works, afforestation, re-afforestation and laying of new orchards and plantations. Except for pucca wells, construction activity under all these categories is of labour intensive type.

20.29. The estimates of 'Other construction works' for 1971-72 in the rural household sector have been worked out separately for each item using the results given by AIDIS, treating two-thirds of the expenditure on repairs and replacement as capital expenditure. The estimates of 'other construction works' in the urban house-

hold sector have been obtained for 1971-72 using the proportion of such estimates to the estimates of the rural sector in 1961-62 worked out on the basis of information contained in NSS Report No. 136, Tables with Notes on Capital Formation (Urban), 17th Round: 1961-62 (NSSO, 1969) and the results of the *All India Rural Debt and Investment Survey (AIRDIS) 1961-62 (RBI, 1965)*. The estimates of new construction and repairs and maintenance in respect of rural and urban 'other construction works' for 1971-72, thus obtained, have been moved backward to 1970-71 using the same indicator as is used for rural non-residential buildings. The component of this construction covered in the commodity-flow approach (pucca wells) is brought at current prices with the help of the index of cost of construction of pucca wells and the rest with the help of the index of daily wages of rural unskilled labour.

20.30. The component of other construction works covered under the commodity flow approach, i.e., construction of pucca wells is obtained by splitting the total estimate on construction of wells into pucca and kutchra on the basis of information on masonry and non-masonry wells available in the *Season and Crop Reports* of various State Governments. The relative value of these two types of wells have been determined on the basis of the estimate of cost of wells given in the *Report of the Working Group for Formulation of Proposals for Minor Irrigation Works for the Fourth Plan (Ministry of Agriculture)*. The analysis of these data suggest that two seventeenth of the total value of construction of wells relate to the labour intensive type. This proportion has, therefore, been used to obtain the value of other construction works covered by the commodity flow approach. Having obtained the estimates of rural and urban other construction works for the accounted part (which covers construction of pucca wells only), the value of construction works under urban non-residential buildings (new and repairs and maintenance) is obtained as a residual from the total value covered in the commodity flow approach deducting the corresponding estimates under other categories. This estimate for 1970-71 has been apportioned into construction and repairs and maintenance using the same proportion as in the case of urban residential buildings.

Labour intensive construction

20.31. The estimates of the value of labour intensive construction works are obtained from the above by categories using the proportions available from independent sources. The proportion and the sources used to obtain the corresponding estimates for the bench mark year (1970-71) are detailed below.

- (i) *Rural residential buildings*.—The proportion of unaccounted construction is determined on the basis of information on construction of buildings in rural areas

available from the NSS Report No. 97 *Tables with Notes on Capital Formation (Rural)—15th Round : 1959-60* (NSSO, 1965) according to these results only 72 p. c. of the value of such construction is covered by the commodity flow approach. Twentyeight p.c. of the total expenditure on rural residential houses has, therefore, been taken to be the measure of the expenditure on capital formation and repairs and maintenance in rural residential buildings of labour intensive type, i.e. unaccounted for in the commodity flow approach. In the absence of current data on proportions of labour intensive construction, the ratio is assumed to be unchanged over years.

- (ii) *Urban residential building.*—Information available in the NSS Report No. 136 on *Tables with Notes on Capital Formation (urban), 17th Round : 1961-62* (NSSO, 1969) show that 20 p. c. of total value of construction is of labour intensive type. This proportion has, therefore, been applied on the annual estimates of total value of construction and repairs and maintenance under this category to obtain the measure of the labour intensive type of construction under this category.
- (iii) *Rural non-residential building.*—As in the case of residential buildings using the data in NSS Report No. 97 on *Tables with Notes on Capital Formation, 15th Round : 1959-60* (NSSO, 1965) 28 p.c. of the total value of rural non-residential building construction and repairs and maintenance have been treated as unaccounted for in the commodity flow approach and, therefore, of the labour intensive type.
- (iv) *Urban non-residential construction.*—On the basis of the details available in the NSS Report No. 136, *Tables with Notes on Capital Formation (urban), 17th Round : 1961-62* (NSSO, 1969) the value of urban household non-residential construction and repairs and maintenance not covered under the commodity flow approach is taken to be 25 p.c. of the accounted part.
- (v) *Rural and urban other construction works.*—The estimated total value of such construction *excluding* pucca wells is treated as labour intensive. The independent estimate of construction of pucca wells is, therefore, deducted from the total to obtain the estimate of labour intensive construction under this category.

20.32. The above estimates, however, are exclusive of afforestation and re-forestation in the public sector, the estimates of which are worked out independently from the data available

in the budgets of the Central and State Governments. Estimates of construction in plantation outside the household sector are prepared at 1970-71 prices on the basis of data available on area of extensions, replacement and replanting in the *annual reports* of the Tea, Coffee and Rubber Boards as well as on data available on the costs of plantation in the *Reports of the Plantation Enquiry Commission* 1956 on tea, coffee and rubber. The estimates are converted to current prices with the help of the index of daily wages of rural unskilled labour.

20.33. The above exercise enables preparation of separate estimates of the value of construction of both types i.e., accounted and unaccounted separately for the categories of residential buildings, non-residential buildings and other construction works. In the case of the first two categories, these are available also by rural and urban areas. Further, the exercise gives separate estimates of repairs and maintenance and new construction. For the bench mark year, i.e., 1970-71, the total value of construction works measured under 'commodity flow approach' and labour intensive type have then been obtained by aggregating the estimates under each of these categories. The total capital formation in labour intensive construction (excluding rural and urban residential buildings) for the year 1970-71 thus obtained has been moved to other years using a combined indicator of gross value added in the unorganised sectors of the economy (excluding trade) at constant prices. In other words, a combined indicator of gross value added in agriculture⁷³ and allied activities, unregistered manufacturing, unorganised transport and unorganised services is used on the assumption that labour intensive construction in the economy moves in line with the overall trend in activities in the unorganised sectors of the economy. To obtain the corresponding estimates at current prices a specially prepared index of wages of rural and urban construction workers and rural unskilled labour is used. The same method is followed for carrying forward the total expenditure on repairs and maintenance in the bench mark year (1970-71) except that the price indicator used for obtaining the current price estimate is different (i.e., cost of general pucca construction excluding residential buildings) in case of expenditure on repairs and maintenance covered under the commodity flow approach.

20.34. Annual estimate of gross domestic capital formation in construction is worked out by deducting from the total value of construction thus obtained the estimates for repair construction and construction for defence. The estimates for defence construction have been worked out on the basis of data on works contained in the *Demand for Grants for Defence*.

⁷³ The gross value added in agriculture includes repairs and maintenance of construction works in farm business.

Machinery & Equipment

20.35. Estimates of gross fixed (domestic) capital formation (at current prices) in machinery and equipment are prepared by the commodity flow method. 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 availability of the items classified under (i) are taken for capital formation. In the case of parts of capital goods, on the basis of ASI data and details from users, 50 p. c. of the value is taken as capital formation and the rest treated as intermediate consumption. The proportions of partly capital goods⁷⁴ attributable to capital goods are given in Appendix 20.7. Similarly, half of the proportions applicable to partly capital goods are applied to part of partly capital goods⁴⁸ for estimating fixed capital formation.

20.36. The detailed ASI census reports, giving itemwise data on industrial production are used for estimation. However, these reports giving detailed data are available upto 1969-70 and for 1973-74 only. For the later years for which provisional results of ASI are available, the estimates are worked out on the basis of the proportion of capital goods, etc., in the production estimates at three digit level of NIC-70 (classification in the provisional results) as 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 index of industrial production of the relevant groups and the corresponding index of wholesale prices.

20.37. The sample sector reports normally give information only for three digit industry groups (NIC-1970) and do not give item-wise data of products and by-products to enable their classification into different categories of capital goods. However, the ASI sample sector detailed results giving itemwise data on production have become available for the first time through special tabulation for 1973-74. The estimates of production of capital goods in the ASI sample sector for other years have, therefore, been obtained by applying the 1973-74 proportions for the corresponding industry groups to the value of output of products and by-products at three digit level of industrial classification (NIC-1970). For the years for which only combined production data for ASI census and sample sectors are available, the weighted average of the proportions for the census and sample sectors obtained for 1973-74 are used. The contribution of unregistered manufacturing to gross capital formation in machinery and equipment is obtained by applying the proportions of the ASI sample sector, 1973-74 to the value of output

in unregistered manufacturing at two digit level of industrial classification (NIC-1970).

20.38. From the estimates of the aggregate production of machinery and equipment in the case of ASI census and sample sectors, the estimates of change in stocks and exports of such goods are deducted and imports added to obtain the net availability.

20.39. To the ex-factory value of capital goods produced domestically, the amounts 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 for capital formation exports. The value of purchases made by public sector as available from the *Directory of Government Purchases* (DGS &D) and the residual are 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 separately for public and private sectors for each year 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.

20.40. For estimating the value of additions to livestock taken to form a 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 and 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 quinquennial livestock censuses. 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 SSBs.

Domestic Fixed Capital Formation by Type of Assets

20.41. The estimates of gross domestic capital formation in construction and machinery and equipment are aggregated to arrive at the estimates of gross domestic fixed capital formation by types of assets. Using the estimates for public sector built up separately, the private sector estimates are obtained as residual.

Fixed Capital Formation by Industry of Use

20.42. An independent set of estimates of fixed capital formation for each of the industrial categories are prepared primarily following the expenditure approach. The industrywise details follow.

⁷⁴. These proportions are not based on satisfactory data and further studies are required to determine the ratios on a more rational basis.

Agriculture and Allied Activities

20.43. The estimates are prepared separately for public, household and private corporate sectors. Data on improvement of land and irrigation works and flood control project, laying of new orchards and plantations and purchase of agricultural implements and machinery in the public sector are culled out from the budget documents and annual reports. The estimates of gross fixed capital formation in household sector excluding livestock have been prepared for 1971-72 on the basis of data on expenditure in farm-business available from AIDIS, 1971-72, supplemented by information available in NSS Report No. 136, *Tables with Notes on Capital Formation (Urban)*, 17th Round: 1961-62 (NSSO, 1969). The estimates in respect of construction works have been moved to other years with the help of the indicator used for this type of works in measuring the total value of construction. The corresponding estimates at current prices have been obtained by superimposing the price changes by utilising the index of rural buildings in the case of farm buildings and the index of cost of construction of 'other construction works' for the rest. The estimates of gross capital formation in the household sector in agricultural machinery and equipment are prepared separately for (i) those produced in the registered manufacturing sector or imported, and (ii) those produced in the unregistered manufacturing sector. The annual estimates of agricultural machinery and equipment not produced in unregistered manufacturing units are prepared on the basis of current data on production (available from ASI), imports, exports/re-exports, excise and import duties and trade and transport margins duly adjusted for purchases by public and private corporate sectors. For the production outside the registered units, the estimate for the benchmark year (1971-72) has been moved with an indicator of the value of output of agricultural machinery and equipment in the registered manufacturing sector. For the bench mark year, the estimate have been obtained by deducting from the total capital formation in agricultural machinery and equipment for 1971-72 (prepared on the basis of data available from AIDIS 1971-72 and NSS Report No. 136, *Tables with Notes on Capital Formation (urban)* 17th Round: 1961-62 (NSSO, 1969) the expenditure on such new capital already covered. The estimates of construction in tea, coffee and rubber plantations and purchase of agricultural machinery and implements in the private corporate sector and increment in livestock treated as fixed capital are then obtained independently. The estimates thus obtained are the estimates of gross fixed capital formation in the private sector. The total of gross fixed capital formation in the public and private sectors then give the total gross fixed capital formation in agriculture.

Forestry and Logging

20.44. Estimates of capital formation in the public sector are worked out from the analysis of budget documents. Data on area under forests by ownership is available for (a) State government; (b) corporate bodies, and (c) private individuals in the *Indian Forest Statistics*. The share of public sector in the area under forest works out at 95 p. c. for 1960-61. This percentage is assumed to hold good for other years. The estimates of the public sector have been marked up by 5 p. c. to account for the private sector.

Fishing

20.45. The estimates of capital stock for the years 1971-72 and 1976-77 at 1970-71 prices have been prepared using the data on fishing boats, etc. available from Indian Livestock Censuses, 1972 and 1977, 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 of net fixed capital formation at 1970-71 prices as annual additions. Adding the estimates of consumption of fixed capital for fishing industry to net capital formation, the estimates of gross fixed capital formation at 1970-71 prices have been obtained. The estimates of gross fixed capital formation at current prices have been arrived at by super-imposing the average index of wholesale prices of (i) timber, (ii) diesel engine, and (iii) nylon/terene and mixed cotton, on the estimates at constant prices. Data on timber prices are available from the NBO publication, *Prices of Building Materials and Wage Rates for Building Labour* (mimeographed) and the indices of wholesale prices in respect of diesel engines and nylon/terene and mixed cotton are available from the *EA's Index of Wholesale Prices*.

Mining & Quarrying

20.46. Estimates of the value of fixed assets at the end of each year for the sampled private joint stock companies are available from the 'Finances of Public & Private Limited Companies' published in various issues of *RBI Bulletin*. These estimates have been inflated by the ratio of paid up capital of all private mining companies to paid up capital of sampled companies to obtain the estimates of fixed capital formation in private joint stock companies. To the estimates thus obtained, capital formation in the public sector non-departmental undertakings is added to cover the entire sector.

Registered Manufacturing

20.47. The estimates are obtained from the annual data available from ASI. However, ASI does not include defence establishments (e.g. ordnance and clothing factories). Information relating to the departmental undertakings are received from the Ministry of Defence. For

non-departmental undertakings, the estimates of capital formation are obtained from the analysis of accounts of these establishments. ASI data are also adjusted for non-response on the basis of industry-wise data on employment. For some years, ASI data do not give break up of assets in terms of land, buildings, plant and machinery and other fixed assets. The value of land included in the figures are estimated using the ratio of land to net fixed assets for the years for which details are available and deducted from the total.

Unregistered Manufacturing

20.48. The estimates of fixed capital formation in 1970-71 have been prepared separately for construction and machinery and equipment using data contained in the NSS Report No. 205—*Some Results on Small Scale Manufacturing in Rural and 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 1970-71 estimates of capital formation in machinery and equipment have been moved to later years with the help of the indices of production and prices for machinery except electrical machinery. The benchmark estimates of 1970-71 in respect of capital formation in construction have been carried forward with the help of gross value added in unregistered manufacturing.

Construction

20.49. The estimates of fixed capital formation in the private sector have been prepared on the basis of RBI studies on finances of joint stock companies engaged in construction and the total paid-up capital of all construction companies. The estimates of fixed capital formation in non-departmental public sector undertakings classified under construction industry are added to the estimates obtained for private companies to arrive at the estimates for total industry.

Electricity, Gas and Water Supply

20.50. Estimates for the private sector for electricity are obtained from the analysis of accounts published annually in the *Public Electricity Supply—All India Statistics (General Review)*, (CEA). The estimates for the public sector are based on data available in the budget documents and annual reports of electricity boards. Estimates of fixed capital formation in production of gas in the private sector are based on the analysis of annual accounts of private gas companies. In the case of water supply, the estimates of expenditure on new capital in the public sector have been adopted for the total industry.

Transport, Storage and Communication

20.51. Estimates for railways and communication have been obtained from the data contained in budget documents. Estimates for rail-

ways refer to transport services only and exclude capital employed in railway workshops and manufacturing units and construction activity undertaken by the railways. The latter are included in the respective groups of activities.

20.52. Estimates for air transport are compiled from the balance sheets of Air India and Indian Airlines Corporation. For capital employed in aerodromes etc. (civil-aviation) data are obtained from budget documents. Estimates in the case of shipping companies are based on an analysis of balance sheets of major shipping companies and Shipping Corporation of India. Estimates in respect of port trusts are based on an analysis of their budgets. For mechanised road transport, the value of transport equipments in the bench-mark year is prepared on the basis of the number of registered public vehicles and prices per unit of different type of vehicles. This estimate is moved to other years using data on production of transport equipment available from ASI and annual net additions worked out therefrom. Fixed capital formation in items other than vehicles has been estimated from the results of the analysis of annual accounts of transport companies/corporations in the public sector. Estimates of fixed assets in non-mechanised road transport and unorganised water transport are obtained by projecting the estimates of capital stock in 1970-71 (based on data contained in NSS 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 constant prices in non-mechanised road and unorganised water transport. The net additions are obtained as annual changes in the estimates of capital stock. These estimates have then been adjusted for price changes. The capital formation in storage is based on the information available from the *Annual Reports of Central and State Warehousing Corporations* and ASI.

Trade, Hotels and Restaurants

20.53. For capital formation estimation, the trade sector is divided into (i) private corporate, (ii) cooperative societies, (iii) public enterprises and (iv) household. For the private corporate sector, estimates are built up on the basis of RBI's analysis of joint stock companies and the total paid up capital of trading companies available from the *Quarterly Blue Book on Joint Stock Companies in India* (Department of Company Affairs). In the case of cooperative societies data are culled from the annual publication, *Statistical Statements Relating to Cooperative Movement in India* (RBI). Capital formation in public enterprises which mainly refer to statutory corporations is based on an analysis of balance sheets of these Corporations. The household sector estimates are based on the results available in the NSS Report No. 197, *Tables with Notes on Household Distributive*

Trade, 20th Round : 1965-66 (NSSO, 1973). The estimates of fixed assets per worker in household enterprises and the total working force in the sub-sector are used to estimate the total fixed capital in the year 1965-66. Gross value added from trade is used as indicator for moving forward the benchmark estimates of the year. The estimates are adjusted for price changes to obtain the measures at current prices. For hotels and restaurants, the data available in RBI analysis of balance sheets of public limited companies are used.

Banking & Insurance

20.54. Estimates in respect of commercial banks and cooperative societies etc., are compiled from the *Statistical Tables Relating to Banks in India and Statistical Statements Relating to the Cooperative Movement in India* (RBI). Estimates for RBI are culled out from the *Annual Report of the RBI*. Estimates of financial corporations and insurance are compiled from their accounts and the *Insurance Year Book*.

Real Estate, Ownership of Dwellings & Business Services

20.55. Estimates of capital formation in real estate are compiled using the estimates of wealth as on March 1971 (obtained from RBI studies on company finances) moved by gross domestic product in real estate at 1970-71 prices and adjusted for price changes. The net additions each year gives corresponding estimates of capital formation. Estimates of capital formation in the form of residential property are identical with the estimates for residential construction under capital formation by types of assets.

Public Administration and Defence

20.56. The estimates cover capital formation in roads and bridges, vehicles and public buildings and are based on the analysis of budgets. An adjustment has been made for additions to plants and machinery used in Public Works Departments on the basis of data on expenditure on plant and machinery in these departments.

Other Services

20.57. Estimates of capital formation in other services group are prepared for (a) medical and health services in the public sector, (b) education, (c) private medical and health services and (d) other services provided by households and non-households. Estimates of fixed capital formation in education for 1970-71 have been prepared on the basis of data contained in the *Education in India, 1970-71* (Ministry of Education and Social Welfare). As the more recent issues of the *Education in India* do not provide data on expenditure on fixed assets, the 1970-71 estimate has been moved to later years with the help of an indicator of indirect expenditure. The data on

indirect expenditure are available annually from *Education in India*. For more recent years for which data on indirect expenditure are also not available, the estimates for the latest year are carried forward with the help of an indicator of gross fixed capital formation in education in public sector. Capital formation in publicly owned services excluding education are prepared on the basis of details on capital formation available from the *Economic and Purpose Classification of expenditure of Central Government*, presented in the NAS (CSO). The expenditure on fixed assets in private medical and health services has been estimated on the basis of its share in the total value added in this sub-sector. Estimates of the household sector are based on data contained in the NSS Report No. 130, *Tables with Notes on Professions and Liberal Arts, 18th Round : 1963-64* (NSSO, 1968) and the estimates of working force for different years.

Increase in stocks at current prices.

20.58. The estimates of change in stocks are prepared separately for all the economic activities. For the industries, which fall exclusively in the public sector and for public sector component in the case of other industries, the estimates are built up using the data contained in budget documents and annual accounts of public sector companies. The methodology for the estimates of change in stocks is as follows :

Agriculture.

20.59. The estimates of stocks in agriculture sector have been prepared separately for (i) public sector, (ii) private sector excluding plantations and livestock, (iii) plantations and (iv) livestock. While the estimates of stocks in the public sector are based on the data available from budget documents and annual reports, the estimates for private sector agriculture (excluding plantations and livestock) have been prepared on the basis of data on bank advances according to occupation and organisation available annually from *Banking Statistics—Basic Statistical Returns* (RBI). In cases where bank margins are not prescribed, it is assumed that the banks keep a margin of 25 p.c. between the value of the commodity and the money advanced. The estimates of stocks in respect of tea, coffee and rubber plantations in the private sector are prepared on the basis of data collected from the respective Boards. From the total value of stocks, thus prepared annual changes have been worked out. The estimation procedure for that part of the change in livestock, which is not treated as fixed assets, is the same as that followed for fixed capital formation.

Forestry and Logging

20.60. 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

20.61. 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. Estimates in respect of other major minerals are based on the information given in the *Mineral Stocks* (IBM). The stock of each mineral is evaluated separately at the average pit-head price during the year implicit in the data on production and value of major minerals published regularly by IBM in the *Mineral Statistics of India* (IBM). The value of mineral stocks for each year, thus obtained, is inflated to account for the stocks of raw materials, stores, etc., on the basis of information available from the analysis of annual accounts of public sector mining undertakings and the RBI analysis of the finances of private mining companies published annually.

Manufacturing

20.62. Estimates of change in stocks for the manufacturing sector are prepared for registered and unregistered manufacturing separately.

20.63. The ASI Reports are used in the case of registered manufacturing. For the years for which ASI results are not available, the estimates of stocks for the latest available year are moved to other years with the help of indices of industrial production (manufacturing group) and wholesale prices. The ASI does not cover defence establishments. Data on changes in inventories for the defence establishments which produce goods for civilian use are collected independently and combined with the ASI results.

20.64. Estimates of change in stocks in unregistered manufacturing are based on the proportion of value added to inventories. The benchmark estimates of inventories for the year 1968-69 have been prepared on the basis of the data available in the NSS Report No. 205, *Some Results on Small Scale Manufacture in Rural and Urban Areas*, 23rd Round : 1968-69 (NSSO, 1975) and the NSS Report No. 236, *Tables with Notes on Non-household Small Scale Manufacture*, 23rd Round : 1968-69, (NSSO, 1977) in respect of small scale manufacture in household/non-household sectors. Use has been made of the annual changes in net value added to arrive at the estimates upto 1973-74. For 1974-75, the proportion of value added to inventories has, however, been revised utilising the data available from the NSS Report No. 280/6, *Table 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 Unorganised 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 gross value added has been used to prepare the estimates from 1974-75 onwards.

Construction

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

Electricity, Gas and Water Supply

20.66. For estimating changes in stocks in electricity undertakings, data for the 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 data available annually in the *Public Electricity Supply—All India Statistics* (Central Electricity Authority, Ministry of Irrigation and Power). The estimates in respect of gas industry are based on the analysis of private gas companies. The estimates for water supply relate only to public sector and are based on data available in budget documents.

Transport, Storage & Communication

20.67. The estimates of change in stocks for railways and communication are obtained from an analysis of their respective accounts. 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 gross value added 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 the public sector have been taken. These are obtained from their accounts.

Trade, Hotels & Restaurants

20.68. 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 the 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 unregistered establishments. The estimates for registered establishments have been prepared separately for (i) joint stock companies; (ii) cooperative 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 annually by RBI and those in respect of cooperative societies and household enterprises are prepared on the basis of data available from the *Statistical Statements Relating to Cooperative Movement in India* (RBI) and data on bank advances to household trading establishments available in the *Banking Statistics* (RBI).

20.69. In case of non-registered 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 the

NSS Report No. 221, *Tables with Notes on Some Features of Household Non-Registered Trade, 24th Round: 1969-70* (NSSO, 1975). Estimates are moved to other years on the basis of advances of the banks to partnership firms and others.

20.70. Estimates of stocks of foodgrains with private traders have been prepared on the basis of information on marketable surplus. From the total marketable surplus of foodgrains, the quantity procured by the government is deducted to arrive at the quantity disposed off to private dealers. It has been assumed that private dealers keep 25 p.c. of their purchases as stocks and on this basis estimate of total stock of foodgrains held by private dealers has been worked out for each year and change in stocks worked out. The change in quantity of stocks has been evaluated at the average price of foodgrains.

20.71. The estimates of change in stocks in hotels and restaurants in the private sector have been prepared using the results of RBI analysis of joint stock companies. The inventories of the sample companies have been blown up using the ratio of total gross value added to the gross value added of the sample companies of RBI to arrive at the estimates of stocks for each year. The estimates for the public sector have been obtained from the analysis of the accounts of the non-departmental commercial undertakings.

Real Estate

20.72. The methodology for estimating change in stocks for real estate is the same as that for hotels and restaurants.

Public Administration & Defence

20.73. Estimates of change in stocks for public administration and defence are obtained from the economic analysis of the budgets.

Other Services

20.74. In the absence of any reliable data, change in stocks in this sector is assumed to be negligible.

Total Domestic Capital Formation at Current Prices

20.75. The estimates of total capital formation for each of the industry groups are obtained by aggregating the figures of fixed capital formation and change in stocks for each industry group. 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.

20.76. 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 as-

sets is adjusted for the difference and this difference is treated as 'errors and omissions'. For measuring of 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 of capital formation by industry of use is adjusted for any difference that might still exist. While tallying the totals, the annual estimates of capital formation for the organised sectors for which direct data are available are not adjusted. The aggregate difference between the two estimates of capital formation is, therefore, distributed among the unorganised sectors only on pro rata basis, i.e., in the same proportion as the corresponding independent estimates. The annual levels of these differences are not of high order and are published regularly in the Section on 'Note on Methodology' appended to NAS.

Estimates at constant prices

20.77. 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 buildings, (iii) urban 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 different inputs for different kinds of construction works and the items covered are given in Appendix 20.8. 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 1970-71 prices.

20.78. 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 (1970-71) prices. Net import of

machinery and transport equipment is deflated by the index of unit value of imports for respective groups.

20.79. For preparing constant price estimates of gross fixed capital formation 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 index number of prices. These include construction cost indices of "pucca/kutchra" construction. Economic Adviser's index of wholesale prices of machinery, transport equipments and prices of livestock by categories. In cases 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.

20.80. Estimates of increase in stocks in foodgrains at 1970-71 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.

20.81. A measure of errors and omissions at 1970-71 prices is obtained by deflating the current price estimates by implicit price index obtained from total capital formation at current and 1970-71 prices. In the case of estimates of capital formation by industry of use, the annual aggregate difference between two sets of estimates is distributed in a manner similar to that followed for estimates at current prices.

Reliability, Objectivity and Current Status of Data

20.82. The methodology described above suffers from a number of limitations due to the paucity of data. The proportions of trade and transport charges in respect of construction material inputs are based on limited information. Blowing-up factors used for arriving at the estimates for the corporate sector are not satisfactory.

20.83. The estimates of capital formation in machinery and transport equipment are, to a large extent, dependent on the figures of domes-

tic production and imports of machinery and equipment. Broadly, statistics of domestic production as given in ASI census and sample sectors reports and MSPSI 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 types of assets suffer from another serious limitation. The proportions used for estimating the production of capital goods out of partly capital goods and parts of capital goods are mostly based on subjective judgements.

20.84. Estimates of gross fixed capital formation 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 p.c.) 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 bench mark 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.

20.85. The estimates of change in stocks in private agriculture industry (excluding plantations and livestock) and 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.

APPENDIX 20.1 : ESTIMATES OF VALUE OF CEMENT USED IN CONSTRUCTION (at current prices)

sl. no.	item	unit	1970-71
1.	total available supply of cement	thousand tonnes	13,558
	1.1 under rate contract	"	4,417
	1.2 other than rate contract	"	811
	1.3 free sale	"	8,330
2.	cement used as input in other industries.	"	1,097
	2.1 other than rate contract	"	97
	2.2 free sale	"	1,000
3.	imports of cement	"	..
4.	cement available for construction.	"	12,461
	4.1 under rate contract	"	4,417
	4.2 other than rate contract	"	714
	4.3 free sale	"	7,330

APPENDIX 20.1 : Contd.

sl. no.	item	unit	1970-71
5.	price of cement	Rs. per tonne	
	5.1 under rate contract	"	188.38
	5.2 other than rate contract	"	211.38
	5.3 free sale	"	223.68
6.	value of cement used in construction.	Rs. lakhs	26,226
	6.1 under rate contract	"	8,321
	6.2 other than rate contract	"	1,509
	6.3 free sale	"	16,396
7.	transport margin (2% of item 6)	"	525
8.	total value of cement used in construction.	"	26,751

.. Negligible.

APPENDIX 20.2 : ESTIMATES OF THE VALUE OF IRON AND STEEL USED IN CONSTRUCTION
(at current prices)

sl. no.	item	(Rs. lakhs)
1.	value of iron and steel in construction	35,175
	(i) census sector	31,617
	(ii) sample sector	3,558
2.	value of net imports of iron and steel goods meant for construction works.	(-), 1,508
3.	import duties	269
4.	value of iron and steel available for construction from small enterprises.	8,815
5.	total value of iron and steel used in construction excluding trade & transport charges (1 to 4).	42,751
6.	trade and transport charges (15% of item 5)	6,413
7.	total value of iron & steel used for construction (item 5 + 6).	49,164

APPENDIX 20.3 : ESTIMATES OF TIMBER AND ROUND WOOD USED IN CONSTRUCTION
(at current prices)

sl. no.	item	1970-71
1.	production of industrial Wood ('000 cu.m.)	9,655
	(i) pulp and match wood (0.19% of item 1) ('000 cu.m.)	18
	(ii) timber (91.86% of item 1) ('000 cu.m.)	8,869
	(iii) roundwood (7.95% of item 1) ('000 cu.m.)	768
2.	timber used in railway sleepers ('000 cu. m.)	191
3.	timber available for uses other than railway sleepers (1 (ii)-2) ('000 cu. m.)	8,678
4.	timber used in construction (48.5% of item 3) ('000 cu. m.)	4,209
5.	price of timber used in construction (Rs. per cu. m.).	795.9
6.	value of timber (items 4 x 5) (Rs. lakhs)	33,499
7.	trade & transport charges (7% of item 6) (Rs. lakhs).	2,345

sl. no.	item	1970-71
8.	total value of timber used in construction (6+7) (Rs. lakhs).	35,844
9.	value of railway sleepers (Rs. lakhs)	759
10.	trade, transport & other charges (5% of item 9) (Rs. lakhs).	38
11.	total value of railway sleepers (9+10) (Rs. lakhs).	797
12.	roundwood used in construction (38.3% of item 1 (iii)) ('000 cu. m.)	294
13.	price of roundwood used in construction (Rs. per cu. m.)	228.1
14.	value of roundwood used in construction (12 x 13) (Rs. lakhs)	671
15.	trade & transport charges (50% of item 14) (Rs. lakhs)	336
16.	total value of roundwood used in construction (14+15) (Rs. lakhs)	1,007
17.	total value of timber used including railway sleepers and roundwood used in construction (8+11+15) (Rs. lakhs)	37,648

APPENDIX 20.4 : ESTIMATES OF BRICKS AND TILES USED IN CONSTRUCTION
(at current prices)

sl. no.	item	1970-71
1.	allocation of coal for brick burning ('000 tonnes).	3,610
2.	total bricks and tiles produced (crores)*	2,256
3.	price of building bricks (Rs. per lakh)	6,671
4.	value of building bricks and tiles produced in the organised sector (2 x 3) (Rs. lakhs)	15,050
5.	value of building bricks and tiles produced in the unorganised sector (Rs. lakhs)	6,500
	(i) small-scale enterprises	4,333
	(ii) others (50% of 5 (i))	2,167
6.	total value of bricks & tiles excluding trade and transport charges (4+5) (Rs. lakhs)	21,550
7.	trade and transport charges (25% of item 6) (Rs. lakhs).	5,388
8.	total value of bricks & tiles (items 6+7) (Rs. lakhs).	26,938

*16 tonnes of coal need to be burnt for preparing 1 lakh of bricks and tiles.

APPENDIX 20.5 : ESTIMATES OF THE VALUE OF FIXTURES & FITTINGS IN CONSTRUCTION
(at current prices)

sl. no.	item	(Rs. lakhs)
1.	fans and blowers	2,499
2.	insulators (H. T. and L. T.)	679
3.	electric cables and wires	12,369
4.	water meters	112
5.	house service meters	1,280
6.	sanitary equipment	319
7.	total	17,258
8.	trade and transport charges (35% of item 7)	6,040
9.	value at site (7+8)	23,298

APPENDIX 20.6 : ESTIMATES OF AVERAGE COST FROM
PILOT ENQUIRY ON BUILDING CONSTRUCTION

Sl. No.	item	(Rs.) Average cost
1.	per house cost of total building materials on constructions, additions and improvements of buildings	14,454
2.	cost of basic construction materials	9,524
	2.1 cement	2,019
	2.2 bricks and tiles	1,922
	2.3 iron and steel	862
	2.4 timber and roundwood (including doors, windows)	2,136
	2.5 fixtures and fittings	2,585
3.	item 2 as percentage of item 1	65.9

Source : NSS Report No. 187, *Pilot Enquiry on Building Construction*—(urban) 22 nd Round—July 1967-June 1968.

APPENDIX 20.7 : PROPORTIONS OF VARIOUS TYPES OF PARTLY CAPITAL GOODS TREATED AS CAPITAL GOODS

Sl. No.	partly capital goods	percentage used in machinery & equipment
1.	furniture and fixtures	50
2.	typewriters	75
3.	refrigerators	20
4.	locks	10

Appendix 20.7 : Contd.

Sl. No.	partly capital goods	Percentage used in machinery & equipment
5.	saddles	90
6.	steel cabinets	50
7.	hurricane lanterns	15
8.	oil pressure lamps	70
9.	metric weights	90
10.	pressure stoves	10
11.	air-conditioners	80
12.	sewing machines	50
13.	electric fans	50
14.	household electric appliances	10
15.	radio receivers	50
16.	cars	30
17.	cycles	15
18.	motor cycles	5
19.	scooters	30
20.	scales	90
21.	clocks	50
22.	geometrical boxes	5
23.	charkhas	50
24.	cameras, projectors etc.	50

APPENDIX 20.8 : WEIGHTS ALLOTTED TO DIFFERENT INPUTS IN THE PREPARATION OF DEFLATORS FOR VARIOUS TYPES OF CONSTRUCTION

Sl. No.	input	type of construction				others*
		general pucca construction excluding residential buildings	rural buildings	urban buildings	rural and urban non-residential buildings and other construction Works	
1.	cement	13	5	13		
2.	iron and steel	15	5	8		
3.	bricks	10	14	12		
4.	logs and timber	17	31	23		
5.	paints and varnish	3	—	7		
6.	glass and glass product	2	—	2		
7.	lime	2	7	2		
8.	electrical goods	3	—	3		
9.	rural construction worker	2	38	—	4	
10.	urban construction worker	33	—	30	30	
11.	rural unskilled labour	—	—	—	66	100

*Construction under this head covers plantations and afforestation outside the household sector.