

INPUT OUTPUT TRANSACTIONS TABLE

Introduction

- 28.1 The system of National accounts includes an integrated set of supply use tables as well as input-output tables. These tables provide a detailed analysis of the process of production and use of the goods and services(products) and the income generated in that production.
- 28.2 The first Input-Output Transactions Table(IOTT), consistent with the National Accounts Statistics(NAS) related to the year 1968-69 was published by the Central Statistical Organisation (CSO), in the publication "National Accounts Statistics, 1978". This table was prepared jointly by the CSO and the Planning Commission. Subsequent to its completion, the CSO undertook the preparation of IOTT for the year 1973-74 at its own and decided to continue the work relating to the preparation of IOTT on regular basis and publish them once in every five years. The IOTT 1973-74, in the aggregated 60 sectors form, was included in the NAS, 1981. A detailed report entitled "Input-Output Transactions Table, 1973-74" was published by the CSO in September 1981. Thereafter, the Reports on IOTT for the reference years 1978-79, 1983-84, 1989-90, 1993-94 and 1998-99 in June 1989, September 1990, November 1997, July 2000 and March 2005 respectively.
- 28.3 It describes the basic approach adopted in the compilation of IOTT and other important issues like the scheme of sectoral classification, valuation of transactions and overall balancing between total Gross Domestic Product (GDP) and the final expenditures. It also gives the method of estimation of inputs and outputs for various sectors of the economy and the underlying assumptions in case of non-availability of information in the forms required, particularly in the case of unspecified inputs and outputs and their allocation to different sectors. It also deals with the method adopted for the generation of various components of final demand and indirect taxes.
- 28.4 *Appendix 28.1* presents, in brief, the theoretical background for the construction of four quadrants of the pure commodity x commodity and industry x industry tables, under different technology assumptions. The specifications of the scheme of detailed sectoral classification (115 sectors) adopted in the IOTT are given in *Appendix 28.2*. *Appendix 28.3* giving the aggregated 60 sector classification and the linkages of the detailed 115 with aggregated 60 sector classification adopted in the earlier IOTTs has been included for the benefit of users for comparative studies with the earlier IOTTs.
- 28.5 Matrices 1 to 5 provide Detailed 115 sector absorption (commodity x industry) matrix for the Indian economy, accompanying make (industry x commodity) matrix and other associated/subsidiary matrices. The 115 sector commodity x commodity table under industry technology assumption, and the Leontief Inverse Matrix are included as Matrices 6 and 7 respectively.
- 28.6 The input-output table gives the inter-industry transactions in value terms at factor cost presented in the form of commodity x industry matrix where the columns represent the industries and the rows as group of commodities, which are the principal products of the corresponding industries. Each row of the matrix shows in the relevant columns, the deliveries of the total output of the commodities to the different industries for intermediate consumption and final use. The entries read down industry columns give the commodity inputs of raw-materials and services, which are used to produce outputs of particular industries. The column entries at the bottom of the table give net indirect taxes (NIT) (indirect taxes-subsidies) on the inputs and the primary inputs (income from use of labour and capital), i.e., Gross Value Added (GVA). The matrices included in the report are the following:

- Matrix-1:** Input Flow (or Absorption) Matrix as the commodity x industry matrix;
- Matrix-2:** Output (or Make) Matrix as the industry x commodity matrix;
- Matrix-3:** Input-Output Coefficient Matrix;
- Matrix-4:** Product Mix Matrix;
- Matrix-5:** Market Share Matrix;
- Matrix-6:** Commodity x Commodity Matrix under the industry technology assumption;
- Matrix-7:** Leontief Inverse Matrix for commodities.

Sector Classifications

- 28.7 The first 32 sectors in the sector classification (Appendix 28.2) represent primary production, the next 66 sectors relate to manufacturing industries and the remaining 17 sectors deal with the tertiary activities. In the primary production, 17 categories belong to agriculture, 3 to animal husbandry and 1 each to forestry and fishing and the remaining 10 to mining. The level of dis-aggregation adopted for manufacturing industries generally correspond to 4-digit level of National Industrial Classification (NIC), 1998. Tertiary activities include services like construction, electricity, gas, water supply, railway transport, other transport, storage and warehousing, communication, trade, hotels & restaurants, banking, insurance, ownership of dwellings, education, medical and health and other services. The final uses have been distinguished under six categories (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 of goods and services (EXP) and (vi) Imports of goods and services (IMP).

Valuation of Transactions

- 28.8 All the entries in the IOTT are at factor cost, i.e. excluding trade and transport margins (TTMs) and NIT. The IOTT, to begin with, is prepared at original purchasers' price, i.e. at the price at which actual transactions take place. The entries at factor cost are arrived thereafter by removing the components of TTMs and net indirect taxes. These have been shown in separate rows in the table. The row of net indirect taxes thus depicts the taxes paid by the industries on intermediate inputs used in the process of production of industry's output.

Secondary Products

- 28.9 Manufacturing industries often produce secondary products either as joint products or as by-products apart from the primary products. For preparing the industry x industry and commodity x commodity matrices, the secondary products are transferred to the industries where they are principally produced following the procedures recommended in the System of National Accounts (SNA).

Overall Balancing between total Product and Expenditure

- 28.10 In the NAS, aggregates according to two approaches obtained independently do not balance and the discrepancies are shown separately in the individual accounts of the Consolidated Accounts of the Nation. For a

balanced IOTT, however, it is essential that adjustments are made for these discrepancies before the overall balancing of row and column totals is undertaken. The overall discrepancy is absorbed in various categories of final demand (on the basis of the discrepancies in each of the aggregates) during the course of manual balancing of supply and disposition of each of the sectors. As a result, the totals of categories of final use presented in the table are marginally different from the corresponding estimates in the Consolidated Accounts of the Nation presented in the NAS.

Inputs and Outputs of Sectors

- 28.11 Input structure in respect of different sectors together with commodity-wise details of final demand vectors and indirect taxes are compiled from the details available in the relevant worksheets made for preparation of national income and related aggregates released annually by the CSO through NAS. The details of sources of information and methodology in this respect have been discussed in the earlier chapters of this publication. However, specific details for the sectoral classification adopted in the Input-Output Transaction Table of Indian National Accounts are discussed in the following paragraphs.

Agriculture (Sectors 1 to 17)

- 28.12 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 developed separately for each of these 17 sectors.
- 28.13 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). The crops for which the data on inputs is not available from the CCS, results of CCS from a year close to reference year made use of.
- 28.14 The information on cost of plantation crops, viz., tea, coffee, rubber, tobacco and coconut is obtained from the Tea Board, Coffee Board, Rubber Board, Directorate of Tobacco Development and Coconut Development Board, respectively. 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.

- 28.15 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 reference year.
- 28.16 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).
- 28.17 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 in the estimation of GDP.
- 28.18 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. Thus, the crop-wise estimates of fertiliser consumption are adjusted so as to correspond to the total fertiliser off-take.
- 28.19 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 total value estimated for deriving GDP in the NAS. Pesticides data are available from Pesticide Association of India.
- 28.20 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.
- 28.21 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.
- 28.22 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.
- 28.23 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.
- 28.24 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.
- 28.25 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, as the final uses are not available separately for these items.
- 28.26 Also, the value of output of by-products like straw, stalks, cane trash, rice bran etc. are included in the output of respective crops, 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)**
- 28.27 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.
- 28.28 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.
- 28.29 Category-wise animal population for the reference year is estimated by using the respective growth of animals observed in various Livestock Censuses (latest being Livestock Census 2003). 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 is 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.

- 28.30 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, and young stock for cow and buffalo, cow and buffalo not even calved once, poultry and pig for various states. Using this data and the estimated livestock population, 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".
- 28.31 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 operational costs 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 21)**
- 28.32 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.
- 28.33 For major products annual data on output 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.
- 28.34 For minor products, output and price data for each type of products are not available for all states. For such states, 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.
- 28.35 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 are obtained through correspondence from the State Forest Departments. Similarly, information on item-wise inputs of forest corporations of various state governments is 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)

- 28.36 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.
- 28.37 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, 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.
- 28.38 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" (ii) ratio of cost of their maintenance derived from the study of mechanisation of fishing boats, by Programme Evaluation Organisation of Planning Commission of India 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 are worked out on the basis of data received from different State Fisheries Departments. The total input cost for mechanised and non-mechanised boats are split up into various items. The input structure of fishing sector is 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)

- 28.39 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 disaggregated 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.
- 28.40 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 Magnasite Corpn, Rajasthan State Mining Corpn, Bharat 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)

- 28.41 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 a reference year is obtained from Annual Survey of Industries (ASI), whereas the data for unregistered

manufacturing is obtained from survey conducted by NSSO for a year close to reference year with proper adjustments.

manufacturing sector. These data are culled out from the Budget Documents of Ministry of Railways for the reference year.

- 28.42 **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 are converted into IOTT sectors using NIC - IOTT concordance codes and ASICC Commodity-IOTT concordance codes for the industries & commodities respectively, which are developed specifically by the CSO. The input and output flows for registered manufacturing are 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 are allocated to construction sector whereas the repairs and maintenance of others, machinery & equipment are 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 are also included in the
- 28.43 **Unregistered Manufacturing:** The source of data for the output and inputs of unregistered manufacturing sector is from the survey on unorganised manufacturing sector conducted by the NSSO. Specially tabulated data on item-wise inputs and outputs are 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 are not given ASICC Codes. These uncoded items are 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 are also made to convert the data to the reference year like for 1998-99, the year of latest IOTT. Input/output flows thus arrived separately for registered and unregistered manufacturing are clubbed together to arrive the total flows of the manufacturing sectors.
- Construction (Sector 99)**
- 28.44 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.
- 28.45 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 is reduced by the total of construction output shown by the respective industries.
- 28.46 The inputs relating to construction not accounted in commodity flow approach are in the form of straw, bamboo and grass etc.

These inputs are assumed to flow from agriculture and forestry sectors.

Electricity (Sector 100)

- 28.47 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 governments and local bodies.

Gas (Sector 101)

- 28.48 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 (dung) 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 (cow dung) and out put of 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)

- 28.49 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, state/UT governments and local authorities including water supply corporations/boards.
- 28.50 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 are 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 (Sector 103)

- 28.51 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.

- 28.52 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)

- 28.53 The other transport service includes road, water, 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.
- 28.54 **Mechanised Road Transport:** Mechanised road transport includes buses, trucks, taxis, 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 (ES), the latest being 1993-94.

- 28.55 **Non-mechanised road transport:** The expenditure on individual items of inputs per enterprise is estimated from the norms obtained on non-mechanised transport in the Enterprise Survey. The ratios of input to GVA

from non-mechanised road transport are then 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.

- 28.56 **Water transport:** Water transport sector includes services rendered by (i) ocean & coastal water transport, (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.
- 28.57 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 are analysed and the proportions are 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 (ES) latest being 1993-94 in respect of water transport relating to ocean & coastal transport.
- 28.58 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. The input to GVA ratio observed in these norms has been applied to the GVA of unorganised inland water transport available from NAS.
- 28.59 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
- 28.60 **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) are 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 are culled out from the annual reports/Demand for Grants of the Ministry of Tourism and Civil Aviation.
- 28.61 **Services incidental to transport:** Services incidental to transports comprise packing, crating, operations of travel agencies etc. These services are associated with shipping, air, railways and mechanised road (truck) transport. The Enterprise Survey provides the ratio of input to GVA in respect of services incidental to transport, covered under the NIC-98 groups 707, 708, 730, 737, 738 and 739. This ratio is 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 are 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.
- 28.62 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)

28.63 This sector covers storage operations comprising warehousing corporations, cold storage & other storage and warehousing when such storage is offered as an independent service. The input structures of public sector warehousing, cold storage and storage & warehousing in the unorganised sector are 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. 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 latest Enterprise Survey. 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)

28.64 This sector comprises of services rendered by public and private communication organisations / enterprises. 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 for Departments of Posts & 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' is obtained on the basis of data obtained from the Central Government departments.

Trade (Sector 107)

28.65 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.

28.66 For estimating the input structure of trade activity, the organised and unorganised parts are dealt with separately. The organised part covers trade in the public sector and the private corporate sector. The inputs in the public sector enterprise are 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 is utilised. The input structure of the unorganised trade is 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 reference 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), are 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)

28.67 This sector consists of services rendered by hotels, restaurants, cafes, and other eating, drinking and lodging places. Organised and unorganised parts are dealt 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 latest available Enterprise Survey.

28.68 The input structure of the public sector part is 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 latest available Enterprise Survey on hotels and restaurants. The item-wise input to GVA ratios obtained from the results of the latest Enterprise Survey are applied to GVA of unorganised hotels and restaurants for reference year (1998-99), available from the NAS to arrive at the item-wise inputs of unorganised part for IOTT. The input structure of hotels and restaurants sector is finally obtained by adding the organised and unorganised parts mentioned above.

Banking (Sector 109)

28.69 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 lender, financiers, chit funds etc. & 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)

28.70 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)

28.71 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)

28.72 Activities covered under this sector are (i) educational services and (ii) research and scientific services. It includes both types of institutions, recognised and unrecognised. The total value of input of recognised institutions is estimated on the basis of data obtained from the Ministry of Human Resources Development. The input items include expenditure on apparatus, chemicals & consumable stores, libraries, maintenance of buildings, maintenance of equipment & furniture, games & 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 available from latest Enterprise Survey.

28.73 The item-wise break-up of "other items" for both recognised and unrecognised institutions is obtained on the basis of norms obtained by analysing the expenditure on the purchase of goods and services in education from the government budgets of Central Ministries/Departments, States/UT 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 is taken as the sum of total inputs mentioned above and GVA of education and research as worked out for NAS.

Medical & Public Health (Sector 113)

28.74 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/UT 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/UT governments.

28.75 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 latest Enterprise Survey, the input for organised sector is estimated using the GVA to output ratio of the public & private unorganised sector. However, "other

operation" appearing in the survey expenditure is further broken up item-wise on the basis of norms obtained from the analysis of accounts of private non-profit institutions relating to medical & health.

Other Services (Sector 114)

28.76 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 & dyeing, photographic studios, barber & beauty shops, (g) international and other territorial bodies, (h) radio and television and (i) services not elsewhere classified.

31.77 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 is dealt with separately for public and private sectors. The public sector part is determined from the analysis of the budget documents of the central and state governments and local bodies of municipal corporations. The input structure of radio and television broadcasting service is obtained by analysing the part of the Demands for Grants for expenditure for 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 latest Enterprise Survey. The combined input structure of "other services" is obtained by clubbing the details of inputs of sanitary services, radio and television services and rest of the other services.

Final Demand & Indirect Taxes

28.78 **Final demand:** 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)

28.79 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, available in the NAS are 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 are also used to arrive at the sector-wise estimates PFCE.

Government Final Consumption Expenditure (GFCE)

28.80 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 are also 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, are 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)

28.81 The detailed commodity-wise output data relating to products and by-products of capital goods industries covered in the ASI, are considered along with detailed data on exports and imports, and import duty for the preparation of commodity-wise estimates of GFCF.

Change in Stocks (CIS)

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

- 28.83 **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 are obtained through ASI and the Survey on Unorganised Manufacturing conducted by the NSSO. 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 are 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 are 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.
- 28.84 **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/UT 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" (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 latest available Enterprise Surveys on Transport & Hotels and Restaurants, Storage and Warehousing & Mining and Quarrying, and DTE & NDTE Surveys, are 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 are clubbed together to obtain the estimates of the commodity-wise CIS in sectors other than manufacturing.
- 28.85 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**
- 28.86 Exports comprise exports of merchandise on free on board (f.o.b.) basis and other items like transport and communication in respect of exports other than merchandise, insurance etc. are available in the DGCI&S publication 'Monthly Statistics of Foreign Trade of India, Vol. I, Exports'. For the remaining items data are obtained from the RBI.
- Imports**
- 28.87 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 cost, insurance and freight (c.i.f.) values are available in the DGCI&S publication 'Monthly Statistics of Foreign Trade of India, Vol. II, Imports'. For remaining items data are obtained from the RBI.
- Indirect taxes**
- 28.88 Indirect taxes are distinguished as commodity taxes and other indirect taxes. Commodity taxes include union & state excise duties, value added tax, 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 is 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: -
- 28.89 Commodity-wise union excise duties are taken from the Receipts budget of Central Government whereas data on state excise duties from respective State budget documents for the reference year.
- 28.90 The budget documents of State governments and Finance Accounts give only the state-wise break-up of the total sales tax levied and does not furnish their commodity-wise data. There is very little uniformity in the rates and exemptions of sales tax levied in different States & Union Territories. For allocating the total sales tax amongst 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 the specially tabulated industry-wise data on sales tax from the report of 51st Round of NSSO on un-registered manufacturing 1994-95.

- 28.91 Imports are reported at cost, insurance and freight (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 DGCI&S. Data on import duties are used to build up commodity sector-wise import duties (115 sectors). Adjustments are made for refunds & withdrawals to arrive at net import duties. Similarly, using the DGCI&S data, commodity-wise export duties/cesses are prepared.
- 28.92 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 are identified and allocated to the respective sectors of the IOTT.

Subsidies

- 28.93 The commodity-wise subsidies are compiled from the budgets 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 are allocated to the respective cells of the domestic flow matrix. Requisite details are, however, not available for many items like subsidies to agriculture, industry, irrigation, Food Corporation of India (FCI), National Small Industries Corporation, Small and Marginal Farmers Development Agencies, industrial corporations and subsidies for product promotion etc. Subsidies paid to FCI are 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. Similar subsidies given to Khadi and Village Industries Commission (KVIC) are allocated on the basis of details available in the report of KVIC. Irrigation subsidy is allocated to various crops in proportion to irrigated crop area.

MATHEMATICAL EXPRESSION ON THE METHODOLOGY OF CONSTRUCTION OF ASSOCIATED MATRICES

- A28.1 This Appendix gives a brief discussion on methods of obtaining *commodity x commodity* table and *industry x industry* table under alternative technology assumptions.
- A28.2 The *commodity x commodity* input-output table is suitable for multi sectoral projections where final demand estimates are obtained on commodity basis. The *industry x industry* input-output table is useful in detailed planning of industries whose products include by-products also. The two alternative assumptions for transferring of outputs of secondary products are (i) industry technology assumption where input structure of a secondary product is considered to be similar to that of the industry where it has been produced and (ii) commodity technology assumption where the input structure of the secondary product of an industry is assumed to be similar to that of the industry where it is primarily produced. Besides these two main assumptions, sometimes mixed assumptions have to be followed, as all secondary products cannot just be based on only one type of technology assumption. Usually commodity technology assumption is followed for subsidiary products and industry technology assumption is appropriate for joint products and by-products.
- A28.3 In a *commodity x commodity* table both rows and columns represent the commodity group sectors. If the secondary products of an industry group along-with the inputs are transferred to the industry group where they are the principal products, the resulting table is a *commodity x commodity* input-output table.
- A28.4 In an *industry x industry* table, on the other hand, both rows and columns represent industry group sectors comprising of a mix of different commodity groups. The row of a sector in this table gives the supply of all products and secondary product (as a mix) produced by the corresponding industry group for different intermediate and final uses.
- A28.5 The following gives briefly the methodology in mathematical terms for constructing such tables. The basic data available from industry input and output tabulations satisfy the following relationships:

Input relations:	$q_i = \sum x_{ik} + f_i$	(1)
Output relations:	$q_i = \sum_k m_{ki}$	(2)
	$g_i = \sum_j m_{ij}$	(3)
Where		
q_i = total output of j-th commodity group		
g_i = total output (of all products and by-products) of the i-th industry group		
f_i = final demand of the j-th commodity		
x_{ik} = output of j-th commodity used as input in the k-th sector (industry group)		
m_{ij} = output of j-th commodity produced by the i-th industry group		
The above symbols without subscript refer to the corresponding vectors		

A28.6 A schematic arrangement of input-output data in a simplified accounting framework can be presented as follows:

	Commodities	Industries	Final demand	Total
Commodities		X	f	q
Industries	M			g
Primary inputs		y'		
Total	q'	g'		

A28.7 Here y denotes the column vector of y_j and y_j denotes the value of primary inputs (factor incomes) in the j -th industry. The superscript prime ($'$) is used to denote the transpose.

A28.8 From this accounting data various other matrices can be derived further using the following notations:

A: *commodity x commodity* coefficient matrix
 W: *commodity x commodity* flow matrix recording the value of purchase of commodities by commodities
 B: *commodity x industry* coefficient matrix, values in the absorption matrix expressed as coefficients
 $B = X(g)^{-1}$

C: *Product mix* matrix, columns of which show proportions in which a particular industry produces various commodities
 $C = M'(g)^{-1}$ where g = diagonal matrix with diagonal elements as the elements of vector g

D: *Market share* matrix, the columns of which show proportions in which various industries produce the total output of a particular commodity
 $D = M(q)^{-1}$ where q = diagonal matrix with diagonal elements as the elements of vector q

E: *industry x industry* coefficient matrix
 Z: *industry x industry* flow matrix recording the value of purchases of industry outputs by industries
 e: final demand for the outputs of industries.

A28.9 The derived matrices can be conveniently seen in the following schematic arrangement:

	Commodities	Industries	Final demand
Commodities	A $W = Aq$ $= BDq = BM$	$B = X(g)^{-1}$	
Industries	$C = M'(g)^{-1}$ $D = M(q)^{-1}$	E $Z = Eg$	e

A28.10 According to the method suggested in "System of National Accounts", Studies in Method Series F.No.2, Revision 3, 1968 (UN), *commodity x commodity* table and *industry x industry* table under the two technology assumptions can be derived as under;

Commodity x commodity table:
Commodity technology: $q = (BC^{-1}) q + f, \quad W = (BC^{-1}) q$
Industry technology: $q = (BD) q + f, \quad W = (BD) q$

Industry x industry table:
Commodity technology: $g = (C^{-1} B) g + e, \quad Z = (C^{-1} B) g$
Industry technology: $g = (D B) g + e, \quad Z = (D B) g$

A28.11 For commodity technology assumption, the output or make matrix has to be square and non-singular so that inverse of the matrix could be obtained.

A28.12 In order to use *industry x industry* table under any of the assumptions, it is necessary to derive the final demand for the outputs of industries, 'e'. However, information of final demand is invariably available on commodity rather than industry basis and in order to estimate the final demand for industry outputs 'f' has to be made industry-wise by multiplying it by the appropriate matrix. Thus under,

Commodity technology : $e = C^{-1} f$
Industry technology : $e = Df$

A28.13 The *commodity x commodity* table is found to be more suitable in most applications since demand is for a particular commodity or group of commodities and not for the mixed

range of output of an industry and thus there is no need to transform the final demand vectors from one unit to another. Moreover, the calculated commodity outputs can be transformed using the market share or product mix matrix into industry output levels. This sequence of calculations makes an industry x industry table unattractive. Further, for a commodity x commodity table, transfers made under the commodity technology assumption, sometimes give rise to negative entries which are difficult to explain. Thus only commodity x commodity table under industry technology assumption has been presented in the present report.

Net indirect taxes for commodity x commodity table

- A28.14 The input flow matrix at producers' price can be considered as the sum of two matrices, (i) the input flow at factor cost and (ii) matrix of net indirect taxes. This matrix of net indirect taxes for commodity x industry table is denoted by T₃₁.
- A28.15 The matrix of net indirect taxes (T₂) for commodity x commodity table under the two technology assumptions can be derived in the same way as the commodity x commodity

flow matrix is obtained from the input flow matrix as described in "Problems of input-output tables and analysis" Studies in Methods -Series F. No. 14, Revision 1, 1966 (UN). Thus under,

Commodity technology : $T_2 = T_1 (g)^{-1} C^{-1} q$
Industry technology : $T_2 = T_1 (g)^{-1} D q$

- A28.16 The column totals of the net indirect tax matrix T₂ represent the total net indirect taxes on inputs consumed by various commodity groups and also on the categories of final demand. These net indirect tax totals are presented as a row at the bottom of the commodity x commodity table.

Value added for commodity x commodity table

- A28.17 In National Accounts Statistics, the estimates of gross value added are prepared according to different industry groups. However, for commodity x commodity table the estimates of gross value added according to different commodity groups are required. In what follows, the necessary details are presented to derive the vector of gross value added for commodity x commodity table.

A28.18 In the notations used so far, the set of industry cost equations can be expressed in the form $g = y + g B'I$ where I denotes the unit column vector **(4)**

A28.19 The set of commodity cost equations can be expressed similarly in the form

$$q = l + q A' i \text{ where } l \text{ denotes the vector of gross value added corresponding to different commodity groups.} \quad \textbf{(5)}$$

pre-multiplying (5) by D, we obtain

$$Dq = Dl + D q A' i \quad \textbf{(6)}$$

Under **commodity technology** assumption, $A = BC^{-1}$
 Also $M = Dq$ and $M' = Cg$
 Thus from (6), we get

$$\begin{aligned} g &= Dl + D q (C^{-1})' B' i && \text{since } g = Dq \\ &= Dl + M (C')^{-1} B' i \\ &= Dl + MM^{-1} g B' i \\ &= Dl + g B' i \end{aligned} \quad \textbf{(7)}$$

On comparing (4) and (7), we see that $y = Dl$

Hence

$$l = D^{-1} y$$

Similarly, on pre-multiplying (5) by C⁻¹, we obtain $C^{-1} q = C^{-1} l + C^{-1} q A' i$ **(8)**

Under **industry technology** assumption, $A = BD$
 Thus (8) becomes

$$\begin{aligned} C^{-1} q &= C^{-1} l + C^{-1} q D' B' i \\ \text{or} \\ g &= C^{-1} l + g (M')^{-1} q D' B' i \end{aligned}$$

$$= C^{-1}I + g (D')^{-1} D' B' i$$

$$= C^{-1}I + g B' i$$

(9)

On comparing (4) and (9), we see that

$$y = C^{-1}I$$

or

$$I = Cy$$

Therefore under,

$$\text{Commodity technology} : I = D^{-1}y$$

$$\text{Industry technology} : I = Cy$$

Mixed Assumptions

A28.20 For mixed assumption, the output matrix would be divided into two parts, such as

$$M = M_1 + M_2$$

Where M_2 is a matrix of those by-products which are to be transferred on the assumption of industry technology and the element of M_1 are outputs which, it seems

reasonable to treat on the assumption of commodity technology. The formation of $M_1 + M_2$ involves splitting individual elements of M , since these elements may contain a mixture of products not all of which are to be treated in the same way.

A28.21 With this decomposition of M , we would have

$$\text{commodity } \times \text{ commodity table} : q = I (B R) q + f$$

$$\text{industry } \times \text{ industry table} : g = (R B) g + R f$$

$$\text{where } R = C^{-1}(I - D_2^{-1} i) + D_2 ;$$

$D_2^{-1} i$ denote a diagonal matrix formed from the vector of $D_2 i$

A28.22 Since R involves the matrix C_1^{-1} , the matrices C_1 and D_2 must be square matrices of the same order.

A28.23 It may further be mentioned that C_1 and D_2 are matrices similar to C and D except that they are now based on M_1 and M_2 respectively using q_1 vector in case of C_1 , but q vector in case of D_2 .

SECTOR SPECIFICATION FOR THE INPUT-OUTPUT TRANSACTIONS

IOTT Sector number	Name	Specification
001	Paddy	P addy, rice milling
002	Wheat	W heat, flour milling
003	Jowar	J owar
004	Bajra	B ajra
005	Maize	M aize
006	Gram	G ram
007	Pulses	M illed and un milled tur, Urad, Moong, matar, masur and gram dal including flour
008	Sugarcane	S ugarcane, gur (indigenous production)
009	Groundnut	G roundnut
010	Jute	R aw jute
011	Cotton	R aw cotton
012	Tea	T ea plantation
013	Coffee	C offee plantation
014	Rubber	R ubber plantation
015	Coconut	C oconut, copra
016	Tobacco	T obacco plantation
017	Other crops	O ther cereals and their milling, sesamum, rape and mustard, linseed, castor, mesta, sannhemp, dry chillies, black pepper, dry ginger, turmeric, indigo, opium, potato, sweet potato, tapioca, banana, cashew nut, Arecanut, cardamom, citrus fruits, grapes, mangoes, other fibbers, other oilseeds, other sugars, other dyes and tanning materials, other drugs and narcotics, other condiments and spices, other fruits and vegetables, fodder, grass, rice bran, rice husk, straw and stalks, badges, cane trash and miscellaneous food and non-food crops.
018	Milk and milk products	M ilk consumed as such, ghee, butter, lassi
019	Animal Services (agri-cultural)	A gricultural animal services by rural bullocks and camels
020	Other livestock products	P roduction of meat, mutton, pork and glands, other meat products, raw hides and skins, animal hair, bristles, wool, eggs, poultry meat, honey, silk worm cocoons, bones, horns, hoofs, dung fuel & manure, increment in livestock
021	Forestry and logging	P lanting, replanting, conservation of forests, production of fuel including charcoal, felling and cutting of trees, hewing or rough shaping of poles, blocks etc. And transportation of logs upto the permanent lines of

IOTT Sector number	Name	Specification
		transport, industrial wood (timber, match and pulp wood) bamboo, sandal wood, gathering of uncultivated materials such as gums, lacs, resins, forest grown fruits, nuts, herbs, barks and cane
022	Fishing	R earing and catching of fish, seaweeds, shells, pearls, sponges etc. Fish curing viz; salting and sun drying of fish
023	Coal and lignite	C oal and lignite mining
024	Crude petroleum, natural gas	C rude petroleum, natural gas
025	Iron ore	I ron ore mining
026	Manganese ore	M anganese ore mining
027	Bauxite	B auxite mining
028	Copper ore	C opper ore mining
029	Other metallic minerals	C hromite, lead and zinc ore, silver ores, gold ores, limonite and rutile
030	Lime stone	L ime stone mining
031	Mica	M ica mining
032	Other non metallic minerals	D olomite, apatite, asbestos, barytes, china clay, gypsum, kyanite, magnesite, diamond, calcite, ochre, garnet, graphite, feldspar, fireclay, flourite, quartz and silica, sillimanite, steatite, minor minerals, salt mining and quarrying, sand and stone quarrying, mining of clay, sandpits, chemical and fertilizer, mineral mining, precious and semi precious stone mining
033	Sugar	M anufacture and refining of sugar
034	Khandsari, boora	B oora, candy and khandsari
035	Hydrogenated oil (Vanaspati)	H ydrogenated oils, Vanaspati ghee
036	Edible oils other than Vanaspati	E dible oils such as linseed oil, mustard oil, sesamum oil, coconut oil, groundnut oil, cotton seed oil, til oil, mahua oil etc.
037	Tea and coffee processing	B lended and unblended black tea leaf grade, dust and waste, coffee curing, roasting and grinding
038	Miscellaneous food products	P reservation, processing and canning of meat, milk foods and manufacture of dairy products, manufacture of fruit juice, jams, jellies, pickles and canning and bottling of fruits and vegetables, canning, preserving and processing of fish, crustacean and similar foods, manufacture of bakery products, production of common salt, manufacture of cocoa, chocolate, sugar confectionery and sweetmeats, cashew nut drying, shelling, roasting, salting etc., Manufacture of ice, prepared cattle, poultry and other animal feeds, starch processed from maize, tapioca, tamarind, potato etc., Manufacture of malted foods, grinding and processing of spices, papads, appalam, egg

IOTT Sector number	Name	Specification
		powder, semi-processed foods and instant foods, sago and sago products, vitaminised high protein flour (multi purpose foods), frying of dals, nuts and foods n.e.c., Residuary snacks n.e.c., Other food processing activities
039	Beverages	D istilling, rectifying and blending of spirits, wines, beer, malt, liquors, other malt country liquor, toddy, manufacture of aerated drinks, aerated natural flavoured syrups, synthetic flavoured syrups, fruit juices and beverages n.e.c.
040	Tobacco products	T obacco stemming, redrying, grading etc. And manufacture of bidi, cigars, cigarette, cheroots, cigarette tobacco, chewing tobacco, zarda and snuff
041	Khadi, cotton textiles in handlooms	C otton spinning in charkha, khadi weaving and finishing of cotton textiles in handlooms
042	Cotton textiles	C otton ginning, cleaning and baling, spinning, weaving and finishing of cotton textiles in mills and power looms, printing, dyeing and bleaching of cotton textiles, cotton textiles n.e.c.
043	Woolen textiles	W ool cleaning, baling and pressing, wool spinning, weaving etc. (handloom, power looms and mills), dyeing, bleaching and manufacture of woollen blankets, shawls, felts and others
044	Silk textiles	S pinning, weaving, finishing, printing, dyeing and bleaching of silk textiles
045	Art silk, synthetic fibre textiles	S pinning, weaving and finishing of synthetic fibres, rayons, nylons etc., Printing, dyeing and bleaching of synthetic textiles, other silk and synthetic fibre textiles
046	Jute, hemp, mesta textiles	P ressing, baling, spinning and weaving, finishing of jute, mesta, hemp and other coarse fibre, dyeing, printing and bleaching of jute textiles, manufacture of jute bags and other jute textiles
047	Carpet weaving	W eaving carpets, rugs, durries and others
048	Ready made garments and made up textile goods	R eadmade garments, clothing and T ailoring, made up textile goods, curtains, bed covers, furnishings, mosquito nets
049	Miscellaneous textile products	C otton, woollen and synthetic fibres knitting in mills or otherwise, thread and thread ball making, jute, cotton, hemp, sisal, nylon rope, cordage and twines, nets, webbing, narrow fabrics, embroidery work, laces, fringes, zari and zari products, manufacture of rain coats, hats, umbrellas etc., Oil cloth, rubberised cloth, tarpaulin, artificial leather, made-up canvas goods, coir fibre, yarn and coir products, linoleum and similar products, gas mantles and other textiles viz. Bandage, gauze, dressing cloth
050	Furniture and fixtures-wooden	W ooden, bamboo, cane furniture and fixtures and repair of such furniture
051	Wood and wood products except furniture	M anufacture of veneer, plywood and their products, sawing and planning of wood, container made of wood, cane, bamboo, reed etc., structural wooden goods such as beams, posts etc., Wooden industrial goods, cork and

IOTT Sector number	Name	Specification
		cork products and miscellaneous wood, bamboo and cane products
052	Paper, paper products and newsprint	M anufacture of machine made and made pulp, paper and paper board including newsprint, containers and boxes of paper and paper board, miscellaneous pulp products, paper and paper board articles
053	Printing, publishing and allied activities	P rinting and publishing of newspapers, periodicals, books, journals, atlases, maps, sheet music, directories, bank notes, currency notes, postage stamps, security passes, engraving, etching, block making, book binding, allied activities like envelope printing, picture post card printing, embossing
054	Leather footwear	M anufacture and repair of leather footwear, leather-cum-rubber/plastic cloth footwear
055	Leather and leather products except footwear	T anning, curing, finishing, embossing and japanning of leather, manufacture of wearing apparel and consumer goods of leather and substitutes of leather, scraping curving and tanning, bleaching, dyeing of fur and other pelts, manufacture of wearing apparel, rugs and other articles of fur and pelts
056	Rubber products	R ubber tyres and tubes for motor vehicles, tractors, aircraft, scooters, motor cycles and cycles and other rubber and plastic footwear, rubber surgical and medical equipment, rubber contraceptives, rubber pipes, balloons, rubber industrial and domestic goods and misc. Rubber products
057	Plastic products	P lastic moulded goods and such as containers, sheets, nets, cords, polythene bags, spectacles frames, industrial accessories, domestic goods and miscellaneous plastic products
058	Petroleum products	P roducts of petroleum refineries
059	Coal tar products	C oke and other coal tar products
060	Inorganic heavy chemicals	B asic heavy inorganic chemicals
061	Organic heavy chemicals	B asic heavy organic chemicals
062	Fertilizers	I norganic, organic, mixed and other fertilizers
063	Pesticides	I nsecticides, fungicides, weedicides and pesticides formulations
064	Paints, varnishes and lacquers	P aints, varnishes, lacquers and dyestuffs, waxes and polishes
065	Drugs and medicines	D rugs and medicines - allopathic, Ayurvedic, Unani, homoeopathic and others
066	Soaps, cosmetics, glycerine	S oaps, perfumes, cosmetics, toothpastes, soap in any form and other toilet aids, glycerine and detergents
067	Synthetic fibres, resin	T urpentine, resin, synthetic resin plastic materials and synthetic fibres like celluloid nylon, terylene and

IOTT Sector number	Name	Specification
		miscellaneous products of fermentation industries other than alcohol
068	Other chemicals	I nedible vegetable oils including solvent extracted oils, animal oils and fats, matches, explosives, ammunition, safety fuses, fire-works, photochemical materials, sensitised films and paper, fine chemicals, drug and dye intermediaries, glue and gelatine, shellac, synthetic sweeteners, textile chemical auxiliaries and other chemical products
069	Structural clay products	S tructural clay products such as fire bricks, refractories, tiles and others
070	Cement	C ement
071	Other non-metallic mineral products	M anufacture of glass and glass products, earthenware and pottery, chinaware, sanitary ware, porcelain ware, insulators, lime and plaster, mica products, structural stone goods, stoneware, stone dressing and crushing, earthen and plaster statues and products, asbestos cement and its products, slate products, cement and concrete products, abrasives, graphite products, mineral wool, silica products and other non-metallic mineral products
072	Iron and steel ferro alloys	I ron and steel, special steel and ferro-alloys
073	Iron and steel casting and forging	I ron and steel castings and forgings
074	Iron and steel foundries	I ron and steel structurals, pipes, plates, wire drawings, tools and others
075	Non-ferrous basic metals (including alloys)	M elting, refining, rolling into basic forms, wire drawings etc. Of non-ferrous basic metals and alloys
076	Hand tools, hardware	H and tools, bolts, nuts, locks, metal chains, agricultural hand tools and implements, general hardware
077	Miscellaneous metal products	M etal containers, steel trunks, safes, vaults, sanitary and plumbing fixtures and fittings of metal, stoves, hurricane lanterns, welded products, enamelling, galvanising, plating and polishing of metal products, metal utensils, cutlery and kitchenware, metal furniture and fixtures, blades, springs, art metal ware, other metal products
078	Tractors and other agricultural implements	T ractors and other agricultural machinery, equipment and implements
079	Industrial machinery for food and textile industries	R ice, dal, flour and oil mill machinery, sugar machinery, tea machinery, textile machinery and jute machinery
080	Industrial machinery (except food and textile)	P harmaceutical machinery, chemical machinery, paper machinery, mining machinery, cement machinery
081	Machine tools	A utomatic, capstans, turrets and lathes, boring, broaching, drilling and threading machines, milling, planning, shaping, gear cutting and slotting machines, grinding, lapping, honing and polishing machines, sawing, filling and cut-off machines, metal forming machinery and other metal work machine tools

IOTT Sector number	Name	Specification
082	Office computing and accounting machinery	C omputing and accounting, office copying machines, calculating machines, typewriters, duplicators, postal franking machines, addressing machines, weighing machines
083	Other non-electrical machinery	D rills, coal cutting machines, earth moving, lifting and hoisting machinery, cranes, conveyors and road rollers and other heavy machinery and equipment used by construction and mining industries, prime movers, boilers and steam generating plants such as diesel engines, refrigerating, air conditioning plants for industrial use, domestic air conditioners and refrigerators, fire fighting equipment and appliances including fire engines, conveying equipment such as bucket elevators, derrick and size reduction equipment like crushers, ball mills etc., Centrifugal machines, pumps, air and gas compressors and vacuum pumps, ball roller and tapered bearings, speed reduction units, sewing and knitting machines, washing machines, filtration and distillation equipment, arms and armaments and miscellaneous non-electrical machinery and their repair services
084	Electrical industrial machinery	G enerators, transformers, switch gears, electric motors
085	Electrical cables, wires	I nsulated cables and wires
086	Batteries	S torage batteries, dry cells
087	Electrical appliances	E lectrical fans, lamps, fluorescent tubes miniature lamps, household appliances like iron, heaters etc. And their repair services
088	Communication equipment	M anufacture of wireless communication apparatus, manufacture of radios, teleprinters, telephones, telegraph equipment, phonographs and record changers, manufacture of parts and accessories and other including public address equipment
089	Other electrical machinery	M anufacture and repair of radiographic X-ray apparatus and tubes and parts, manufacture of light fittings, emergency lighting equipment, flash lights, stage lighting equipment, electric furnaces and oven telescopic aerials and parts and accessories
090	Electronic equipment including TV	M anufacture of television sets, electronic computers, electronic control instruments, other parts and accessories
091	Ships and boats	M aking of ships and other vessels drawn by power, boat building, and their repairing
092	Rail equipment	M anufacture of diesel locomotives, steam locomotives, electric locomotives, railway coaches, wagons, parts and accessories
093	Motor vehicles	M anufacture of motor cars, buses, trucks, jeeps, station wagons and parts and repair of motor vehicles
094	Motor cycles and scooters	M anufacture of motor cycles, scooters and scooter parts and accessories and their repair
095	Bicycles, cycle-rickshaw	M anufacture of cycles, cycle rickshaws and repair of bicycles and cycle-rickshaw
096	Other transport	M anufacture of other rail-road equipment, tramway

IOTT Sector number	Name	Specification
	equipment	works, bullock carts, push-carts, hand-carts and transport equipment not elsewhere classified
097	Watches and clocks	M anufacture of clocks, table time pieces, watches and their parts and repair of watches and clocks
098	Miscellaneous manufacturing	M anufacture of surgical, medical, laboratory scientific and mathematical instruments water meters, steam meters and electricity meters, recording and regulating devices for pressure, temperature, weight, level etc. Photographic and optical goods (excluding photochemical, sensitised paper and film), jewellery and related articles, minting coins, sports and athletic goods and play equipment, musical instruments, stationery articles like fountain pens, pencils, pens, pin cushions, tags, hair brushes, dusters, feather articles, signs and advertising displays, mechanical toys, other toys, bones, ivory, horns and similar products, wigs, costume and imitation jewellery novelties, lampshades, presentation articles, badges and others, manufacture of aircraft and parts and repair of enterprises not elsewhere classified
099	Construction	C onstruction and maintenance of buildings, aerodromes, roads, railways, bridges, tunnels, pipelines, ports, harbours, runways communication systems, waterways, water reservoirs, hydro electric projects and industrial plants and activities allied to construction
100	Electricity	G eneration and transmission of electric energy and its distribution to households, industrial and commercial and other users
101	Gas	M anufacture of gas in gasworks and distribution through mains to household, industrial and commercial and other users, L.P.G., gohar gas
102	Water supply	C ollection, purification and distribution of water
103	Railway transport services	G overnment railways and Private railways
104	Other transport services	B uses, tramways, trucks, taxies, auto-rickshaws, animal services, urban bullock, urban buffalo, horses and other animals drawn carts, cycles, hand pulled rickshaw and pack animals, shipping transport by boats, steamer, ferry etc. By canal or rivers and unorganised water transport by sea, air transport and services incidental to these transports
105	Storage and warehousing	W arehousing, cold storage and storage and warehousing not elsewhere classified
106	Communication	P ostal, telephones, telegraph services rendered by postal and telegraph department and overseas communication services
107	Trade	W holesale and retail trade
108	Hotels and restaurants	S ervices rendered by hotels, boarding houses, eating houses, cafes, restaurants, canteen etc.
109	Banking	C ommercial banks, banking department of RBI, other financial companies, industrial development and financial corporations, post office saving banks, cumulative time deposit accounts, cooperative credit societies

IOTT Sector number	Name	Specification
110	Insurance	Life insurance corporation, postal life insurance, employees state insurance and non-life insurance such as fire, marine, accidents etc.
111	Ownership of dwellings	Residential houses
112	Education and research	Education, scientific and research services
113	Medical and health	Medical and health services
114	Other services	Real estate, religious, legal, information & broadcasting, recreation and entertainment, domestic laundry, cleaning and dying, barbers and beauty shops and other personal services, sanitary services etc. Wrapping packing and filling of articles and information & broadcasting services
115	Public administration and defence	Public administration and defence

Notes:

1. Sectors 001 to 017 also include agricultural and horticultural services such as harvesting, baling and threshing, husking and shelling, preparation for marketing, pest destroying and spraying, pruning, picking and operating irrigation systems.
2. Sectors 018 to 020 include breeding and rearing of animals and poultry including private veterinary services.
3. Sectors 023 to 032 include extraction, breaking, milling, washing, cleaning, grading and processing.

AGGREGATED SECTOR CLASSIFICATION FOR INPUT-OUTPUT TRANSACTIONS

Aggregated Sector no.	Description of aggregated sector	Sectors in Appendix 28.2
1	Food crops	1, 2, 3,4, 5, 6, 7
2	Cash crops	8, 9, 10, 11, 16
3	Plantation crops	12, 13, 14, 15
4	Other crops	17
5	Animal husbandry	18, 19, 20
6	Forestry & logging	21
7	Fishing	22
8	Coal and lignite	23
9	Crude petroleum & natural gas. . .	24
10	Iron ore	25
11	Other minerals	26, 27, 28, 29, 30, 31, 32
12	Sugar	33, 34
13	Food products excluding sugar	35, 36, 37, 38
14	Beverages	39
15	Tobacco products	40
16	Cotton textiles	41,42
17	Wool, silk & synthetic fibre textiles	43, 44, 45
18	Jute, hemp and mesta textiles	46
19	Textiles products including wearing apparel..	47, 48, 49
20	Wood and wood products except furniture. . .	51
21	Furniture and fixture.	50
22	Paper and paper products.	52
23	Printing, publishing and allied activities. .	53
24	Leather and leather products.	54, 55
25	Plastic and rubber products.	56, 57
26	Petroleum products	58
27	Coal tar products	59
28	Inorganic heavy chemicals	60
29	Organic heavy chemicals.	61
30	Fertilizers.	62
31	Paints, varnishes and lacquers.	64

Aggregated Sector no.	Description of aggregated sector	Sectors in Appendix 28.2
32	Pesticides, drugs and other chemicals. . . .	63, 65, 66, 67, 68
33	Cement.	70
34	Non-metallic mineral products	69, 71
35	Iron & steel industries and foundries. . . .	72, 73, 74
36	Other basic metal industry.	75
37	Metal products except mach. & transport Equipment	76, 77
38	Agricultural machinery.	78
39	Industrial machinery for food and textiles. .	79
40	Other machinery.	80, 81, 82, 83
41	Electrical, electronic machinery & appliances.	84, 85, 86, 87, 88, 89, 90
42	Railway transport equipment.	92
43	Other transport equipment.	91, 93, 94, 95, 96
44	Miscellaneous manufacturing industries. . . .	97,98
45	Construction.	99
46	Electricity.	100
47	Gas and water supply.	101,102
48	Railway transport services.	103
49	Other transport services.	104
50	Storage and warehousing.	105
51	Communication.	106
52	Trade.	107
53	Hotels and restaurants.	108
54	Banking.	109
55	Insurance.	110
56	Ownership of dwellings.	111
57	Education and research.	112
58	Medical and health.	113
59	Other services.	114
60	Public administration and defence.	115
