

## CHAPTER 2

### METHOD OF ESTIMATION AND SOURCES OF DATA

#### **Inputs and Outputs of Sectors**

2.1 Input structure in respect of primary and tertiary sectors and the commodity-wise details of final demand vectors and indirect taxes have been compiled from the details available in the worksheets prepared for the preparation of national income and related aggregates, which are released annually by the CSO through NAS. The details of sources of information and methodology in this respect are available in the CSO's publications National Accounts Statistics: Sources and Methods, 1989 and New Series on National Accounts Statistics (Base Year 1993-94), which are available on the web-site of the Ministry of Statistics and Programme Implementation, at [www.mospi.nic.in](http://www.mospi.nic.in). The additional sources of information and specific methods used for the present table are given in detail in this chapter. For preparing the input and output structures of manufacturing industries (both registered and unregistered), the detailed results available from the Annual Survey of Industries and the Survey on unorganised manufacturing sector.

#### ***Agriculture (Sectors: 1 to 17)***

2.2 The first 17 sectors of the IOTT, namely, (1) paddy, (2) wheat, (3) jowar, (4) bajra, (5) maize, (6) pulses, (7) gram, (8) sugarcane, (9) groundnut, (10) jute, (11) cotton, (12) tea, (13) coffee, (14) rubber, (15) coconut, (16) tobacco and (17) other crops, cover the agriculture sector. The input structures for these sectors have been prepared separately for each of the 17 sectors.

2.3 The main sources of data utilised for estimation of various inputs going into production of various crops are the Cost of Cultivation Studies (CCS) published by the Directorate of Economics and Statistics, Ministry of Agriculture (DESAg) having reference year 1998-99. For the crops for which the data on inputs is not available from the CCS, 1998-99, results of CCS from a year close to 1998-99 have been made use of.

2.4 The information on cost of plantation crops, viz., tea, coffee, rubber, tobacco and coconut was obtained from the Tea Board, Coffee Board, Rubber Board, Directorate of Tobacco Development and Coconut Development Board, respectively for the year 1998-99. The cost structure furnished by these Boards includes cost beyond the cultivation stage, whereas for agricultural sectors, the charges up-to the cultivation stage are only relevant as processing of these crops is the activity outside the scope of agriculture. Account is therefore taken of the value of inputs used only up-to the stage of cultivation. These inputs relate to cost of materials required towards cultivation cost, such as, general fieldwork, manuring, spraying, plucking and tapping.

2.5 The data available from the above sources has been used for estimating the cost of production on crops mentioned above. Since data available from these

sources are in value terms and sometimes refer to different years, necessary adjustments are made for the price changes in those cases where the data related to the years other than 1998-99. However, no allowances are made for changes in the rates of inputs and it is assumed that these rates are valid for the year 1998-99 also.

2.6 The inputs going into production of agricultural commodities are (i) seed, (ii) chemical fertilisers, (iii) organic manure, (iv) pesticides and insecticides, (v) irrigation charges, (vi) electricity, (vii) diesel oil, (viii) bullock labour, (ix) current repairs and maintenance of fixed assets and other operational costs, (x) market charges and (xi) financial intermediation services indirectly measured (FISIM).

2.7 The value of seed in respect of individual crops is estimated on the basis of seed rates available from the various CCS as well as from the State Agriculture Departments. The seed rates are the same as those utilised for the annual estimates of GDP.

2.8 The consumption of fertilisers for each of the crops (other than tea, coffee and rubber for which actual consumption estimates are available from the respective Boards) is estimated on the basis of information relating to crop-wise per hectare consumption of fertiliser available from the CCS Reports and the corresponding area under the crops. The fertiliser consumption in the case of 'other crops' is estimated on the basis of per hectare weighted average value of fertiliser consumption of all the principal crops and the area under 'other crops'. The total value of fertilisers thus estimated differs from the total off-take of fertilisers available from "Fertiliser Statistics" published by the Fertiliser Association of India and used in estimation of GDP. The crop-wise estimates of fertiliser consumption are, therefore, adjusted to correspond to the total fertiliser off-take.

2.9 The consumption of dung (organic) manure, pesticides and insecticides for each of the crops (other than tea, coffee and rubber) is estimated on the basis of information relating to crop-wise per hectare consumption of manure and pesticides available in the reports of the CCS and the area under each crop. In the case of 'other crops', the respective consumption of manure and pesticides is estimated on the basis of per hectare weighted average value of the manure and pesticides consumption of all the principal crops and the area under 'other crops'. These crop-wise estimates are adjusted so as to correspond to the GDP estimates published in the NAS. Pesticides data are available from Pesticide Association of India.

2.10 The irrigation charges are payable to the government in lieu of water supplied to producers from government owned canals. These data are collected from the State Directorates of Economics and Statistics (DESS), State Irrigation departments and budget documents of the state governments. The items on which the information is collected are sale of water for irrigation purposes, irrigation cess, local cess, etc. Allocation of charges to individual crops (excluding plantation crops) is done on the basis of data available from the CCS and the area under each crop. In the case of 'other crops', irrigation charges are estimated on the basis of per hectare weighted average value of irrigation charges of all the principal crops and the area under 'other crops'. The irrigation charges paid for agricultural activity

are taken as self input and clubbed with the value of seed. As the government irrigation system is considered as service output of agricultural sector, the material input costs of government irrigation are also to be taken as inputs of the sector. The total material cost of government irrigation is arrived at from the budget documents of centre, state and local bodies. These items are (i) travel expenses, (ii) advertisement \ publicity, (iii) electricity, (iv) publication, (v) postage and stamps, (vi) paper and stationery, (vii) repair of furniture, typewriters etc., (viii) maintenance of staff car and petrol charges, and (ix) repairs and maintenance. These material costs are allocated to each crop (excluding plantation crops) and 'other crops' in proportion to crop-wise area under canal irrigation.

2.11 Information on electricity consumption is not explicitly available from the CCS. Data on electricity utilised for agricultural purposes is obtained from the Central Electricity Authority and is distributed to various crops in proportion to crop-wise area irrigated by tube wells and pump sets.

2.12 Information on diesel oil consumption is also not explicitly available in the CCS. The total consumption of diesel oil in agriculture is estimated on the basis of number of tractors and diesel engines used in agriculture and per unit consumption of diesel oil. The data on the number of tractors are obtained from the respective state DES and the number of diesel engines, estimated from the livestock census. The value of diesel oil consumption by tractors is distributed among the various crops in proportion to the area under each crop (excluding area under plantation crops & orchards) and that of diesel oil consumed by oil engines on the basis of crop area irrigated by all the sources except tube wells and canals.

2.13 The cost of bullock labour for the crops (excluding plantation crops) is estimated on the basis of data available from the CCS relating to crop-wise per hectare cost of bullock labour and the area under each crop. In case of 'other crops' the value is estimated on the basis of per hectare weighted average value of bullock labour of all the principal crops and the area under 'other crops'. The crop-wise estimates are finally adjusted so as to correspond to the value of bullock labour. These are in fact animal services produced in the animal husbandry sector for the use of agriculture and are taken as purchases from the animal husbandry sector.

2.14 Information on repair and maintenance is not available in the CCS. The estimates of total repairs and maintenance for all types of farm implements and machinery, farm houses, grain golas, plantations and orchards, reclamation of land, bunding and other land improvements are prepared on the basis of data contained in All India Debt and Investment Survey (AIDIS), RBI, 1991- 92. Allocation of repairs and maintenance of fixed capital for various categories of assets for different crops is made in proportion to the fixed capital estimated on the basis of the CCS and is adjusted so as to correspond to the estimates for the agricultural sector as a whole.

2.15 In the dis-aggregated statement on value added from agriculture and allied activities published in the NAS, the item "market charges" is included as an input item. This item relates to transport charges for carrying the agricultural products from the farmer's field to the nearest market and the charges paid by the farmers to the primary marketing centres. In relation to these agricultural sectors, it may be

mentioned that the manufacturing activities of rice milling, flour milling, dal milling and other grain milling are clubbed with the respective sectors of paddy, wheat, pulses and other crops. This has been done, as the final uses are not available separately for these items.

2.16 Also, the value of output of by-products like straw, stalks, cane trash, rice bran etc. have been included in the output of respective crops of which these are by-products, as no separate inputs are required for their production. FISIM have also been allocated to the respective sectors and are treated as an input item.

***Animal Husbandry (Sectors 18-20)***

2.17 Animal husbandry activity is divided into three sectors namely (i) milk and milk products, (ii) animal services to agriculture consisting of services rendered by draught animals for different agricultural operations and (iii) other livestock products comprising of various edible and non-edible livestock products other than milk and milk products. The services rendered by animals for carrying goods and passenger traffic (unorganised transport) are considered as a part of transport sector and not of the animal husbandry sector.

2.18 The inputs of animal husbandry sector consist of livestock feed cost, expenditure on repairs and maintenance and operational cost. Livestock feed comprises of (i) roughages, which include cane-trash, grass, fodder, stalks and straws etc., (ii) concentrates, which are oil cakes, crushed pulses, grains, gram, rice bran, husk, oilseeds, gur etc. and (iii) salt, medicines and other miscellaneous feed. The entire value of fodder products, cane trash and grass, 95 per cent of the value of stalks and straws (produced in agriculture sector) are assumed to constitute the feed of total livestock population (including transport animals). A correction is made to adjust for the consumption of these items by those animals which are not used in agriculture by excluding the proportion of consumption of animals like bullocks in urban areas, horses, camels etc. mainly used for transportation purposes. The 30th Round of NSS provides direct information for the year 1975-76 on consumption of concentrates, salt and medicines by cattle and buffaloes in milk. The relative rates of consumption by other categories of animals are available in the studies carried out by the Indian Agricultural Statistics Research Institute (IASRI) and the State Animal Husbandry Departments. Norms of feed of poultry are estimated from the results of surveys of egg production and poultry practices carried out in certain states. The overall consumption norm based on these surveys is used for all other states.

2.19 Category-wise animal population is estimated by using the respective growth of animals observed between 1987, 1992, 1997 and Livestock Censuses. Cost of feed of animals used in agricultural activities is estimated as a proportion of total feed cost of the entire population. For distributing the total cost between the agriculture and non-agriculture sectors, the respective number of animals under each of these categories are converted into cattle equivalents and proportions are worked out. The total urban working population of cattle and buffaloes and the entire population of horses, ponies, donkeys, mules and camels are treated as animals not used for agricultural purposes.

2.20 The commodity-wise total feed estimated as above is allocated to various categories of animals under the three sectors of animal husbandry and transport service animals on the basis of results of studies conducted by IASRI. Commodity-wise details, available from the above studies on Cost of Production of Livestock products pertaining to the States viz., Jammu & Kashmir, Karnataka, Mizoram, Tamilnadu and Uttar Pradesh, are made use of in preparing the respective input-structures of the Animal Husbandry sector. These reports provide data on the average daily feed per animal per day for different categories of animals such as milch cow, milch buffalo, goat, sheep, bullock cow, bullock buffalo, young stock for both cow and buffalo, cow and buffalo not even calved once, poultry and pig for various states. Using this data and the estimated livestock population for 1998-99, the quantity of feed for the whole year is estimated separately for each category of animals. Per animal feed norm is obtained using feed consumed by bullock cow and bullock buffalo. Using this norm, the population of the animals and the cattle equivalence ratios, the quantity of feed for transport animals i.e. horses and ponies, donkeys and mules, urban camels, urban bullock cow, and urban buffalo bullock is obtained. Similarly the quantity of feed for agricultural service animals, i.e. rural bullock cow, rural buffalo bullock and rural camel is also estimated. Quantity of feed for milch cow, milch buffalo and milch goat is assumed as the input of the sector "milk and milk products", the feed for agricultural service animals is assumed as input for the sector "agricultural animal services" and the feed for the rest of the animals taken together is taken as the input of the sector "other livestock products".

2.21 As mentioned earlier, the inputs of animal husbandry consist of feed, repairs and maintenance and operational cost. The cost of repairs and maintenance of cattle sheds and meat stalls is estimated using the results of AIDIS, 1991-92 and credited to construction sector. Operational cost of removing hides, skins, hair and wool consists of repair and maintenance of implements used and also the cost of labour. Since no information is available on the operational costs relating to livestock products, it is assumed that twenty five per cent of it is firewood and thus credited to sector 17, ten per cent repairs and maintenance of implements used to be credited to sector 77, and the rest of it i.e. sixty five per cent of the operational cost is on labour which is produced and consumed by the two sectors 'milk and milk products' and 'other livestock products'. Gross value of output from livestock products is estimated from 8 broad groups, viz. (i) milk and milk products (ii) meat and meat products, (iii) hides and skins, (iv) eggs and poultry meat, (v) wool and hair, (vi) dung, (vii) increment in livestock and (viii) other products. The output thus worked out at market prices is then converted at producers' prices by deducting the market charges.

### ***Forestry (Sector 021)***

2.22 The economic activities covered under this sector are (i) forestry (planting & conservation of forests, gathering of uncultivated forest products such as resins, lac etc; and charcoal burning carried out in the forests and the like) and (ii) logging (felling and rough cutting of trees, rough shaping of poles etc.) and transportation of logs upto the permanent lines of transport. The forest products are classified into two broad groups, (a) major products and (b) minor products. Major products include industrial wood (timber, round-wood, match and pulpwood) and fuel wood (fuel wood and charcoal wood) whereas minor

products comprise a large number of items such as bamboo, sandal wood, charcoal, lac, resins, honey, gum, tendu leaves, etc.

2.23 For major products annual data on out-turn and wholesale prices at assembling centres are obtained from the Chief Conservator of Forests or through the DES in the states. For estimating the value of output of major products, the production is evaluated at producers' prices at state level.

2.24 For minor products, out-turn and price data for each type of products are not available for all states. For such states, where detailed statistics are not available, information on royalty value or contract fee released by the government is available. The value of output in such cases is worked out indirectly from the royalty value using appropriate proportions decided in consultation with the Chief Conservator of Forests/DES.

2.25 The inputs under this activity refer to operational costs and expenditure on repairs and maintenance of roads, transport equipment and other assets. On the basis of data on revenue and expenditure of the State Forest Departments, the value of inputs has been taken to be 10 per cent of total value of output. This sector consists of three parts (i) State Forest Departments appearing in the demands for grants of centre and state government budgets, (ii) state government forest corporations of various states and (iii) the work done by the contractors (private part). Information on purchase of commodities and services for government forests has been culled out from the budget documents of central and state governments. The total cost has been split up into items of raw material and services used on the basis of proportions obtained from the analysis of budget documents of the central and state governments. The commodity-wise details of items such as 'materials and supplies' and 'office expenditure' which appear in the 'Demands for Grants' of budget documents were obtained through correspondence from the State Forest Departments. Similarly, information on item-wise inputs of forest corporations of various state governments has been culled out from their annual reports. However, for the remaining third part, the item-wise inputs are estimated on certain assumptions according to the nature of work done by the contractors.

### ***Fishing (Sector 22)***

2.26 The activities included in this sector are commercial fishing in (i) ocean, coastal and off-shore water, (ii) inland water which includes catching, tackling and gathering of fish from rivers, irrigation and other canals, lakes, tanks etc., subsistence fishing and exploitation of uncultivated plants life in inland water and artificial ponds. Fish curing viz., salting and sun drying of fish is also taken as an activity falling within the sector.

2.27 The total input of fishing activity in the form of operational costs and expenditure on repairs and maintenance is obtained using the same norms as adopted in the estimation of gross value added from this sector. The total input in fish curing activity viz., value of salt used has been estimated on the basis of data on value of salt used for fish curing received directly from the State Fisheries Department of the maritime states.

2.28 The total input of fishing activity is divided into two parts namely; using (i) mechanised boats and (ii) non-mechanised boats. On the basis of the data available in (i) All India Livestock Census, 1997, (ii) ratio of cost of their maintenance derived from the study of mechanisation of fishing boats, by Programme Evaluation Organisation and (iii) the results of the studies conducted by the Indian Institute of Management, Ahmedabad, the total repair and maintenance of the boats is estimated. The item-wise operational costs other than the repair and maintenance of boats have been worked out on the basis of data received from State Fisheries Departments of Karnataka & Tamilnadu relating to the year 1998-99. The total input cost for mechanised and non-mechanised boats has been split up into various items. The input structure of fishing sector has been obtained by clubbing the respective input structures, and also the value of salt used for fish curing and the FISIM.

***Mining and Quarrying (Sectors 23 to 32)***

2.29 Mining and quarrying activity is dealt separately under four groups, viz., (i) coal and lignite, (ii) petroleum and natural gas, (iii) metallic minerals and (iv) non-metallic minerals. These have further been dis-aggregated into ten sectors namely, (i) coal and lignite, (ii) petroleum & natural gas, (iii) iron ore, (iv) manganese ore, (v) bauxite, (vi) copper ore, (vii) other metallic minerals, (viii) lime stone, (ix) mica and (x) other non-metallic minerals.

2.30 The input norms for coal, lignite and crude petroleum & natural gas are based on data obtained from the Coal Controller, Neyveli Lignite Corporation Ltd., Oil & Natural Gas Commission and Oil India Ltd. Data on metallic and non-metallic minerals to the extent of iron ore, bauxite, manganese, other metallic minerals and non-metallic minerals (excluding minor minerals) are obtained through correspondence from the respective producing mines. The data for minor minerals are taken from survey results of Enterprise Survey 1992-93 with proper adjustments. The items “other inputs” and “raw materials” appearing in the data have been broken up into various commodities on the basis of the expenditure details culled out from the annual reports of Non-Departmental Commercial Undertakings, such as, Kudremukh Iron Ore Corporation, Manganese Ore India Ltd., Haryana Minerals, Maharashtra State Mining Corpn, Tamilnadu Magnesite Corpn, Rajasthan State Mining Corpn, Bharath Gold Mines, Hutty Gold Mines, Coal India Ltd, Neyveli Lignite Corporation Ltd., and Oil India Ltd. The input-structure of other non-metallic minerals is obtained by combining those of the non-metallic minerals and minor minerals.

***Manufacturing (Sectors 33 to 98)***

2.31 Manufacturing sector, comprising of 33 to 98 sectors of the IOTT, is prepared separately for registered and unregistered manufacturing respectively. Data for registered manufacturing for the year 1998-99 have been obtained from Annual Survey of Industries (ASI), whereas the data for unregistered manufacturing have been taken from survey conducted by NSSO for the year 2000-01 in it's 56<sup>th</sup> Round with proper adjustments.

2.32 **Registered Manufacturing:** The source of data for the output and inputs of registered manufacturing sector is the ASI. The Data of ASI used for the IOTT are Block H (Pt I Schedule) (inputs), Block J (outputs) and Block I, F & G (other

inputs & outputs). These data available at 4-digit level of National Industrial Classification (NIC), 1998, estimated for All India by Industry x ASICC Commodity Codes from the respective Blocks have been converted into IOTT sectors using NIC - IOTT concordance codes and ASICC Commodity-IOTT concordance codes for the industries & commodities respectively, which have been compiled specifically by the CSO. The input flows and output flows for registered manufacturing have been arrived at by combining the individual flows of data from Block H, I, F for the former and Block J & G for the latter respectively. The unidentified items appearing in the Data such as "other products" and "addition to stock of semi-finished products" are clubbed with principal product of the industry. Also items like (i) other basic materials, (ii) other chemicals and auxiliary materials, (iii) other packing materials, (iv) consumable stores and (v) building material are distributed to the relevant conceivable sectors in proportion to their existing values. In addition to these items, some more items do appear viz. (i) electricity produced and sold, (ii) sale value of goods sold in the same condition as purchased, (iii) work done for others (iv) own construction (v) materials consumed for repairs and maintenance of machinery, building & others (vi) contract and commission works done by others on materials supplied, (vii) purchase value of goods sold in the same condition as purchased (viii) printing and stationery (ix) rates & taxes excluding income-tax, (x) insurance charges (xi) bank charges (xii) inward freight and transport charges (xiii) postage, and telephone telex charges and (xiv) miscellaneous charges. While the items (i), (iii), (iv) and the difference of (ii) and (vii) (taken as trade output) relate to output, remaining items are inputs. Item (iii) & (vi) are allocated to other services sector in the output and input flows respectively. The repairs and maintenance of buildings have been allocated to construction sector whereas the repairs and maintenance of others, machinery & equipment has been allocated to relevant sectors producing industrial machinery. The remaining items are allocated to the respective sectors with the necessary adjustments. Repair & maintenance of locomotives & other rail road equipment have also been included in the manufacturing sector. These data have been culled out from the Budget Documents of Ministry of Railways for the year 2000-01.

**2.33 Unregistered Manufacturing:** The source of data for the output and inputs of unregistered manufacturing sector is the survey on unorganised manufacturing sector conducted by the NSSO during 2000-01. Specially tabulated data on item-wise inputs and outputs has been used for preparing the input/output flows of the unregistered manufacturing. Treatment of unidentified items appearing in the above mentioned tables are same as those of registered manufacturing, except for those items which were not given ASICC Codes. These uncoded items have been given IOTT sector codes by the CSO on the basis of the corresponding descriptions of these items, made available to the CSO by the NSSO. Necessary adjustments have also been made to convert the data to the year 1998-99.

**2.34** Input/output flows thus arrived separately for registered and unregistered manufacturing are clubbed together to arrive the total flows of the manufacturing sectors for the year 1998-99.

***Construction (Sector 99)***

2.35 The values of the basic materials viz., cement, iron and steel, bricks and tiles, timber and round wood and other construction materials used for construction are the input costs of the construction sector. To split up the aggregate value of other construction materials over their various constituents, the input norms for roads and bridges compiled from "Detailed analysis of building projects" of the Planning Commission (unpublished) and for other buildings, obtained from Central Building Research Institute (CBRI), Roorkee are used. The office expenditure of construction companies is taken from annual reports of public sector companies. The input norms for building construction are applied to the value of building construction and the input norms for roads and bridges are applied to the value of construction other than buildings. In the Make Matrix the outputs shown by the industries against construction have been shown as such. Since the value of output and domestic product for the total construction is derived by the commodity flow approach, the output of construction sector in the Make Matrix has been reduced by the total of construction output shown by the respective industries.

2.36 The inputs relating to construction not accounted in commodity flow approach are in the form of straw, bamboo and grass etc. These inputs have been assumed to flow from agriculture and forestry sectors.

***Electricity (Sector 100)***

2.37 The economic activities covered in this sector are generation, transmission and distribution of electrical energy. The estimates of inputs are arrived at by aggregating the inputs of (i) State Electricity Boards, (ii) Neyveli Lignite Corporation, (iii) Damodar Valley Corporation, (iv) Departmental Commercial Undertakings of Central and State Governments relating to the electricity sector, Municipal Electricity boards & Local Bodies and (v) Private Electricity companies, respectively. The item-wise expenditure on inputs in these undertakings and private companies is compiled from their annual reports and budget documents of central and state government and local bodies.

***Gas (Sector 101)***

2.38 The gas sector covers the activity of gas produced and supplied. The major source of data is Khadi & Villages Industries Commission (KVIC) in the case of gobar gas. The data on production of gobar gas (methane) and manure in quantity and value terms along-with the number of gobar gas plants and the repair and maintenance of these plants are obtained from the KVIC. The input gobar and output manure are assumed to be of equal value due to the non-availability of details on their valuation. Thus, the inputs entering in the cost structure of gas sector, are gobar and repairs and maintenance of the gobar gas plants.

***Water Supply (Sector 102)***

2.39 The economic activities covered in this sector are collection, purification and distribution of water for domestic and industrial consumers, excluding the operation of irrigation system. For preparing the input structure, government sector comprises of centre and state governments and local authorities including water supply corporations/boards. The item-wise inputs in respect of the government sector are estimated on the basis of data culled out from the budget documents of centre and state governments and local authorities and water supply

corporation/boards. In the case of private sector, the only inputs considered are plumber charges and transportation charges. These have been taken as one per cent of the GVA of private sector, in the absence of cost details of water supply activity in the private sector.

***Railway transport service (Sector 103)***

2.40 Railway transport service includes government railways. The total material consumption of government railways is obtained by analysing the Demands for Grants for Expenditure of the Central Government Railways. The expenditure made by railways on education, medical facilities, and repair and maintenance activities of manufacturing railway (workshops) is excluded from this sector and is included in the respective sectors of the IOTT.

2.41 The material consumption of government railways appears as expenditure under five heads in the Demands for Grants for Expenditure of the Central Government Railways. These expenditure heads are (i) travel expenses, (ii) contingent expenses; (iii) cost of materials, (iv) contractual payments, and (v) other expenses. Item-wise details for contingent expenses, cost of materials, contractual payments and other expenses are culled out, to the extent possible, from the respective heads of the budget document and information collected from the Railway Board.

***Other Transport Services (Sector 104)***

2.42 The other transport service includes road, water and air transport and services incidental to transport. These activities are considered separately for the purpose of estimation of input structure. The road transport is further classified into mechanised and non-mechanised road transport.

2.43 **Mechanised Road Transport:** Mechanised road transport includes buses, trucks, taxis and auto rickshaws and tramways. The total material consumption of mechanised road transport is estimated separately for public and private sectors. For the public sector undertakings, input structure is estimated by analysing the annual reports of State Road Transport Corporations and Budget Documents of Centre, States & Local bodies. The public sector undertakings in respect of mechanised road transport are mainly engaged in bus transport services. As regards private sector, material consumption is estimated separately for passenger and freight traffic. For passenger and freight traffic, the input cost and item-wise details of the inputs are estimated separately, on the basis of norms obtained from the results of the Enterprise Survey, 1993-94.

2.44 **Non-mechanised road transport:** The expenditure on individual items of inputs per enterprise is estimated from the norms obtained on non-mechanised transport from the data collected in the Enterprise Survey, 1993-94. From these data, the ratios of input to GVA from non-mechanised road transport are worked out and applied to the total GVA from non-mechanised road transport available from NAS to get the input structure of non-mechanised road transport. The data available from the survey on unregistered manufacturing sector has been utilised to break-up the item repair and maintenance appearing in the input structure into different IOTT sectors. In the case of animal transport services, the input item "maintenance of working animals" is further broken up into item-wise feed of

transport animals on similar lines as in the case of animal husbandry sector for the item, livestock feed.

2.45 **Water transport:** Water transport sector includes services rendered by (i) ocean & coastal water transport and (ii) inland water transport and (iii) supporting services to water transport. The organised and unorganised parts for each of these categories of water transport are considered separately for preparing the input structure of the sub-sector.

2.46 The organised ocean & coastal water transport covers freight and passenger traffic by shipping companies. For the details of material inputs, the profit and loss accounts of major shipping companies have been analysed and the proportions have been applied to the GVA for the entire shipping transport available from NAS. The input structure of unorganised part is estimated on the basis of the norms obtained through Enterprise Survey, 1993-94 in respect of water transport relating to ocean & coastal transport.

2.47 The input structure of organised inland water transport is arrived at by analysing the income and expenditure accounts of (i) Central Inland Water Transport Corporation, Calcutta, (ii) Kerala Water Transport Corporation and (iii) Kerala Inland Navigation Corporation. For unorganised inland water transport, the input structure has been prepared on the basis of the norms obtained through Enterprise Survey, 1993-94. The input to GVA ratio observed in these norms has been applied to the GVA of unorganised inland water transport available from NAS.

2.48 The organised part of supporting services to water transport comprises (i) port trusts, (ii) ports, pilotages, light houses and light ships and (iii) Dredging Corporation of India Ltd. The activities of port trusts include handling of import & export traffic and other port services. Separate accounts are available for each of the port trusts. Details available in these accounts are used to obtain the input structure of port trusts. In the case of Dredging Corporation of India Ltd., the information available in its annual report has been made use of to arrive at the input structure. The data on purchase of goods and services in respect of ports, pilotages, light houses and light ships are culled out from the Demand for Grants of the Ministry of Home Affairs and Ministry of Surface Transport and the relevant state government budgets. The item "office expenses", for which no details are available in the above mentioned government budgets, has been broken up on the basis of information obtained from the concerned Ministries through correspondence. For the unorganised part of the supporting services to water transport, total input structure has been prepared using the norms obtained through the Enterprise Survey, 1993-94.

2.49 **Air Transport:** For preparing the input structure of public sector airlines, the annual reports of Air India and Indian Airlines provide the basic data from the profit and loss accounts. Item-wise details of miscellaneous expenses appearing in the reports are obtained from the companies through correspondence. For non-scheduled operators, input structure is estimated either on the basis of data available from the annual reports or from the data obtained from the companies through correspondence. To the above, the input structure of International

Airport Authority of India (IAAI), National Airport Authority, flying & gliding clubs and the Directorate General of Civil Aviation (DGCA) have been added to get the input structure of total air transport activity. Requisite information in respect of flying & gliding clubs is obtained from the companies and for IAAI and DGCA, the inputs have been culled out from the annual reports/Demand for Grants of the Ministry of Tourism and Civil Aviation.

**2.50 Services incidental to transport:** Services incidental to transport comprise packing, crating, operations of travel agencies etc. These services are associated with shipping, air, railways and mechanised road (truck) transport. The Enterprise Survey 1993-94 provides the ratio of input to GVA in respect of services incidental to transport, covered under the NIC-87 groups 707, 708, 730, 737, 738 and 739. This ratio has been applied to total GVA in respect of services incidental to transport available from NAS to arrive at the total input of the activity. The total inputs obtained has been broken up into various expenditure items on the basis of details of expenditure obtained from the same survey and few travel agencies directly through correspondence.

2.51 The combined input structure of other transport sector is obtained by clubbing the input structures of road, water and air Transport and services incidental to transport.

#### ***Storage and Warehousing (Sector 105)***

2.52 This sector covers storage operations comprising warehousing corporations, cold storage and other storage and warehousing when such storage is offered as an independent service. The input structures of public sector warehousing, cold storage and storage and warehousing in the unorganised sector have been prepared separately and consolidated thereafter to arrive at the value of inputs for this sector. Analysis of reports of public warehousing corporations provides the estimates of inputs for warehousing. Inputs for cold storage are estimated on the basis of results of ASI for the year 1998-99. However, break-up of certain items like stationery, repair and maintenance etc. is done on the basis of data obtained from few private cold storage units. The input structure of private storage and warehousing is estimated on the basis of the results of Enterprise Survey, 1992-93. The ratio of input to GVA of the storage and warehousing observed in the survey results has been applied to the total GVA of 'other storage and warehousing' from NAS.

#### ***Communication (Sector 106)***

2.53 This sector comprises of services rendered by public and private communication organisations/enterprises. The activities of Department of Posts relating to Post Office Saving Bank & Postal Life Insurance are excluded from communication as the same are included in banking & insurance sectors, respectively. Similarly the activities of the Department of Telecommunication relating to telecommunication factories and administrative services are excluded from communication and merged in the concerned sectors. The item-wise details of purchases of goods and services are prepared on the basis of the data culled out from the Demands for Grants for Expenditure of the Central Government of Departments of Posts and Telecommunication and the annual reports of the non-departmental commercial enterprises. The input relating to the private communication services is estimated on the basis of GVA to output ratio of the

public sector part and is allocated to the different sectors on the basis of the norms of the public sector. The item-wise break-up of 'office expenses' has been obtained on the basis of data obtained from the Central Government departments.

### ***Trade (Sector 107)***

2.54 The activities considered in this sector are (i) wholesale and retail trade in all commodities, both produced at home (including exports) and imported, purchase and selling agents, brokers and auctioneers. Wholesale trade covers units which resell without transformation, new and used goods generally to the retailers and industries, commercial establishments, institutional and professional users or to other wholesalers. Retail trade covers units, which only resell without transformation, new and used goods for personal or household consumption. The gross output in the distribution of commodities is measured as gross trade margins of the trading establishments, i.e. gross output is the gross margins released on the sale of goods in the same condition as they have been purchased and reduced by the delivery cost of the goods to the unit.

2.54 For estimating the input structure of trade activity, the organised and unorganised parts have been dealt with separately. The organised part covers trade in the public sector and the private corporate sector. The inputs in the public sector enterprise have been estimated from the analysis of income and expenditure accounts available in the annual reports of various trading corporations. For the private corporate sector, data from the RBI's study of sample companies has been utilised. The input structure of the unorganised trade has been prepared on the basis of the results available in the Directory Trade Establishments (DTE) Survey, 1990-91 and Non-Directory Trade Establishments (NDTE) and Own-Account Trade Establishments (OATE) Survey, NSS 46th Round, 1990-91. To arrive at the item-wise input estimates for DTE, NDTE & OATE for the year 1998-99, the item-wise estimates of 1990-91 available from these surveys are inflated to 1998-99 prices by applying suitable indices. Ratios of item-wise inputs to GVA observed in the unorganised trade (DTE, NDTE and OATE), have been applied to GVA of unorganised trade estimated independently for the NAS to arrive at the item-wise estimates of purchase of goods and services in respect of unorganised trade.

### ***Hotels and Restaurants (Sector 108)***

2.55 This sector consists of services rendered by hotels, restaurants, cafes, and other eating, drinking and lodging places. Organised and unorganised parts have been dealt with separately for preparing the input structure. The organised part covers hotels & restaurants in the public sector, whereas the unorganised part includes hotels (other than public sector, but including joint stock companies), rooming houses, camps and other lodging places, restaurants, cafes and other eating and drinking places covered by the Enterprise Survey, 1993-94.

2.56 The input structure of the public sector part has been prepared using the expenditure details available in the profit and loss accounts of the annual reports of various central and state non-departmental commercial undertakings and the respective budget documents for departmental commercial undertakings dealing in the activity. The input structure of the unorganised part is prepared on the basis of

norms obtained through the results of the Enterprise Survey, 1993-94 on hotels and restaurants.

2.57 The item-wise input to GVA ratios obtained from the results of the Enterprise Survey, 1993-94 have been applied to GVA of unorganised hotels and restaurants for 1998-99 available from the NAS to arrive at the item-wise inputs of unorganised part. The input structure of hotels and restaurants sector has finally been obtained by adding the organised and unorganised parts mentioned above.

#### ***Banking (Sector 109)***

2.58 Banking sector consists of commercial banks, banking department of RBI, non-banking financial institutions, post office saving bank, cooperative credit societies and unorganised financial institutions such as money lenders, financiers, chit funds etc. and the services of employee's provident fund organisation. The item-wise details of inputs for these categories of banking institutions are compiled from the annual reports and data obtained from commercial banks, banking department of RBI and non-banking financial institutions. For post office saving bank, the item-wise purchase of commodities and services are arrived at by analysing the budget documents and for cooperative credit societies, input data are obtained from National Bank for Agricultural and Rural Development (NABARD). Input cost of unorganised financial institutions is taken, as in the case of GDP, one third of the organised miscellaneous financial companies of the non-banking financial institutions.

#### ***Insurance (Sector-110)***

2.59 The insurance activity covers life insurance, non-life insurance, deposits insurance, export credit and guarantee insurance, etc. The detailed information of income and expenditure of life insurance is available in the annual reports of Life Insurance Corporation. The information on income and expenditure of non-life insurance and other insurance is available in the annual reports of the respective companies. Details of management expenses are collected from these companies. The input structure of postal life insurance is prepared on the basis of the information culled out from the Demands for Grants of the Department of Posts.

#### ***Ownership of Dwellings (Sector 111)***

2.60 The activities covered in this sector are actual and imputed income from residential houses. The annual inputs of rental income are the cost of repairs and maintenance of dwelling, which is treated as a purchase from the construction sector.

#### ***Education and Research (sector 112)***

2.61 Activities covered under this sector are (i) educational services and (ii) research and scientific services. They include both types of institutions, recognised and unrecognised. The total value of input of recognised institutions has been estimated on the basis of data obtained from the Ministry of Human Resources Development. The input items include expenditure on apparatus, chemicals and consumable stores, libraries, maintenance of buildings, maintenance of equipment and furniture, games and sports and other items. The data thus obtained relate to recognised institutions only. The contribution of unrecognised institutions is estimated on the basis of the results of Enterprise Survey 1991-92.

2.62 The item-wise break-up of "other items" for both recognised and unrecognised institutions has been obtained on the basis of norms available by analysing the expenditure on purchase of goods and services in education from the government budgets of Central Ministries/Departments, States and Local Bodies. However, the item-wise break-up of office expenditure into different items is worked out on the basis of the detailed data received from the education departments of central and state governments on 'office expenditure' and 'material and supply'. The output of this service sector has been taken as the sum of total inputs mentioned above and GVA of education and research as compiled for the NAS.

***Medical & Public Health (Sector 113)***

2.63 The total value of input of medical & health services is estimated separately for government and non-government sectors. In case of government hospitals the medical facilities provided by government administration (including railways), inputs are estimated on the basis of data culled out directly from the budget documents of the central and state governments and local bodies. The item "office expenditure" and "material supply" appearing in the budgets are broken up into various items on the basis of data obtained through correspondence from the medical and health departments of central and state governments.

2.64 In the case of non-government sector, the item-wise inputs are estimated separately for organised and unorganised sectors. While the input details of unorganised sector is estimated on the basis of results available from the Enterprise Survey, 1991-92, the input for organised sector is estimated using the GVA to output ratio of the public & private unorganised sector.

***Other Services (Sector 114)***

2.65 Other services cover (a) sanitary services, (b) real estate, (c) business services such as legal and similar other services, (d) religious and community services, (e) recreation and cultural services, (f) personal services such as domestic services, laundry, dry-cleaning and dyeing, photographic studios, barber and beauty shops, (g) international and other territorial bodies, (h) radio and television and (i) services not elsewhere classified.

2.66 The input structure is obtained separately for sanitary services, radio and television broadcasting and rest of the other services. The input structure of sanitary services has been prepared separately for public and private sectors. The public sector part is estimated from the analysis of the budget documents of the central and state governments and municipal corporations. The input structure of radio and television broadcasting service has been obtained by analysing the part of the Demands for Grants for expenditure of the Ministry of Information & Broadcasting. The real estate services comprise of activities of all types of dealers such as operators, developers and agents connected with real estate. The details of inputs in respect of all other services including real estate and the corresponding private part of the sanitary services are estimated on the basis of the results available in the Enterprise Survey 1991-92. The combined input structure of "other services" has been obtained by clubbing the details of inputs of sanitary services, radio and television services and rest of the other services.

## **Final Demand & Indirect Taxes**

### **Final demand**

2.67 The final uses of gross domestic product have been classified into six categories viz., (i) Private Final Consumption Expenditure (PFCE), (ii) Government Final Consumption Expenditure (GFCE), (iii) Gross Fixed Capital Formation (GFCF), (iv) Change in Stocks (CIS), (v) Exports (EXP), and (vi) Imports (IMP).

### ***Private Final Consumption Expenditure (PFCE)***

2.68 PFCE represents the consumption expenditure of households and non-profit institutions. The methodology adopted to prepare the vector of PFCE is the same as that adopted for NAS. However, to arrive at the sector-wise estimates of PFCE, the item-wise details of PFCE by object for the year 1998-99 available in the NAS have been used along with the output data (at four digit level national industrial classification (NIC)) from the results of surveys conducted on registered and unregistered manufacturing sectors. The relevant import /export data obtained from RBI have also been used to arrive at the sector-wise estimates PFCE.

### ***Government Final Consumption Expenditure (GFCE)***

2.69 GFCE represents current consumption expenditure of the government. This expenditure comprises of compensation of employees, depreciation and intermediate consumption (purchase of goods and services including repair and maintenance less sales). The total GFCE is divided on the basis of economic classification into sectors of education, medical and health, water supply, construction, other services and public administration and defence. The expenditure relating to these sectors, except public administration & defence, is allocated to these respective sectors whereas in the case of public administration and defence, only the compensation of employees is allocated to the sector "public administration and defence". The details of intermediate consumption and receipts are culled out from the budget documents of central & state government and local bodies and Finance Account of Union Government. The annual reports of research and scientific institutions and Employee's Provident Fund Organisation and the details of Issue Department of RBI have also been used to get the details of intermediate consumption. These are allocated to the appropriate sectors in the final demand under GFCE. Items like "office expenditure" and "material and supply" for which no break-up is available in the budget documents, have been split up into the respective sectors on the basis of information received through correspondence from the ministries/departments of the central and state governments and attached subordinate offices.

### ***Gross Fixed Capital Formation (GFCF)***

2.70 The detailed commodity-wise output data relating to products and by-products of capital goods industries covered in the ASI, 1998-99 have been used along with detailed data on exports and imports, and import duty for the preparation of commodity-wise estimates of GFCF.

### ***Change in Stocks (CIS)***

2.71 Commodity-wise CIS has been estimated separately for (a) manufacturing sectors and (b) sectors other than manufacturing.

2.72 **Manufacturing Sectors:** Industry-wise estimates of CIS in manufacturing sector are dealt separately for registered and un-registered manufacturing. The data on "value of stocks at the beginning and end of the year by industries" for registered and un-registered manufacturing have been obtained through ASI for the year 1998-99 and through the Survey on Unorganised Manufacturing conducted by the NSSO for the year 2000-01, adjusted for 1998-99 respectively. To obtain the corresponding commodity-wise estimates of CIS, these have been reclassified. For an industry, the CIS, is available under the categories: (i) raw materials, (ii) stores, (iii) fuel, (iv) semi-finished goods and (v) finished goods. The finished and semi-finished goods of an industry have been identified as the main product of the industry and treated as change in stocks of the main product. The values under raw materials, stores and fuels of an industry have been divided into shares of specific commodities on the basis of main basic materials, stores and fuels consumed in that industry and taken as stocks of these specific input commodities. These sector-wise details are then clubbed together to arrive at the combined CIS for the manufacturing sector.

2.73 **Other than Manufacturing Sectors:** Commodity-wise CIS in sectors other than manufacturing have been arrived separately for public sector (Departmental Commercial Undertakings and Non- Departmental Commercial Undertakings), private corporate sector, co-operative societies and households. Commodity-wise details available from the budget documents of central & state government and local bodies, annual reports of the undertakings are made use of to arrive at the change in stocks of the public sector. Data received from the RBI is used to obtain the commodity-wise change in stocks relating to the private corporate sector. Data from NABARD's publication "Statistical Statements Relating to the Co-operative Movements in India 1993-94 (Part I) is also used to arrive at the change in stocks of the co-operative societies. Commodity-wise details available from the results of Enterprise Surveys on Transport & Hotels and Restaurants for the year 1993-94, Storage and Warehousing & Mining and Quarrying for the year 1992-93, and DTE & NDTE Surveys, for the year 1990-91 were utilised to prepare the commodity wise change in stocks of the respective sectors of the household part. The estimates of CIS arrived separately for the above mentioned parts have been combined to obtain the estimates of the commodity-wise CIS in sectors other than manufacturing.

2.74 Commodity-wise CIS estimated for manufacturing sector and sectors other than manufacturing, as mentioned above, are added together to obtain the total commodity-wise CIS.

### ***Exports***

2.75 Exports comprise exports of merchandise on f.o.b. basis and other items like transport and communication in respect of exports other than merchandise, insurance etc. Item-wise break up of exports of merchandise, f.o.b. is available in the DGCI&S publication 'Monthly Statistics of Foreign Trade of India, Vol. I, Exports'. For remaining items, the source of data is the RBI.

**Imports**

2.76 Imports include the imports of merchandise and other items like transport services of merchandise, imports by resident industries, other transport and communication services by non-residents and miscellaneous commodities, etc. Item-wise details of imports of merchandise at c.i.f. values are available in the DGCI&S publication 'Monthly Statistics of Foreign Trade of India, Vol. II, Imports'. For remaining items, the source of data is the RBI.

**Indirect taxes**

2.77 Indirect taxes are distinguished as commodity taxes and other indirect taxes. Commodity taxes include union & state excise duties, sales tax, custom duties (on imports & exports) and various other duties and cesses. Other indirect taxes include levies like electricity duty, motor vehicle tax, entertainment tax, and stamp duty, etc. The types of indirect taxes by commodities and services on which they are levied have, therefore, been ascertained and each particular tax has been apportioned in proportion to the value of flow of commodities going to different industry sectors and final uses. The source material used for different components of indirect taxes on various commodity groups is described below: -

2.78 Commodity-wise union excise duties for the year 1998-99 have been taken from the Receipts budget 2000-01 of Central Government whereas data on state excise duties from respective State budget documents for the year 2000-01.

2.79 The budget documents and Finance Accounts of State Governments contain the details of total sales tax receipts and not their commodity-wise data. For allocating the total sales tax among different commodity sectors, the commodities on which sales tax are levied are identified, to the extent possible, and are allocated to the respective sectors. The remaining amount of sales tax is allocated to the different commodity sectors in proportion to the norms arrived on the basis of results available from 51<sup>st</sup> Round of NSSO on un-registered manufacturing 1994-95.

2.80 Imports are reported at c.i.f. values and are exclusive of import duties and domestic taxes. The commodity-wise custom duties (both on imports and exports) are available from the Ministry of Finance. Data on import duties have been used to build up commodity sector-wise import duties. Similarly, using the same source, commodity-wise export duties/cesses have been prepared.

2.81 Source material used for "other indirect taxes" is the budget documents of state governments and Finance Accounts of the Union and State Governments. These taxes have been identified and allocated to the respective sectors of the IOTT.

**Subsidies**

2.82 The commodity-wise subsidies have been compiled from the budget documents of Central and State Governments. These are identified to the relevant commodity sectors and allocated to different consuming industry sectors and final uses in proportion to the domestic flow. Some of the subsidies meant for specific purpose like subsidy provided for export promotion, electricity, and subsidy on the construction of wells for agriculture purposes have been allocated to the respective

cells of the domestic flow matrix. Subsidies paid to FCI have been allocated to items such as wheat, rice and other crops on the basis of detailed data available from the Annual Report and Accounts of FCI, 1998-99. Similar subsidies given to Khadi and Village Industries Commission (KVIC) have been allocated on the basis of details available in the report of KVIC. Irrigation subsidy has been allocated to various crops in proportion to irrigated crop area.