Chapter Four

METHODS FOLLOWED FOR ESTIMATION OF INDIA'S INCOME

4.1. In spite of the difficulties mentioned in the preceding chapter we have ventured to put forward an estimate of India's income for 1948-49. The estimate undoubtedly makes use of a number of expedients, assumptions and guesses in order to overcome the many gaps in the statistical field and to extend its coverage to the whole of the country and to all the sectors of its economy. The estimate is obviously tentative and subject to revision in the light of additional data. If nevertheless we have put forward these provisional figures, it is because we feel that the only way to make progress in this field is to make the best use of what is available and in the process point to the directions in which there is need for collection of additional data or for additional analysis.

4.2. In determining the methods followed for estimating India's income for 1948-49, we have received valuable help from the work of previous research workers in the field. In particular, the two pioneering studies made by a member of the Committee in the field of national income deserve mention*. Though the estimates now put forward do, in our opinion, constitute better estimates than any published so far, we are also conscious of the fact that this is due in large measure partly to the availability of new material such as the Census of Manufactures and Marketing Reports and partly to the advance which has taken place in the whole field of national income work in the last ten to twelve years. We must also acknowledge that the broad pattern of the methods followed in our estimate have their basis in the methods adopted by our colleague in the two studies mentioned above.

4.3. The methods followed in the estimation of India's income have been necessarily governed by the availability of data. It has, therefore, not been possible to use either the 'inventory' or the 'income' method to cover the entire range of the economy. We have, therefore, estimated the total working force in 1948-49 and its distribution among different occupations; this occupational classification is made on the basis of the classification of the economy by industry, including under the term 'industry'

* V.K.R.V. Rao : *An Essay on India's National Income: 1925–29* (Allen and Unwin) and *The National Income of British India : 1931–32* (Macmillan).

also agriculture, services, and all other means of income generation. The inventory method is applied to as many sectors of the economy as possible, the value of net product being obtained by complicated process of estimation involving many ingenious devices and assumptions for inferring the magnitudes of the unknown from those of the known; while for the remaining sectors the income method is applied, the number of workers in each category being obtained from the re-organized data on occupational classification. The total gives the net domestic product at factor cost, and after adjusting for earned income from abroad, the figure of national income for 1948-49 is derived. The area and population covered by this estimate pertains to the whole of the Union of India; and this in turn involves a good deal of processing of statistical material as also the use of a number of assumptions as much of the data available in the field of Indian income relates to the territory and population of India before partition.

4.4. Detailed notes on our methods of estimation are to be found in the appendix. In this chapter, however, we have given a brief account of the major features of the methods followed for estimating India's income in order that the reader may be able to form his own judgment on the degree of validity of our figures.

4.5. In arriving at the total number and the occupational classification of the working force, we have been faced not only with the difficulty that the year chosen for the estimates is an inter-censal year, but also by the fact that the published census reports of 1941 do not contain figures of occupational classification, tabulation of the occupation data having been abandoned on grounds of economy. A significant exception to this statement is provided by the census reports of Class B and C States covering a population of 53.8 millions. Fortunately a 2 per cent (every fiftieth) sample of census slips had been preserved; and after an expert enquiry* made by the Government of India in 1945, the Indian Statistical Institute of Calcutta was entrusted with the task of making estimates of occupational distribution for class A States for 1941. These tables covering a population of 235.1 millions together with the tables available in the 1941 census for class B and C States covering a population of 53.8 millions gave a total of 288.9 millions out of a total population of 318.9 millions. For the balance of 30 millions, the working force is estimated from ratios calculated separately for Class A and for Class B and C States. The total gives the working force for 1941. For arriving at the working force and its

* *Report of the Population Data Committee* (Government of India, 1945).

classification for 1948, the assumption is made that the ratio of occupied population in all industrial classes and subclasses in 1941 to the total population remained the same in 1948; these ratios were calculated separately for male and female principal earners and working dependents. It will be possible to check this assumption when the results of the 1951 Census become available, and it is likely that these figures will require some revision in future.

4.6. Another feature of the estimated working force and its industrial classification is our inclusion of working dependents in the working force and the exclusion of subsidiary workers. Dr. Rao had included both working dependents and subsidiary workers in his calculation of the working force in 1931 and gave them weights of $\frac{1}{4}$ and $\frac{1}{8}$ respectively as compared to 1 for principal earners. We have not followed this procedure mainly because the scale of equivalence adopted is somewhat arbitrary, and considerable research has to be undertaken before scales of equivalence can be established with real justification. Moreover, the inclusion of subsidiary workers as above rests on the assumption that an earner with a subsidiary occupation necessarily earns more than one without a subsidiary occupation whereas it may well be that subsidiary occupation is associated with less than average income in the primary occupation. Finally any error arising from our procedure is likely to be negligible in the estimates of Indian income as the bulk of it is estimated on the inventory or net output method.

4.7. We have made some adjustments in the category of occupational classes with a view to making our classifications more logical in respect of the persons included in each category. Estimates of working force and its occupational distribution in 1948 are given in Table 1; these constitute the controlling totals in our calculation of India's income.

TABLE 1: DISTRIBUTION OF WORKING FORCE BY CENSUS SUBCLASSES

census subclasses		principal earners plus working dependents		principal earners plus ½ working dependents	
		no. in (000)	p.c.	no. in (000)	p.c.
(1)		(2)	(3)	(4)	(5)
I.	exploitation of animals and vegetation	90,537	68.2	81,550	67.9
II.	exploitation of minerals	633	0.5	589	0.5
III.	industry	18,019	13.6	16,245	13.5
IV.	transport	2,448	1.8	2,269	1.9
V.	trade	8,250	6.2	7,706	6.4
VI.	public force	1,909	1.4	1,847	1.5
VII.	public administration	1,697	1.3	1,638	1.4
VIII.	professions and liberal arts	5,044	3.8	4,673	4.0
IX.	domestic service	4,194	3.2	3,533	2.9
total		132,731	100.0	120,050	100.0

4.8. The categories of income arising from the following sectors are estimated on the basis of the 'inventory' or value of net product method:

(1) exploitation of animals and vegetation including animal husbandry and fishing;
(2) exploitation of minerals; and
(3) industry.

The remaining items in Table 1 are dealt with on the 'income' method, except in the case of house property where income from urban house property is derived from municipal taxes on property and that from rural house property from an average rate of return on the basis of the estimated value of rural houses.

4.9. Estimating the value of agricultural output is subject to a number of difficulties because of inadequacy of coverage and, where coverage exists, inaccuracy of return in regard to the data dealing with acreage, outturn, valuation, and derivation of net value. Thus statistics of land utilization are available only for 557 million acres out of a total geographical area of 781 million acres in the Indian Union. Of these 781 million acres, 224 million acres are 'non reporting'. For 180 million acres, returns of land utilization are estimated and are not based on complete enumeration.* Estimates of yield for the 'forecast' crops cover 230 million acres or roughly 76 per cent of the gross area under cultivation; estimates of yield are also available for tea, coffee and rubber. Even in the case of forecast crops, with the exception of rice and wheat in class A States for which out-turn statistics based on random sample surveys are available, estimates of out-turn are generally based on eye-estimation by the village *patwari* and contain an unknown element of error. Estimates of out-turn for certain other crops are made by the Ministry of Agriculture as also estimates of out-turn of foodgrains for part of the non-reporting area. For the remaining crops including pulses, fruits, vegetables, 'other' foodgrains, 'other' pulses, 'other' oilseeds, 'other' drugs and narcotics, 'other' dyes, 'other' fibres, 'other' condiments and spices, fodder crops, grass, straw, rice husk and bran and miscellaneous food and non-food crops, estimates have been made on the basis of miscellaneous data obtained from both official and non-official sources, especially the Ministry of Agriculture and from published and unpublished Marketing Reports prepared by the Agricultural Marketing Adviser to the Government of India. A noteworthy feature is our inclusion of the output of straw, stalks, rice husk,

* Ministry of Agriculture: *Co-ordination of Agricultural Statistics in India*, 1949, p. 3.

bran, grass and fodder even though these are used mostly for animal consumption.

4.10. As regards valuation, we have in the main adopted harvest prices for individual States as constituting the nearest approximation to prices at the farm level or those relevant for the producer. It must be noted however that harvest prices are usually wholesale prices ruling in important rural markets during the harvest time, while in the case of Bombay, Madras and for a few crops in Madhya Pradesh harvest prices are in fact retail prices. Moreover, harvest prices are not available for all crops or for all areas even for important crops, and recourse has had to be taken to other available price data for such crops and for such areas. Since these prices, including harvest prices, are in a sense market prices of crops after husking, cleaning and similar processing for market, we have treated the value of agricultural output as including these ancillary activities including marketing services performed by the cultivator. Incidentally this involves a departure from a strictly industrial classification of national income but this is due to the lack of a strictly functional distribution of economic activity in our country. It may also be noted that our treatment fails to take note of the possible differences between the imputed value attributable to the non-marketed part of the agricultural output and the actual value measured by the price obtained for the marketed output. The gross value of agricultural output resulting from these calculations is thus based on different types of estimates. The approximate coverage of these different types of estimates is as follows. Forecast crops, including rice husk and bran, stalks and straw, and including the estimate for non-reporting areas roughly constitute 74 per cent of the total. Estimates of output (for non-forecast crops) supplied by the Ministry of Agriculture come to 6 per cent while those derived from the Marketing Reports also cover 6 per cent; finally, 13 per cent of the gross value of agricultural output is based on estimates of value per acre of the crops for which estimates of output are not available.

4.11. The problem of netting the gross value of agricultural output arrived at as above is complicated by the fact that there is no census of agricultural production as such nor are there authoritative and comprehensive studies of agricultural costs covering the entire country and all the crops. Information on seed, wastage, market charges, manures, repairs and depreciation of implements and feed of livestock used on the farm have been obtained either from the Ministry of Agriculture or from standard text books of agriculture or from Marketing Reports or other miscellaneous published and unpublished material. No deduction has been made for

interest on productive agricultural debt, as all income originating in each category has been included by us in that category even though it may not all accrue to the persons returning their occupation under that category. It may be of interest to the reader to know that the total cost of production deducted by us comes to 21 per cent of the gross value of agricultural output. To the net value thus arrived at, we have added an arbitrary figure to cover non-reporting areas.

4.12. As regards the income originating in animal husbandry we have used the livestock census data of 1945 as our controlling totals. Estimates of the output of different livestock products such as milk and milk products, meat, hides and skins, eggs and poultry, wool, dung and minor items have been obtained either from Marketing Reports or from the Directorate of Marketing and Inspection. For valuation of output, prices have been obtained either from published Marketing Reports or from the Directorate of Marketing and Inspection or from other sources; where the prices obtained do not cover all areas, averages have been used based on available data. Direct estimates of value have been taken, made on a somewhat arbitrary basis for minor products such as bones, horns, ivory, tips, blood, etc. The net value of the product has been arrived at by deducting the estimated value of goods consumed by non-service livestock, no allowance being made for distributive margins in view of the fact that almost the entire material consumed comes from within the agriculture and livestock sector. It may be of interest to note that the estimated cost of production works out at 47 per cent of the gross value of output in this sector.

4.13. As regards forestry, a considerable volume of data is available for government forests but it is not in a form that can be directly used for purposes of estimation. The situation is further complicated by the existence of private forests as also by the lack of complete coverage of the area under forests in the country. An attempt has been made to estimate directly the value of forest products in the area for which data are available and the average value per acre thus obtained extended to the remaining area. The method followed is not very satisfactory but cannot be helped in the absence of more comprehensive data.

4.14. As regards the income originating in the fishery sector, the statistical material available is both scanty and unreliable, and reliance has been placed mainly on the Marketing Report on fish. This figure will undoubtedly have to be revised when additional data become available.

4.15. Estimation of gross value of output in the minerals sector is comparatively easy, as adequate statistical material is available both in the

Reports of the Chief Inspector of Mines and in the surveys made by the Geological Survey of India. The latter gives break-downs of the figures by States and endeavours to evaluate the output of all minerals at pit-head prices. We have, therefore, preferred to use the figures obtained from the Geological Survey. Net value figures are obtained after making some arbitrary deductions for cost of materials and of electricity consumed, deductions for depreciation being obtained from an analysis of the balance sheets of mining companies carried out by the Reserve Bank of India.

4.16. The sector on industry has some good statistical coverage on the one hand and a great deal of scattered and somewhat uncertain data on the other. We have classified the industrial sector under two broad categories, namely factory industries, and small enterprises including hand-trades (≒handicrafts). Figures of the number of persons employed in the former are obtained on the basis of factory statistics with some minor adjustments for lack of coverage, while those of the persons employed in small enterprises are obtained by deduction from the overall total of persons engaged in industry given in Table 1.

4.17. For factory industries, there have been available for some years figures of output of a number of such industries. Recently, however, more comprehensive data have become available in the Census of Manufactures annually undertaken since 1946 by the Directorate of Industrial Statistics. Thus, the Census of Manufactures for 1948 gives not only figures of persons employed and quantum of output but also those of net value added by manufacture in each group arrived at by gross value of output *less* raw materials, fuel, etc., *less* depreciation. No allowance however is made for certain other operational costs such as current repairs, insurance charges, costs of advertisements, etc. Moreover, the data given in the Census of Manufactures pertain only to 29 groups of industries, covering an employed population of 1.5 million workers, out of the total employed population of 2.6 million workers in 63 groups of industries. Thus 1.1 million workers have been re-classified into the Census of Manufactures categories, and rates of net output per worker as given in similar industries in the census were used. For those workers who could not be brought under any of these categories, a simple average of net output per worker for all the 29 groups of industries was applied. Independent estimates of net output were made for electricity generation, film industry, etc. From the total value thus arrived at, which is already net of raw materials, fuel and depreciation, deductions have been made for insurance

premiums, imputed banking charges,* and other miscellaneous charges. The resulting figure constitutes the net value of manufacture of the factory sector of industry.

4.18. The position regarding the net value of manufacture of small enterprises, which consists of small establishments of the factory type and of cottage and hand industries, is much more difficult, as there is not even a partial census of this sector nor comprehensive studies either of output or earnings. The workers in this sector have been classified under three broad categories, viz. factory type small enterprises, those of an intermediate type, and cottage and hand industries, on the basis of an examination of the detailed census heads into which the total figure has been classified. For arriving at the net output per worker, all available material on daily, weekly, monthly and annual earnings in these activities have been tabulated and reduced to annual equivalents, and adjusted for changes in earnings in the case of data which pertain to an earlier period. The figures thus arrived at for different occupational categories are applied to workers in the cottage industry group; in the case of workers in the intermediate group an addition of 12 per cent is made to account for income payments other than wages and salaries, while in the case of workers in the factory type, the corresponding addition is 24 per cent. It may be noted that the addition made to the net earnings per worker in the intermediate and factory type small enterprises are on the basis of $\frac{1}{8}$ and $\frac{1}{4}$ respectively of the difference between net value of manufacture per worker and net figure of wages and salaries per worker in the factory industries. These additions have been made on the obvious assumption that in these types of small enterprises, a given return is attributable to factors of production other than labour. It must be added that as the earnings data, on the basis of which the figures of net output per worker are calculated, are scattered and not derived from a random sample, the resulting figures of the net value added by this sector are likely to contain a significant measure of error. It goes without saying that these figures will have to undergo substantial revision when additional data become available.

4.19. As regards trade and transport, the workers in this category are classified for purposes of income estimation into the following broad groups, viz. communications, railways, organized banking and insurance, and other commerce and transport. The last is a residual and not only accounts for the largest number of workers in this category but also corresponds to

* See appendix, A.72.

the small enterprise section in the industrial sector in respect of the domestic or non-organized character of the economic activity.

4.20. The value of the net output of communications is derived from government budget accounts, while that of railways is obtained from the accounts published by the Railway Board. As regards banks, use has been made of the analysis of the balance sheets and profit and loss accounts of 611 scheduled and non-scheduled banks for 1948, undertaken by the Reserve Bank of India. For co-operative societies, costs of management for 1948-49 *less* 10 per cent deduction for cost of stationery, etc., have been assumed to represent wage and salary payments and banking surplus. The net value added by the banking department of the Reserve Bank of India has been estimated on the basis of wage and salary payments derived from the Bank's profit and loss accounts for the year ended June 1949. The sum of the above is taken to be the net product of the banking sector. Imputed receipts of the banking sector for services rendered to other sectors have been calculated in order that they may be deducted from the net value of those sectors and double counting thus avoided.

4.21. As regards insurance companies, data available in the Indian Insurance year book for 1949 have been made use of, and the net contribution estimated on the basis of wages and salaries plus operating surplus of the concerns constituting the sector. Here again, imputed values are estimated of business insurance premiums paid by different sectors of productive activity and deducted from the net value contributed by the relevant sectors.

4.22. Net value attributable to other commerce and transport is extremely difficult to estimate in the absence of a census of distribution. In fact, it is not possible to assess even the volume of trading transactions in the absence of such a census. The earnings of workers in this sector have therefore to be estimated on a rough and ready basis of average earnings in different trades. The workers under other commerce and transport are divided into two broad categories, viz. those who pay income tax and those who do not. The income of the former is obtained from income tax statistics. The latter are, in turn, divided into employers and employees on the basis of some evidence available for Bombay in pre-war years. Obviously the application of this ratio to the whole of the country leads to an error of unknown magnitude. The earnings of employees and of employers are estimated on the basis of scattered and miscellaneous data that are available on the subject. It may be noted that the average rate of earnings applied to employers is Rs. 2400 per year, while that applied to

the bulk of the employees is Rs. 720 per year. No deductions are made, as the figures are assumed to represent *net* average earnings in this sector. An alternative approach followed by the National Income Unit on the basis of an analysis of distributive costs culled from sources of widely differing reliability and range of comprehensiveness gives a figure of net value added by this sector which is slightly higher than the first figure. We have decided to use the first figure, which is based on the income method as it involves a much smaller number of assumptions than the alternative approach, the assumptions made being also more capable of verification in a broad kind of way. Moreover, the difference between the two alternative estimates is less than 4 per cent. In any case, there is no doubt that the estimate of income from this sector forms the weakest link in our estimates of India's income for 1948-49; and too much stress cannot be laid on the imperative need for the collection and analysis of additional material in the field of both incomes and distributive margins in respect of unorganized trade and transport.

4.23. The sector entitled professions and liberal arts presents even greater difficulties for the national income estimator, for the data available on numbers are not reliable while those available on earnings and expenses are not representative. The division of workers in this sector between urban and rural areas is also a matter of conjecture. Nevertheless an estimate has been made on the basis of estimated average earnings in each category figuring under this sector; the figures thus arrived at have been compared with the estimated value of the net output of this sector derived from an analysis of the somewhat large but not particularly representative data available on consumer expenditure. As the two figures do not show a wide divergence, and as the latter is based on somewhat firmer data than the former, we have used the latter figure in our estimate of national income. It is not necessary to stress the importance of consumer expenditure studies undertaken on a country-wide and random sample basis in order to derive not only the figures of net value contributed by this sector but also in order to obtain the more important figures of expenditure patterns, and of savings. Such studies could usefully be supplemented by income studies for workers in this sector, especially of those like barbers, washermen, etc., whose services are of a more standardized character and whose incomes are likely to show a smaller range of variation than those of, say, lawyers and doctors.

4.24. The net value contributed by government services fall under two sections, viz. general administration, and business enterprises. The latter

fall under the industry sector and have been treated there on the same basis as other industries. As regards the former, the convention has necessarily to be accepted of treating the wages and salaries paid by all government administrative departments as the value (at cost) of government services. Figures in respect of these have been culled from budget accounts, both central and State, accounts of municipalities, and returns received directly from port trusts. Where establishment expenses do not clearly distinguish wages and salaries from purchase of materials or other miscellaneous expenditure, rough allocations and estimates have had to be made. In view, however, of the wealth of data available in regard to government accounts and the importance of analysing government share in the generation, utilization and disposal of national income, including current consumption and capital formation, we have devoted special attention to the public sector and have put forward in the next two chapters a number of tables which constitute the first of their kind to be published in this country.

4.25. Estimation of the income of domestic workers is subject to the same difficulties as those we have mentioned for estimating the income accruing to professions and liberal arts. Though an estimate has been made of the net value added by this sector, we cannot emphasize too strongly its unsatisfactory character. Here again is a field of study that requires immediate attention.

4.26. All house property in the country is divided into two classes, viz. urban and rural. Estimated annual rentals in urban areas derived from the collection of municipal rates and house taxes are used for estimating the income from urban house property. It is not possible to do the same in the case of rural house property. Here, therefore, the number of rural houses is estimated by extrapolation from the 1941 census tables, the average value of rural houses estimated on the basis of some limited data that are available on the subject, and current rental value imputed by applying 6 per cent rate of interest on the value of this property. From this rental value, the net value is obtained by deducting the estimated annual expenditure on maintenance and repairs of rural houses.

4.27. The sum of the net output of all the sectors discussed above gives the net domestic product at factor cost. In order to arrive at the national income we have to adjust this figure by that of the estimated net income from abroad. Fortunately, a wealth of statistical material in regard to the country's balance of payments is available in the publi-

cations of the Reserve Bank of India which have been made use of in this connection. Incidentally, we have taken the opportunity of using these data for presenting a number of tables in the next two chapters showing the relation of the economy to the rest of the world. Adjusting the estimated net domestic product by the estimated net income from abroad we arrive at an estimate of the national income of India for 1948-49.

4.28. In the next chapter, we proceed to give in tabular form the results of the calculations described in this chapter. We have pointed out the many limitations of the available material. We are, however, presenting the estimates not because we think that the individual figures are free from a large margin of uncertainty but because they have an overall value in showing the relative magnitudes of the different items, and because they bring out the need of a continuing improvement of the statistical information and its economic analysis.