CHAPTER II

INCOME FROM AGRICULTURE

1. Since the publication of the Final Report of the NIC (1954), certain additional data have become available making it possible to carry out certain revisions to improve the estimates of net output from 'agriculture' as published in various issues of the 'Estimates of National Income'. These estimates have so far been prepared using the methodology and source material described in paras 2.47 to 2.89 of the Final Report of the NIC. The revisions made in the course of the calculations in this chapter consist mainly of the following : revision of the earlier years' outturn estimates of principal crops on the basis of official index numbers of agricultural production, estimation of yield rates of various bye-products and value of yield per acre of certain unspecified minor crops where no data exist on physical yield rates, revision of the basis of estimating value of various cost deductions and widening of the empirical coverage of data on wholesale prices used for evaluation of crop outturn. These improvements have been discussed in the following paragraphs and the revised estimates presented for the period 1955-56 to 1959-60.

2. The activities included in the sector 'agriculture' comprise 'growing of field crops, fruits, nuts, seeds, vegetables and flowers; tea, coffee and rubber plantations; agricultural and horticultural services on a fee or contract basis such as harvesting, baling and threshing, husking and shelling and preparing of tobacco for auctioning; pest destroying, spraying, pruning, picking and packing and operating irrigation systems' (other than those operated by government), rental income from farm buildings and farm machinery; interest on agricultural debt; to the extent the producers themselves carry their farm products to established markets for direct sale to wholesalers etc., these distributive services are also regarded as ancillary activities of the primary producers in this sector. Even though this is not in strict conformity with the International Standard Industrial Classification of All Economic Activities, the diversified nature of activities of the primary producers in an underdeveloped country like India makes it difficult to adhere strictly to the concept of industrial classification. Necessary deductions have, however, been made to the extent that certain income payments flow across the boundary of production as defined above.

2.1. Contribution to national income from 'agriculture' sector has been estimated by using the 'value added' or 'inventory' method, which comprises of estimating the gross value of agricultural output (including the bye-products and the income arising from various ancillary activities enumerated above) and deducting from it the value of various raw materials, service inputs and depreciation of assets used up in the process of production.

3. The principal sources of information used for purposes of building up the revised estimates are (i) the land utilization statistics (LUS), (ii) periodic estimates

of area and outturn of principal crops, (iii) *ad hoc* estimates of minor crops, (iv) marketing reports on various farm products, (v) data on prices and (vi) other *ad hoc* publications. A brief review of the present position regarding these sources and their order of reliability is given below to enable a proper appreciation of the methods of estimation followed here.

3.1. *Land-use statistics in India :* At present statistics on land utilisation flow as a bye-product of the normal departmental activity of the State government revenue departments who collect them for various administrative needs of land revenue collection, which differ from State to State. The Directorate of Economics and Statistics (DESAg) functions only for the purposes of co-ordination, consolidation and timely publication of these statistics furnished by the State governments[1]. The DESAg publish these statistics in their annual publication entitled the 'Agricultural Statistics in India' with a time lag of about three years[2]. For purposes of reporting the land use statistics, the geographical area in the country can be broadly divided into four categories. Table 2.1 summarises the main features of area covered under each category separately. Land use statistics are available for (i) 548.8 million acres on the basis of field to field enumeration by the patwari or village officials, (ii) 17.4 million acres in West Bengal as furnished by Sample Surveys, (iii) 52.' million acres from *ad hoc* estimates and (iv) 87.4 million acres as completely non-reporting. In Jammu and Kashmir State, agricultural statistics are reported for 5.9 million acres only out of a total geographical area of 55 million acres. Excluding Jammu and Kashmir State the non-reporting area in the country would be roughly 38.3 million acres[3], that is a little more than 5 p.c. of the geographical area of Indian Union.

3.1.1. The Agricultural Statistics, published by the DESAg, relate to (i) classification of area reported according to various uses, (ii) area under different forms of irrigation, (iii) distribution of gross areas sown by different crops, (iv) net area sown etc.[4].

3.2. *Periodic Crop Estimates :* Periodical estimates of area and yield of principal crops initially prepared by the concerned State agencies, are consolidated by the DESAg and issued on pre-assigned dates in the form of crop estimates. At present, such estimates are prepared in respect of 27 crops generally known as forecast crops[5]. The scope of these forecast crops has also been increasing from year to year[6].

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1 Who also publish these in their annual Season and Crop Reports.

2 It was nearly five years upto the year 1954.

3 These 38.3 million acres are scattered over different States as follows :—

Assam : 18.6; Rajasthan : 0.2; Himachal Pradesh : 4.7; Manipur : 5.1; Mysore : 1.4; and other States : 8.3. (Not much cultivation may, however, be carried on in these areas which are covered mostly by hills, forests and deserts.).

4 For further details reference may be made to the latest issue of 'Agricultural Statistics in India', 1956-57 (mimeographed).

5 These are rice, wheat, jowar, bajra, barley, maize, ragi, small millets, gram, tur, kharif pulses, rabi pulses, ground nut, rape and mustard, sesamum, linseed, castor, sugarcane, cotton, jute, mesta, sann-hemp, tobacco, potato, chillies, pepper, ginger.

6 Since the publication of Final Report of NIC, the additional crops brought under the ambit of reporting as forecast crops, are small millets, tur, kharif pulses, rabi pulses, mesta, sann-hemp, potato, dry ginger, pepper, chillies and tobacco.

Usually two to three estimates are issued in respect of each crop except for cotton for which five estimates are issued. In the case of castor seeds, however, only one estimate is issued. In the case of cotton, in addition to the five estimates by the DESAg, an assessment of the actual crop is also made by the Indian Central Cotton Committee (ICCC). These periodic estimates are designed to indicate the

TABLE 2.1: COVERAGE OF AGRICULTURAL STATISTICS ACCORDING TO METHODS OF REPORTING : 1955-56

category	geographical area (million acres)	p.c. to total area	areas (States or parts thereof) covered	method of reporting
(1)	(2)	(3)	(4)	(5)
1. cadastrally surveyed and possessing a primary reporting agency.	548.8 (543.0)	68.1 (72.3)	most of the temporarily settled areas of Andhra Pradesh, Bombay, Madras, M.P., Punjab, U.P. Mysore and permanently settled areas of Bihar.	statistics of area and of land use are available with a fairly high degree of accuracy with all fields in a village surveyed and mapped; a list of fields, which are numbered together with their areas, is maintained by village patwari, who compiles the statistics of land-use by a periodical field to field inspection;
2. cadastrally surveyed but not possessing a primary reporting agency.	17.4 (17.4)	2.2 (2.3)	the permanently settled areas of West Bengal.	statistics are obtained through sample surveys conducted by West Bengal State Statistical Bureau;
3. unsurveyed but possessing a primary reporting agency.	152.7 (152.6)	18.9 (20.3)	mostly large pockets within the temporarily settled parts of the country and permanently settled areas of Orissa.	in the absence of any detailed maps and field measurement records, the primary agency furnishes reports on the basis of visual impressions and inquiries; among cultivators, statistics on area originate with tehsil or sub-divisional officers who ascertain, by personal visits and enquiry, the relation, which the area under a crop in a given year bears to normal acreage in the settlement year;
4. unsurveyed and also without a primary reporting agency.	87.4 (38.3)	10.8 (5.1)	consists mainly of erst while jagir areas and large uncultivable tracts like hills and inaccessible forests.	completely non-reporting for land-use statistics.
5. total	860.3 (751.3)	100.0 (100.0)		

Note :—figures within parenthesis are excluding Jammu and Kashmir State.

main features of a crop at various stages of its growth[7]. The 'final estimate', however, attempts to provide firm estimates of total area sown and the actual or expected

[7] For example the first estimate which is generally issued about a month after the commencement of sowing, is intended to give an idea about the area sown under the crop. The second estimate follows about a couple of months later and indicates area, conditions of the crop and probable or expected yield in some cases.

yield. These 'final' estimates are subject to further revisions depending on the subsequent availability of returns from some of the defaulting areas. Such revisions are generally carried out at the time of the release of final estimates of the next year's crop. Even at this stage it has been often found that the returns from the States are sometimes not complete and as such the revisions effected may be only partial, for which reason they are known as 'partially revised estimates'. These 'partially revised estimates' are subsequently revised when complete returns have been obtained from all areas reporting for a crop. The resultant estimate is then known as 'revised estimate'. It may, however, be noted in this context that not all the areas may report for a given forecast crop, though for foodgrains alone some *ad hoc* allowances are made for non-reporting areas to ensure complete coverage. The 'final', 'partially revised' and the 'revised' estimates of area and production are published State-wise for each crop by the DESAg in their annual publication 'Area and Outturn of Principal Crops in India'.

3.2.1. Estimates of outturn of a crop are obtained by multiplying the area under it by its average yield per acre. The former involves (i) cadastral survey of the cultivable area and (ii) annual reports as to the area under each crop from the primary reporting authorities[8]. Information on (ii) is based on village records maintained by State revenue authorities while the average yields of principal food crops and a few non-food crops, are estimated from the results of crop-cutting experiments. Table 2.2 summarises the position regarding the area and outturn covered by such experiments pertaining to the years 1951-1952, 1956-57 and 1958-59.

It will be clear from this table that there are areas where estimates of outturn in respect of the above principal crops and other remaining crops are still based on the traditional methods of yield estimation. In the traditional methods the average yield of crop is calculated by means of its 'normal yield' and 'seasonal factor'. The 'normal yield' is fixed for a district for a period of at least five years and is supposed to be based on crop-cutting experiments conducted in a few fields which the authorities consider as representing the average condition of the tract. The condition of the crop in a season is expressed as a proportion of the 'normal yield', in terms of annas, by means of eye estimation ; this is also called the anna condition factor.

3.3. *Ad hoc estimates of minor crops :* As stated earlier, there are a number of minor crops, viz. banana, tapioca, sweet potato, turmeric, indigo, opium, gur, arecanuts, cashewnuts, cardamom and coconuts in respect of which the DESAg publish annually *ad hoc* estimates of area and outturn. The estimates of outturn of these crops are relatively less reliable than those of the principal crops as they are not made on any objective basis. The area estimates, however, are based on the land-use statistics. Besides the crops enumerated above, the DESAg also

[8] The term 'reporting' differs in the case of land utilization statistics and periodic estimates. A reporting for one need not necessarily report for the other thus making it difficult to resolve the difference between area under crops according to the two sources. The point has been discussed at length by the NIC in their Final Report (paras 2.44 to 2.47).

TABLE 2.2: PERCENTAGE OF AREA AND PRODUCTION COVERED BY CROP-CUTTING EXPERIMENTS

crop	p.c. to total area			p.c. to total production		
	1951-52	1956-57	1958-59	1951-52	1956-57	1958-59
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. rice	63.7	83.4	85.9	60.2	86.6	89.9
2. wheat	68.5	96.4	98.5	68.6	98.1	99.2
3. jowar	46.9	99.7	99.8	56.8	99.6	99.8
4. bajra	36.9	99.6	99.6	53.8	99.2	99.4
5. barley	81.6	91.9	97.8	86.3	93.9	98.7
6. maize	30.5	56.7	74.5	38.8	68.6	79.0
7. ragi	—	78.5	79.6	—	85.2	86.0
8. small millets	—	—	25.4	—	—	16.9
9. gram	—	96.5	98.5	—	98.4	99.1
10. arhar (tur)	—	55.6	80.7	—	54.0	87.8
11. other pulses	—	1.5	13.6	—	1.5	34.5
12. rape and mustard	4.9	3.1	33.6	5.7	2.6	21.3
13. sugar cane	—	3.6	13.6	—	7.8	18.8
14. cotton	24.0	2.8	68.5	17.6	3.5	51.1
15. jute	—	56.3	66.2	—	58.6	72.2
16. tobacco	—	23.9	23.1	—	21.8	20.3
17. potato	—	23.3	23.5	—	21.8	32.2
18. linseed	11.8	—	48.2	12.0	—	42.1
19. sesamum	—	—	41.5	—	—	31.1
20. ground nut	—	—	52.4	—	—	41.7

collect information on plantation crops, viz. tea, coffee and rubber through special returns obtained directly from the various State Governments. The information thus collected relates to number of plantations, average daily employment, total area under the crop and area plucked/tapped[9] during the year, production of crop by broad specifications[10] etc.; these are published annually by the DESAg in their various *ad hoc* publications.

3.4. *Marketing Reports*: The DMI also conduct certain *ad hoc* trade surveys in respect of a number of farm products; the results of these surveys are published in the relevant marketing reports. Among other things, these reports contain information on area and outturn of each crop, utilisation of the crop for various purposes (e.g. quantity marketed, quantity retained for household consumption, seed, cattle feed etc.), analysis of price spreads over different stages of distribution, as also the wholesale and retail prices of these products prevailing in the more important centres. These data are collected by the DMI through local enquiries from well-known traders etc. through their own marketing officers spread all over the country. Although most of the data collected relate to distant past years, some of these have been brought up to date and published during the past few years. As the data are not collected on a planned and scientific basis these cannot be regarded as sufficiently reliable. In the absence of anything better, use[11] had to be made of these data and their details have been given in the following paragraphs of this chapter.

[9] Area tapped in the case of rubber only.

[10] In the case of tea, outturn is separately given for green and black tea whereas in the case of coffee it is available separately for (i) Plantation A (ii) Arabic Cherry Flats and (iii) Robusta Cherry Flats.

[11] For a full list of the MRs actually used, reference may please be made to the bibliography.

3.5. *Statistics on prices of agricultural commodities :* There are a number of agencies who are presently engaged in the collection of wholesale and other types of prices of agricultural commodities. These are (i) the DESAg, (ii) State agriculture departments and the State Statistical Bureaus (SSBs), (iii) the DMI, (iv) Indian Labour Bureau and (v) the NSS. Most of the prices collected by these agencies are published regularly on weekly/fortnightly/monthly basis in their respective publications.

3.5.1. Data on wholesale and retail prices which are collected on weekly basis by the DESAg are published in their (a) Bulletin of Agricultural Prices (weekly), (b) Wholesale Prices of Foodgrains (weekly), (c) Agricultural Prices in India (annual) and (d) Agricultural Situation in India (monthly). These prices are mostly collected under their marketing intelligence schemes and the centres selected for collection of wholesale prices[12] are distributed all over the country and are so chosen as to represent all the important *mandis*, rural and urban, producing and consuming and surplus, deficit and self-sufficient regions.

3.5.2. Prices collected by State agriculture departments are published in the Statistical Supplements to the State Gazettes and cover both wholesale and retail transactions. Previously there was wide duplication in respect of collection of prices by various agencies. As a result of the recommendations of Agricultural Prices Inquiry Committee, 1954, however, the work of price collection has been rationalised and prices collected by one agency are rarely collected again by some other agency. The data collected by the State agriculture or revenue departments are supplemented by prices of more important commodities collected by the SSBs through their district statistical officers; these prices are published in the quarterly/monthly State statistical bulletins and annual statistical abstracts of the SSBs.

3.5.3. Prices collected by the DMI relate only to such commodities as are not normally covered by any other agencies. These prices are also not published regularly. Instead they are reproduced in their relevant marketing reports in the form of appendices with the result that the time lag in the availability of these data is appreciable.

3.5.4. Prices collected by the Indian Labour Bureau are mostly retail prices. These relate to the more important industrial centres in urban areas and as such no direct use can be made of these for estimation of value of output.

3.5.5. Wholesale and retail prices were also being collected by the NSS upto the 13th round as part of their socio-economic surveys (schedule 3.01). These prices were collected on weekly basis for randomly selected centres located in rural and urban areas. Of these, only weekly retail prices were published by the Indian

[12] Prices are model prices on each Friday, or on the previous working day in case Friday happens to be a holiday or a 'no market day'.

Statistical Institute (ISI) in their 'Weekly Price Bulletin'[13]. Over and above the prices collected in their schedule, the NSS have also collected ex-farm prices in respect of a large number of agricultural commodities as part of their cost of cultivation studies conducted during some of their earlier rounds[14]. From the 14th round onwards, however, the NSS collect data only in respect of retail prices. It would have been very useful if all these data, collected by the NSS, were put together and published in the form of a separate report to be available to various users.

3.6. Besides the publications mentioned above, a number of other reports giving the results of certain *ad hoc* studies on different aspects of cultivation practices in India, have also been published during the past few years. To the extent these have been used in the present context, necessary details are given in the subsequent paragraphs on 'derivation of net output' (paras 6.2.1 to 6.2.7).

4. *Estimates of outturn :* There are 69 agricultural commodities including various bye-products which have been considered here for purposes of evaluation. They can be divided into 4 broad categories, viz. (i) 29 principal crops[15] for which periodic estimates of area and outturn are issued by the DESAg; (ii) 17 minor crops out of which *ad hoc* estimates of area and outturn for 14 crops[16] are released annually by the DESAg; (iii) miscellaneous and unspecified crops consisting of all such crops or crop groups which have not been included in any of the two categories described above and (iv) 12 bye-products[17].

4.1. *Principal Crops :* State-wise estimates of area and outturn have been adopted from the relevant periodic crop estimates[18] released by the DESAg. Production figures reported in these estimates, in respect of cereals and gram, relate to both 'reporting' and 'non-reporting' areas while for the other crops figures relate to reporting areas only. Estimates of area and production of foodgrains for the non-reporting areas are based either on special returns received from State Governments or on the basis of information available in the 'Season and Crop Reports'. In the case of sugarcane, however, outturn *net* of quantity converted into 'gur' by primary producers through indigenous methods is taken into account. Data on quantity

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[13] Of the various agricultural commodities covered, data were published in respect of the following items only: rice, wheat, jowar, bajra, ragi, gram, barley, arhar dal, gram dal, masur dal, moong dal, urid dal, kheshari dal, gur, potato, onion, dry chillies, turmeric, fire wood, arecanuts, tobacco, betel-leaf, straw.

[14] These studies were undertaken by the NSS during their 5th to 7th, 10th and 11th rounds.

[15] These are rice, wheat, jowar, bajra, barley, maize, ragi, small millets, gram, arhar, urid, moong, masur and other pulses (with separate breakdown, available for peas, kheshari and other pulses not included elsewhere), linseed, sesamum, groundnut, rape and mustard, castor, sugarcane, cotton, jute, mesta, sannhemp, tobacco, dry chillies, black pepper, dry ginger and potatoes.

[16] They are 'gur' (indigenous production only), coconuts, indigo, opium, sweet potato, tapioca, banana, cashewnut, turmeric, betelnut, cardamom, tea, coffee and rubber.

[17] The important bye-products considered are bagasse, cotton seeds, cotton sticks, sesamum sticks, jute sticks, arhar sticks, rice bran, rice husk, sugarcane tufts, grass, stalks and straw and farm yard wood.

[18] For 1955-56 and 1956-57 use has been made of the 'revised estimates'; for 1957-58 and 1958-59 'partially revised estimates' have been adopted whereas for 1959-60 figures are based upon 'final estimates'. These are generally published in 'Area and Production of Principal Crops in India'.

converted into 'gur' are made available by the DESAg and are very rough in character, derived as they are through very indirect methods[19]. As regards cotton lint, the official estimates are generally observed to be lower than the trade estimates, prepared by the ICCC. Following the NIC practice we have accepted the trade estimates for purposes of estimation. A comparative idea of the official and the ICCC estimates of outturn of cotton lint can be had from Table 2.3.

TABLE 2.3: OUTTURN OF COTTON LINT IN INDIA

(in 000 bales[a])

year	official estimate	estimate adopted[b]
(1)	(2)	(3)
1050–51	2910	3255
1955–56	3998	4542
1956–57	4707	5077
1957–58	4739	5052
1958–59	4686	5150

[a] one bale = 5' 2 lbs.

[b] Simple mean of the two all-India estimates framed by the ICCC on the basis of two different formulae. These are:

Formula I: actual crop = mill consumption + net exports + variations in stocks + extra-factory consumption;

Formula II: actual crop = cotton pressed + mill consumption of unpressed cotton + net exports of unpressed cotton + variations in stocks of unpressed cotton + extra-factory consumption.

4.1.1. Prior to the year 1953-54, when the official estimates of production were mostly based on conventional methods of crop estimation which suffered from various limitations such as subjective errors of over/underestimation of crop condition and yield, the NIU, following the practice adopted by the NIC, had made use of certain advance information on the results of random crop-cutting surveys, conducted by Indian Council of Agricultural Research (ICAR), in respect of some principal food crops like rice, wheat, jowar etc., regardless of the fact that some of these results had not been accepted by the DESAg for their crop forecasts. Although the coverage of such experiments went on increasing year after year in respect of crops as well as States covered, the production estimates were based partially on the results of crop-cutting surveys and partially on 'conventional' methods, and therefore, could not provide a comparable series for national income estimation purposes. From 1953-54 onwards, however, the official estimates were used exclusively regardless of the fact that the official estimates were not wholly based on crop-cutting experiments. To the extent such a series of outturn estimates suffered from year to year incomparability, the earlier estimates of agricultural output, adopted for national income estimation

[19] Estimates are finalised by the DESAg in consultation with the Indian Institute of Sugar Technology, Kanpur and the Directorate of Sugar and Vanaspati.

purposes, as also the net contribution from agriculture to total national income, also suffer from incomparability.

4.1.2. Recently, however, the DESAg have published a comparable series of estimates of food production based on their Index Numbers of Agricultural Production. The revised estimates for the year 1956-57 have been chosen as benchmark figures for arriving at the revised estimates for earlier years. Assuming that the index numbers provide a strictly comparable series, the revised estimates of production, it is proposed, may be adopted for revision of the earlier series for years prior to 1955-56 also. As the index numbers are constructed at the all-India level only, the adjusted estimates of production would hold true only for the country as a whole. Thus it will not be possible to work out a revised series for production at State level for any of the years prior to 1955-56. For 1955-56, however, the outturn figures whether based on the index number or the corresponding 'revised' estimates are almost identical so that the State-wise distribution of the adjusted total production does not pose any special problem. This holds true for foodgrain crops. As regards non-foodgrain crops which are also covered under index numbers but where no similar revisions have been effected by the DESAg, we have adopted the procedure similar to that for foodgrains, that is arriving at the earlier years' estimates of outturn by carrying backwards the 1956-57 revised estimates by means of the published index numbers of each of these crops[20].

4.2. *Minor crops*: Area and outturn figures for these are published by the DESAg in their 'Area and Production of Principal Crops' and, sometimes in 'Agricultural Situation in India' also. These estimates are very rough in nature and as such are distinct from the regular estimates of principal crops. In addition to crops enumerated under category (ii) of para 4 above, data are also available in this publication for onions, papaya and lac. Due to extreme paucity of data on prices of the former two items, it has not been possible to consider these separately for evaluation purposes and they have instead been included in category (iii), i.e. other unspecified crops. As regards lac, the same being regarded as forest product, has not been considered here at all.

4.2.1. In the case of tea, however, the outturn estimates published in 'Tea in India', relate to production of processed tea and not production of raw tea leaf; we have considered the input of raw tea leaf into the processing of tea as equal to the output of tea leaf in agriculture. Data on total input of raw tea leaf together with its value, were made available by the SSMI Wing of the NSS for the years 1955 to 1957. For later years the value of raw tealeaf input was estimated by relating the 1957 figure to the movement of output of processed tea[21].

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[20] The only exception to this procedure being cotton, where the trade estimates may be retained without any change.

[21] The assumption implicit being that the physical relationship between raw and processed tea remains constant over time. These estimates would, however, be tested as soon as independent data become available from the SSMI.

4.2.2. Prior to 1956-57, estimates of outturn of cashewnuts and cardamom were framed independently by the NIC by applying yield rates of these crops to the total area reported under them in the AgStat. The former were adopted from the corresponding marketing reports with their reference periods as 1944-45 and 1938-39/1940-41 for cardamom and cashewnuts respectively. Estimates for 1955-56 have, however, been obtained by adjusting 1956-57 figures on the basis of change in acreage under each of these crops.

4.2.3. In respect of arecanuts, data on production, obtained independently from the Indian Central Arecanut Committee were used in preference to the DESAg estimates due to the more detailed and reliable character of the former estimates. Similar remarks apply to opium in respect of which the estimates of area and outturn were directly obtained from the Narcotics Commissioner to the Government of India.

4.2.4. As stated earlier, the estimates of indigenous 'gur' production were obtained from the DESAg who frame these estimates on the basis of information on possible utilisation of sugarcane for various purposes (e.g. cane consumed by organised sugar mills, khandsari producers, etc.) and the relevant technological ratios.

4.2.5. Besides the minor crops covered by the DESAg in their 'Area and Production of Principal Crops', some useful information on yield rates, area and outturn of certain other minor crops is available in various marketing reports. In the absence of any current data on acreage under these crops or their prices, it has not been possible to consider all these crops separately, the only exceptions being citrus fruits, mangoes and grapes where the estimates of outturn have been framed by applying the observed average yield rates to total acreage under each of these crops. The former have been taken down from the relevant marketing reports while the acreage figures have been adopted from the AgStat. In the case of mangoes, however, year to year comparable estimates of acreage are not available. On comparing the AgStat acreage figures with those available in the Report on the 'Marketing of Mangoes in India (1958)' and similar *adhoc* estimates available with the ICAR, we have accepted the MR figures in preference to the AgStat figures[22]. In view of these facts, the area and outturn estimates of mangoes as given in the MR on the subject have been accepted without any change for all these years.

4.3. *Miscellaneous and unspecified crops:* This category comprises of eleven unspecified crop groups (not included anywhere else), viz. other cereals, other oilseeds, other sugars, other fibres, other dyes and tanning materials, other drugs and narcotics, other fruits and vegetables, other condiments and spices, fodder crops, miscellaneous food crops and miscellaneous non-food crops. There are no outturn estimates available in respect of these crop groups each of which might include innumerable items within it. There are a few marketing reports which contain useful

[22] Area figures for West Bengal and Uttar Pradesh, accounting for nearly 50 per cent of the total area under mangoes, were observed to be highly unreliable.

information on some of these constituent items such as nigerseeds, kapok seed, prome and stone fruits etc. In the absence of any current data on acreage under each of these or prices thereof they could not be considered separately. Data on area under these unspecified crop groups are, however, available in the AgStat although with a timelag of about two years. In the absence of outturn estimates, therefore, value of yield of such crops has been directly estimated by applying appropriate 'average value of yield per acre' to the corresponding acreage figures for each group separately, the details thereof being given in a subsequent section of this chapter.

4.4. *Bye-Products :* Of the innumerable bye-products resulting from cultivation of crops and their processing, we have considered only those which are readily identifiable and have some definite economic value; these are stalks and straw (obtainable from important foodgrain crops (except arhar), arhar sticks, sesamum sticks, cotton seed, cotton sticks, jute sticks, bagasse, sugarcane-tufts, rice husk, rice bran and farm yard wood (timber and fuel wood both). In the absence of any published data on the subject, an attempt was made to collect whatever information was available with the State agriculture departments, the SSBs, and various research institutions, by sending them a circular requesting them to furnish available data on average yield rates of these bye-products through a special return but the response to this enquiry was very poor. As such use had to be made of the scanty data available with this organisation.

4.4.1. *Straw :* The per acre yields of straw for various cereals and pulses used for the revised series are substantially different[21] from those adopted by the NIC, especially in the case of paddy straw. The NIC estimates were based on the information supplied by Indian Agricultural Research Institute (IARI) and the Agricultural College, Kanpur and were used at all-India level. The revised estimates are, however, based on zone-wise data published in the NSS Report No. 32. The yield rates for States falling within each zone have been assumed to be uniform for each zone. Where independent yield rates are not available, figures relating to the adjoining zone have been used. These form the basis of building up the estimates of outturn of straw at State level. Of the total estimated production of straw, 25 p.c. is assumed to be wasted or not collected at all, the remaining 75 p.c. being the net available supply.

4.4.2. *Arhar sticks :* The estimates have been framed on the basis of data supplied by the Rajasthan Agriculture Department according to which the yield per acre works out at 25 maunds. This has been related to the average per acre yield rate of arhar grain in Rajasthan, yielding ratio of sticks to per ton of grain as 6.67. This compares favourably with the NIC ratio of 8.65 tons of sticks per ton of grain which were based on the information supplied by the IARI and the Agricultural College, Kanpur.

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[21] Comparative statement of yield rates of straw for various crops is given in Appendix 2.6.

4.4.3. *Sesamum sticks :* Due to paucity of data this item had been ignored so far and has been introduced here for the first time. According to the information supplied by the Punjab Agricultural Department the yield rate of sesamum sticks works out at 5 maunds per acre, which rate has been adopted for estimating the outturn for all the States and for all the years.

4.4.4. *Cotton seed :* The State-wise data on the outturn of cotton seeds are published by the DESAg only as part of the periodic crop estimates for cotton lint. As stated earlier the official estimates of cotton are usually underestimates compared to the ICCC estimates. For national income estimation purposes as we have been using the ICCC estimates only, the State-wise official estimates of cotton seed are adjusted proportionately, thus maintaining technological ratios between the cotton seeds and cotton lint as implicit in the periodic crop estimates on cotton.

4.4.5. *Cotton sticks :* The estimates of outturn of cotton sticks have been built up on the basis of data supplied by the departments of agriculture of Punjab and Madras according to which the average yield rate of cotton sticks works out at 10 maunds per acre[24].

4.4.6. *Jute sticks :* As in the case of sesamum sticks, this item has been introduced here for the first time. The data supplied by the Indian Jute Committee suggest an average yield rate of jute sticks of 2 maunds for every maund of jute fibre which rate has been used for each State and for each year.

4.4.7. *Grass :* Burns in his 'Technological Possibilities of Agricultural Development in India' has placed the estimate of production of grass in India at 19176 thousand tons. Following the practice adopted by the NIC, in the absence of any fresh data, the same figure has been adopted for later years also. Some information on this subject was collected by the NSS in their 5th to 7th rounds in the context of feed cost of livestock. The same has not, however, been tabulated so far.

4.4.8. *Bagasse :* Bagasse is obtained as a bye-product from conversion of sugarcane into 'gur' and is estimated to form 45 p.c. of the cane. It is further assumed that 95 p.c. of bagasse is used as fuel for indigenous production of 'gur'. The balance, that is 5 p.c. is considered here for purposes of evaluation. Accordingly, bagasse relevant for estimation forms 22.5 p.c. of actual 'gur' production which rate has been used uniformly for every State and for each year.

4.4.9. *Sugarcane tufts :* Sugarcane tufts form an important ingredient of livestock feed. On the basis of the data received from Punjab State, the value of outturn per acre of sugarcane tufts works out at Rs. 12.50 which rate has been used uniformly for all States throughout the period 1955-56 to 1959-60.

4.4.10. *Rice husk and rice bran :* The Report on the Marketing of Rice in India, 1955, furnishes some useful data on the average yield of bran and husk per

[24] The corresponding NIC estimates worked out at 37.5 maunds per acre based on information supplied by the IARI and the Agricultural College, Kanpur.

ton of paddy according to the old set up of States. These have been suitably adjusted to make them conform to the reorganised set up of States. The weighted all-India average yield rates of bran and husk work out at 4.40 and 24.72 per cent of paddy before husking which yield rates are slightly lower than the yield rates adopted by the NIC (these are 7.5 p.c. and 25.8 p.c. of paddy in the case of rice bran and rice husk respectively). Of the total production thus estimated allowance for wastage has arbitrarily been made at the rate of 5 p.c. and 25 p.c. for bran and husk respectively.

4.4.11. *Farmyard wood:* This item comprises of timber and firewood collected by the primary producers from 'trees outside regular forests', e.g. trees in village commons, field ridges and fruit gardens no longer productive of fruits etc. Similarly wood is obtainable from canal banks and roadside avenues which normally fall under the jurisdiction of the State Forest Administration and as such should be included in the forestry sector. The estimates of unrecorded timber and fuel wood are available in the Timber Trends Study (TTS) Report and relate to the three year period 1953-55. From the total unrecorded production, the quantities of timber and fuel wood, estimated to originate in the 'forestry secctor', have been deducted to arrive at the production of unrecorded timber and fuel wood in 'agriculture' proper. As regard the exact details about the derivation of the two estimates and their projection to years other than reference period, the same have been described in detail in Chapter IV on forestry (paragraph 4.2.1).

4.5. The estimates of area and outturn of principal crops, minor crops and various bye-products, derived as explained in the preceding paragraphs in this chapter, are reproduced in Tables 2.4 and 2.5.

5. *Evaluation of agricultural output:* The problems involved in respect of evaluation of agricultural output are (i) defining an appropriate price, (ii) comprehensiveness of the available data on prices with minimum time-lag in their availability, (iii) method of averaging the individual price observations and (iv) imputation of value of outturn retained by producers for their household consumption etc. These problems are discussed below in detail with a view to examining the appropriateness of different types of prices which can be used in the present context. As our objective is to evaluate production at prices actually accruing to the producer, we may either use average price of a commodity at the point of production or the average price which accrues to the producer at the first point of its sale. As stated earlier in para 2, 'agriculture' sector is to include various ancillary activities of the primary producer, such as trading his own output, and as such the prices at the point of production would not be quite appropriate. Instances of the prices at point of production are the farm harvest prices which are at present being collected by concerned State agencies; these vary from State to State.

Income from Agriculture

TABLE 2.4: AREA UNDER VARIOUS CROPS: 1955-56 TO 1958-59

(in 000 hectares)

crop	1955-56	1956-57	1957-58	1958-59
(1)	(2)	(3)	(4)	(5)
1. rice	31522	32278	32152	32958
2. wheat	12367	13525	11858	12603
3. jowar	17363	16228	17080	17224
4. bajra	11339	11251	11022	11331
5. barley	3419	3518	3055	3336
6. maize	3696	3758	3974	4232
7. ragi	2307	2279	2319	2506
8. other cereals*	5556	5302	5161	5338
9. gram	9780	9674	9252	10063
10. arhar	2287	2293	2303	2400
11. other pulses*	11149	11349	10897	11570
12. linseed	1529	1682	1266	1605
13. sesamum	2293	2172	2093	2226
14. groundnut	5124	5532	6020	5899
15. rape and mustard	2556	2539	2420	2437
16. coconuts	639	665	659	660
17. other oilseeds*	1668	1736	1547	1620
18. sugarcane	1847	2060	2056	1944
19. cotton lint	8086	8020	8092	8064
20. jute	704	772	705	782
21. tea	316	316	319	322
22. coffee	97	94	97	108
23. tobacco	410	419	353	363
24. dry chillies	604	601	637	595
25. black pepper	89	89	93	93
26. arecanut	111	99	123	99
27. other condiments and spices*	543	623	486	578
28. mango	772	772	772	772
29. banana	145	148	147	146
30. potato	280	286	321	347
31. sweet potato	156	148	175	223
32. cashewnut	78	74	84	84
33. other fruits and vegetables*	1188	1215	1205	1223
34. fodder crops	5207	5728	5459	5306
35. other crops*	3049	2034	1924	2288
36. total	148006	149270	146126	151306

* For details about composition, reference may be made to footnotes to Table 2.7 of this chapter.

TABLE 2.5 : OUTTURN OF VARIOUS CROPS : 1955-56 TO 1958-59

(in 000 metric tons)

crop	1955-56	1956-57	1957-58	1958-59
(1)	(2)	(3)	(4)	(5)
1. rice	27541	29037	25284	30841
2. wheat	8769	9403	7865	9929
3. jowar	6728	7327	8378	8854
4. bajra	3454	2873	3579	3850
5. barley	2815	2863	2274	2715
6. maize	2601	3078	3085	3435
7. ragi	1847	1793	1692	1907
8. gram	5420	6231	5059	6991
9. arhar	1860	1989	1435	1698
10. other pulses	3770	3229	3166	4389
11. linseed	420	390	253	454
12. sesamum	467	438	360	519
13. groundnut	3861	4369	4507	4889
14. rape and mustard	860	1042	938	1041
15. coconuts[a]	4297	4446	4491	4456
16. cotton seed	1617	1806	1796	1830
17. sugarcane[b]	6075	6957	6981	7227
18. cotton lint[c]	4542	5077	5052	5150
19. jute[d]	4199	4289	4052	5158
20. tea	307	311	311	317
21. coffee	34	36	40	42
22. tobacco	510	777	564	568
23. dry chillies	361	355	368	331
24. black pepper	28	27	27	26
25. arecanut[e]	88	87	88	88
26. mango	5068	5068	5068	5068
27. banana	1744	1747	1856	1903
28. potato	1858	1724	1998	2364
29. sweet potato	1109	1116	1062	1555
30. cashewnut[e]	87	82	96	96
31. timber	287	282	277	272
32. firewood[f]	25244	19789	19344	18909
33. straw	53096	55601	56618	55506

[a] in million numbers
[b] in terms of 'gur' equivalent
[c] in 000 bales of 392 lbs. each
[d] in 000 bales of 400 lbs. each
[e] in 00 metric tons
[f] in lakh cu. ft.

Income from Agriculture

5.1. The farm harvest price is defined as 'the average wholesale price at which the commodity is disposed of by the producer at the village site during the specified harvest period'[25]. The collection of farm harvest prices was recommended by the Agricultural Prices Enquiry Committee in the year 1954. Accordingly such price data were to be collected every week from a number of villages selected on a purposive basis during the specific harvest period of 6 to 8 weeks. The weekly prices are to be averaged into tehsil and district averages by taking their simple mean, whereas the State average is to be worked out as a weighted average of the district prices with the production of the crop in the districts as weights. It will be seen, therefore, that these prices would be relevant only for that part of the produce which is disposed of by the primary poducer at the village site during the specified harvest periods. In practice, however, the cultivator may sell his produce at different points of time, to the wholesaler, the retailer or directly to the consumer in varying quantities and at different places (at village site, in or near about mandis, or in distant regulated markets) and within or outside the harvest period. A reassessment of the current conditions indicates that the bulk of the transactions actually take place during the peak marketing periods rather than during the harvest periods, there being a time lag of 1 to 2 months between the two periods. Table 2.6 summarises the position regarding the distribution of market arrivals of important foodgrains in the regulated markets during the 'harvest periods' and equally long marketing periods with different time-lags.

TABLE 2.6: PERCENTAGE MARKET ARRIVALS OF PRINCIPAL FOODGRAINS: 1956-57

crop	percentage arrival during the harvest period			
	proper	equal periods with a time lag of		
		one month	two months	three months
(1)	(2)	(3)	(4)	(5)
paddy	31.6	33.9	36.1	35.3
rice	29.2	35.5	34.6	33.2
jowar	19.1	23.1	21.4	19.9
wheat	16.3	27.6	31.6	18.9
gram	13.4	22.8	26.4	18.9

It is clear from the above statement that the percentage market arrivals is low in the initial stages of the harvest, increasing gradually over the next one or two months, which shows that the simple average price during the harvest period along would be a poor substitute for the weighted average price for the entire year (with monthly market arrivals as corresponding weights for the monthly average prices). The extension of credit facilities to the primary producers has made it possible for the

[25] Collection of Agricultural Prices in India, 1954 (page 15, para 2.41).

producer not to rush his surpluses to the market soon after the harvesting. Instead he studies the market conditions beforehand in order to see that his sales are conducted at the most advantageous prices. All these factors point to the fact that the farm harvest prices may not provide an appropriate substitute for the average price accruing to the producer at the first point of sale. As regards the coverage and availability of farm harvest prices, they are generally available for 10 or 12 major crops. For the relatively less important crops, farm harvest prices are not generally being collected. Besides, the time lag in the availability of price data is much larger in the case of farm harvest prices. For example the latest available data on these prices relate to 1957-58. For estimation of national income, however, it is most essential that the price data should be made available with a maximum time lag of one year. To quote a few illustrations the farm harvest prices of Assam are not available from 1955-56 onwards. Similarly in the case of Bombay, farm harvest prices are available only for the year 1956-57. As regards the representativeness of a price, the same depends on the method of averaging used. Among the States which are collecting 'farm harvest prices', varying practices in averaging are used. Thus, Kerala, Madras and Himachal Pradesh *use simple arithmetic averages* for calculating State average prices from district averages. In Jammu and Kashmir as also in Tripura, district areas under crops are used as weights while in the case of Rajasthan no State average is compiled at all. There are other dissimilarities also. Thus in U.P., centres for price collection are selected at random every year unlike in any other State. In Andhra, the prices are collected for a period of 6 to 8 weeks after the harvesting period and not during the harvesting period. In certain cases farm harvest prices are derived from wholesale prices ruling *in* the neighbouring *mandis* by deducting from them, transport and other marketing charges. In view of the above reasons, it has not been possible to readily switch over to the use of farm harvest prices for evaluating agricultural output.

5.2. The NIC on the other hand made use of the data on wholesale prices collected by the DESAg as also by various State Government agencies. Various characteristics of these prices, have been briefly described earlier in paras 3.5 to 3.5.5 of this chapter. These prices were averaged for each crop/State over the appropriate harvest period, information on the latter being available in the Indian Crop Calendar published by the DESAg. Use of average wholesale prices during the harvest period is based on the tacit assumption that the bulk of the marketable surplus is disposed of by the producers during the harvesting periods of each of these crops. As stated earlier this assumption does not seem to be true in view of the fact that the entire quantity of marketable surplus does not get sold even during the peak marketing period and small quantities continue to come to the markets in the subsequent months of the year. Besides, the entire marketable surplus is not, in practice, disposed of by the primary producer in the wholesale markets; a good portion of it may be brought to these markets by the intermediaries who buy such surpluses from the producers directly in the villages. Such a situation obviously calls for detailed examination of the problem of appropriateness of wholesale prices for evaluating

agricultural output. In this connection certain exploratory studies were conducted by the National Income Unit on the basis of preliminary data on monthly market arrivals of principal foodgrains[26]. A study of these data reveals that only 25 to 30 per cent of annual marketable surplus of principal foodgrains are sold in the primary markets during the harvesting periods, whereas relatively much larger proportion of the total marketable surplus gets transacted during the peak marketing periods. Other rough indications available on the prices also reveal that the average wholesale prices over the harvest periods are higher than the annual wholesale prices particularly of foodgrains. Comparison of the farm harvest prices referred to above with the average wholesale prices over harvesting periods for comparable crops/States reveals that the latter are roughly 7 p.c. higher than the former. It is, however, not known as to what part of the marketable surplus is transacted in the villages directly to the intermediaries or to consumers. Data on the disposal of foodgrains have recently been collected by the NSS in their 15th round (schedule 1.4). Once these data become available it should be possible to know broadly the proportion of the marketable surplus disposed of by the primary producer to the intermediaries, to retail dealers, to consumers and to the wholesalers (proportion of marketable surplus disposed of to each agency at the farm site, in the neighbouring market or in the regulated markets). With the help of this information and the monthly market arrivals of principal crops[27] it should be possible to adjust the wholesale prices appropriately so as to provide the nearest approximation to the prices accruing to the producer at the first point of sale. It may, however, be repeated that the wholesale prices as collected at present are quite extensive both in respect of the States and the crops covered within each State.[28] In view of the magnitude of the contribution from agriculture to the total national income it is considered desirable to conduct some more exploratory studies on the appropriateness of prices before any revision on this account could be incorporated in the revised series.

5.3. For the above reasons, the NIC practice of using the average wholesale prices over the harvest periods has been continued for the revised series also. Two improvements have been effected in the context of use of wholesale prices. In the first instance, the empirical coverage of these prices has been considerably widened by collecting a mass of published and unpublished material from various State Statistical Bulletins, Statistical Supplements to State Gazettes, Weekly Bulletins of Wholesale Prices of Foodgrains, Wholesale Prices of Agricultural Commodities, Agricultural Prices in India etc. To the extent some of the minor crops were not covered through the published material, special returns furnishing unpublished data were obtained from different SSBs to ensure that maximum coverage was attained and the prices thus collected were most representative for each commodity and for

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[26] These data were supplied by the DESAg on a special request and Table 2.6 is based on that.

[27] The DESAg should make it available in as much detail as possible with minimum time lag.

[28] The approximate number of price observations used for estimating the State average prices of more important commodities, are given in Appendix 2.1.

each State. The exact nature of price material used for evaluation of different commodities is summarised in a tabular form in Appendix 2.2. Secondly, due to readjustment of State boundaries in November, 1956 the data on harvesting periods given in the Indian Crop Calendar had undergone considerable changes. As such a special return had to be sent to various SSBs from whom district-wise information on harvesting periods of each crop was obtained and harvesting periods appropriately revised to suit the reorganised set up of States. These adjusted harvesting periods for more important commodities are reproduced for each State in Appendix 2.3.

5.4. The method of averaging used by the NIC has also been changed with a view to making it more representative. An ideal average should take account of regional disparity in prices and quality differences therein. It should also be based on a sufficiently large number of observations so as to minimise the errors of sampling. A weighted mean of prices, prevailing during a period in which the major part of the produce relating to a particular crop is disposed of in the markets, where the bulk of producers sell their produce, would approximate to this ideal. Adequate statistical material to arrive at such price averages are not, however, readily available. Some experimental work was undertaken by the NIU for 17 crop/States in order to see which method of averaging would yield the best results. For years prior to 1953-54 the following was the procedure for price averaging for a State:

(a) averaging was done for the harvest period in individual centres; and
(b) an arithmetic mean was calculated where the number of price observations was less than 11; otherwise medians were used.

On the basis of the experimental studies referred to above, it was found that the median price would be better suited for valuation purposes than the simple mean. We have, therefore, adopted the following procedure:[29]

(a) arithmetic averages of centre prices have been calculated to get a district mean at each time point;
(b) median of such district prices at each time point has been taken to represent the State price;
(c) arithmetic average of these State prices at each time point over the harvesting period has been used for evaluating the State outturn.

5.5. *Evaluation of retention for own consumption:* The quantity of a crop retained annually by producers for seed purposes and for self consumption, is not known with sufficient reliability. This is likely to vary from year to year depending upon the size of the crop, the prevailing price trends and other factors. Such retention for own consumption can be evaluated at (i) retail price or (ii) the cost price to the producer, or (iii) the price at which the marketed portion is sold. The evaluation of retention at retail price would, however, involve the assumption that the

[29] As this practice was followed from the year 1953-54 onwards the conventional estimates of net income from agriculture (at current prices) from that year onwards may not be strictly comparable with the estimates for the earlier years. In the revised series, however, where this method has been uniformly adopted for each State and for each crop, the estimates are strictly comparable.

quantities retained, if routed through the ordinary market channels, would leave the prices unaltered, which is hardly true. Also in that event further trading income would have been generated which would have had to be credited to the producers retaining such non-marketed commodities. The use of cost price of the producer although quite appropriate from a technical point of view is beset with difficulties because of non-availability of satisfactory data on the subject. Till this problem is satisfactorily resolved the simplest procedure[30] would be to evaluate it at the same rate as the quantity marketed.

5.6. Estimates of gross value of outturn have been obtained by evaluating the State outturn figures for each commodity at the corresponding State average price—average of the wholesale prices prevailing over the harvest period of each crop. This practice has been followed uniformly for all principal crops and some minor crops. For a few minor crops and all the unspecified crops where the outturn figures are not statistically measurable, the exact details regarding methods of evaluation are given in the following paragraphs.

5.6.1. *Minor crops :* In the case of small millets and 'other pulses', due to the highly varying nature of their composition, it has not been possible to collect the price data independently. As such, the average prices per unit of their production were estimated by relating the same to the observed average value per unit of the corresponding known items on the basis of information published in the NSS Report (No. 32) on Certain Aspects of Cost of Cultivation. Thus for 'small millets' the average price works out at 75 p.c. of the weighted average price of jowar, bajra, barley, maize and ragi. Similarly[31] the average price per unit of 'other pulses' works out at 85 p.c. of the weighted average price of urid, moong, masur and arhar. These all-India factors have been applied at State level to the weighted average price per unit of the relevant crops for arriving at the State average prices of 'small millets', and 'other pulses'. In the case of bananas, data on wholesale prices[32] were collected for the year 1958-59 for six States from the relevant State gazettes. The 1958-59 average prices were further adjusted[33] for trade margins to make them represent producer's prices and then projected backwards and forwards for other years with the help of wholesale price index numbers for banana, published by the office of Economic Adviser (EA). In case of 'citrus fruits', State-wise wholesale prices have been

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[30] Procedure adopted by most of the countries.

[31] The NIC had arbitrarily assumed the price of 'small millets' to be 90 p.c. of the price of ragi. Similarly in the case of 'other pulses' the NIC had arbitrarily assumed its average price to be 90 p.c. of the price of moong.

[32] In certain cases, however, the prices were quoted in terms of rupees per specified numbers whereas the production data are available only by weight. On the basis of certain enquiries made from the ICAR and other research institutions it was estimated that, on an average, one maund of bananas contained roughly 400 pieces. With the help of this conversion factor prices were estimated in terms of rupees per maund.

[33] According to the Report on the Marketing of Bananas in India, 1945, the producer's share in wholesaler's price works out at 68 p.c. (rounded off to 65 p.c.).

collected[34] for the year 1958-59 and adjusted[35] for trade margins. The adjusted prices were then projected to other years, with the help of EA's index numbers of wholesale prices of 'oranges'. For grapes the NIC adopted Rs. 40/- per maund for the year 1949-50 which has been adjusted to other years with the help of EA's index numbers of wholesale prices of 'fruits'. In the case of mangoes State-wise wholesale prices were worked out in detail for the year 1950-51 on the basis of data given in the Report on Marketing of Mangoes in India, 1958. These were suitably adjusted for trade margins[36] to make them represent producer's prices. The adjusted prices of 1950-51 were then projected to other years (viz. 1955-56 to 1959-60) with the help of EA's index numbers of wholesale prices of 'fruits'. Data on wholesale and ex-factory prices of arecanuts and opium were obtained directly from the Indian Central Arecanut Committee and the Narcotics Commissioner to Government of India respectively. In the case of tea data on actual value of input of raw tea leaf as consumed by the manufacturing industry, have been obtained from the SSMI Wing of NSS for the years 1955-56 to 1957-58 and the same used to represent the value[37] of raw tea leaves. In the case of coffee, data on average price paid to growers were obtained directly from the Indian Coffee Board and used for purposes of evaluation. Indigo has been evaluated at average wholesale price prevailing in Bombay wholesale market. In the absence of any better information, they were averaged and used uniformly for each State for evaluating the production of indigo. As regards 'rubber', the NIC had made use of the wholesale prices of rubber prevailing in Kottayam market in Kerala State. Apparently these prices relate to sheet rubber and as such include certain processing charges also. To arrive at the producer's prices of rubber before processing, therefore, an overall allowance of 5 p.c. has been made on the basis of information available in the Plantation Enquiry Committee Report on Rubber.

5.6.2. *Unspecified crops:* The value of unspecified crops, the outturn of which is not statistically measurable due to their highly varying composition, has been estimated by applying the appropriate 'average value of yield per acre' to the total estimated acreage under each of these crop groups. According to the NSS Report No. 32 the average value of yield per acre of minor cereals (other than small millets) works out at 110 p.c. (rounded off to 100 p.c.), of the weighted average value of yield per acre of jowar, bajra, barley, maize and ragi. This all-India relationship has been made use of to estimate the State values of output of 'other cereals.' The NIC on the other hand had assumed the value of yield per acre of other cereals to be

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[34] Wherever the prices were given in terms of numbers, the same were converted into prices per maund using the relationship that on an average 286 fruits would weigh one maund. The latter information is available in the 'Pilot Sample Survey on Oranges' conducted by Maharashtra State Agricultural Department in 1956-59.

[35] The share of production in wholesaler's price of citrus fruits works out at 51 p.c. (here rounded off to 50 p.c.) according to the Report on the Marketing of Citrus Fruits in India, 1950.

[36] According to the MR on Mangoes producer's share in the wholesaler's price works out at 60 p.c. only.

[37] For latter years the values were estimated by projecting 1957-58 figures by relating to year to year movement of projection of processed tea.

the same as for small millets. According to the same source the value of yield per acre of 'other oilseeds' works out at 84 p. c. (rounded off to 85 p. c.) of the weighted average value of yield per acre of sesamum, linseed and castor. This all-India relationship has been uniformly used for every State to arrive at the value of output of 'other oilseeds'. In the case of 'other sugars', 'other fibres', 'other dyes, etc.', 'other drugs and narcotics' following the practice adopted by the NIC, the average value of yield per acre has been assumed[38] to be 90 p. c. of the value of yield per acre of sugarcane (including gur), sannhemp (including mesta), indigo and opium respectively. For 'other condiments and spices', however, the value of yield per acre has been assumed to be equal to 90% of the weighted average value of yield per acre of cardamom, dry chillies, black pepper and dry ginger uniformly for each State. As regards 'other fruits and vegetables' the average value of yield per acre is observed[39] to be equal to the weighted average value of yield per acre of all specified fruits and vegetables (viz. mango, banana, citrus, cashewnuts, potato, sweet potato and tapioca) and the same has been used at State level for estimating the value of 'other fruits and vegetables'. For fodder crops, the value of yield per acre was assumed[40] to be equal to that of 'small millets' (including millet straw) uniformly for each State. In the case of 'miscellaneous food' and 'miscellaneous non-food' crops, the NIC all-India estimate of value of yield per acre for the year 1948-49 has been projected to later years with the help of movement of General Wholesale Price Index over the period.

5.6.3. *Bye-products :* Ex-farm prices of straw relating to the year 1952-53 were extracted from the NSS Report No. 32 and adjusted with the help of index numbers of input prices of straw, specially constructed from information available in the annual Reports of the Census of Indian Manufactures (CMI). The estimated all-India prices were uniformly used for each State to evaluate straw. For arhar and sesamum sticks and rice husk, an average price of 50 nP per maund has been arbitrarily assumed whereas in the case of cotton sticks an average price of 75 nP has been adopted on the basis of information supplied by the State Agriculture departments of Punjab and Madras. Prices of jute sticks were obtained directly from the Indian Central Jute Committee for each year. For bagasse the average ex-factory prices,[41] as given in the CMI Reports were used; the prices of bran were collected from the Bulletin of Agricultural Prices (Weekly), averaged over the year and the same used for purposes of evaluation. For sugarcane tufts, as stated earlier in para 4.4.9. the value was directly estimated on the basis of average value of yield per acre at Rs.12.50[41].

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[38] Whereas the NIC made this assumption at all-India level, in the present series the assumption has been uniformly adopted for each State.

[39] In reply to a circular letter, sent to various SSBs, State Agriculture departments, and a number of Agricultural Research Institutions, the average value of yield per acre of a large number of minor fruits and vegetables constituting 'other fruits and vegetables' group, worked out at Rs. 630 as against the observed 'weighted average value of Rs. 645 per acre of specified fruits and vegetables'. As the sample was not a satisfactory one, no use was made of the absolute figures. The data were thus used only for establishing relationship between the value of yield per acre of unspecified and specified fruits etc.; the latter works out at 102 p.c. (here rounded off to 100 p.c.) of the former.

[40] The NIC adopted a similar assumption at all-India level.

[41] On the basis of information supplied by the Punjab Agricultural Department.

As regards grass, the NIC had estimated[42] the price at 75 nP for the year 1948-49 which has been adjusted to later years with the help of yearly index numbers of input prices of grass, specially constructed on the basis of the CMI data on input of grass consumed by the paper manufacturing industry. The prices of timber and fuel-wood removed from farmyards have been obtained from Table 4.3 of Chapter IV.

5.6.4. The value of output of the more important crops and bye-products, thus derived, are presented for the years 1955-56 to 1958-59 in Table 7.

5.7. *Adjusted gross value of output :* From the total gross value of output presented in Table 2.7, necessary deductions have been made for (i) foodgrains procured at prices lower than the free-market prices and (ii) value added by organised rice-milling industry. As regards (i) yearly data relating to quantities of different foodgrains (mostly rice and wheat) procured and the corresponding procurement prices have been obtained separately for each State from the *DESAg* on the basis of which necessary adjustments have been made for the lower value of procured foodgrains. Data in respect of value added by rice-milling industry has been adopted from the unpublished reports relating to the SSMI. For the years 1958-59, for which the SSMI data are not readily available, the CMI data have been used after suitable adjustment for under coverage on the basis of the total employment in the rice-milling industry as obtained from Indian Labour Bureau in relation to the employment figure given in the CMI. No deductions have, however, been made for value added by hand-pounding of rice, which is considered as an ancillary activity of the agriculturists.

6. *Derivation of net output :* To arrive at the net value of output from 'agriculture' certain deductions have to be made for current costs of cultivation, market charges and depreciation. These[43] consist of (i) seed, (ii) manure (chemical fertilisers and organic manure), (iii) current repairs and maintenance of implements and various operational costs, (iv) irrigation charges (payable to government), (v) cost of feed of livestock required on farm, (vi) market charges and (vii) depreciation of implements and other fixed assets (e.g. farm buildings, wells, tanks etc.).

6.1. The data as used by the NIC in respect of the above items in their Final Report were very inadequate and highly local in character and as such of limited[44]

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[42] Kanpur wholesale price of Re. 1/- per maund deflated by 25 p.c. to allow for trade and transport margins. The NIC further adjusted it to later years on the basis of 'General Wholesale Prices Indices'.

[43] The classificatory character of items has been revised from that adopted by the NIC; this was considered necessary to press the available data into service with least adjustments.

[44] The limitations of these data were clearly discussed in the First and the Final Reports of the NIC in paras A.18 to A.29 of the First Report and paras 2.71 to 2.82 of the Final Report. In the Final Report the Committee stated : "The available material relates to local enquiries for widely different purposes and is, in any case, of extremely doubtful generality even for these local areas, being used on a few case studies rather than any scientific study. The utility of these studies, however, is considerably marred by the fact that these studies are concerned with the derivation of cost per crop in terms of money". (para 2.71).

TABLE 2.7: VALUE OF OUTTURN IN AGRICULTURE: 1955-56 TO 1958-59

(at current prices) (in Rs. crores)

	crop	1955-56	1956-57	1957-58	1958-59
	(1)	(2)	(3)	(4)	(5)
1.	rice	1087	1420	1426	1621
2.	wheat	340	412	317	497
3.	jowar	153	276	276	296
4.	bajra	80	113	135	149
5.	barley	75	94	57	98
6.	maize	56	97	103	131
7.	ragi	38	58	58	63
8.	other cereals[a]	38	57	48	61
9.	gram	153	219	143	320
10.	arhar	64	81	53	86
11.	other pulses[b]	122	132	119	197
12.	linseed	23	21	14	27
13.	sesamum	28	40	31	43
14.	groundnut	128	204	203	241
15.	rape and mustard	46	78	60	72
16.	coconuts	56	70	86	91
17.	other oilseeds[c]	18	21	18	22
18.	sugarcane (gur)	203	251	251	308
19.	cotton lint	168	188	182	176
20.	jute	49	53	51	55
21.	tea	53	67	71	72
22.	coffee	13	14	14	14
23.	tobacco	99	146	123	120
24.	dry chillies	57	68	57	60
25.	black pepper	8	5	5	4
26.	arecanut	27	28	31	36
27.	other condiments and spices[d]	72	76	39	50
28.	mango	69	66	80	75
29.	banana	24	30	30	39
30.	potato	48	52	51	83
31.	sweet potato	20	23	20	26
32.	cashewnut	6	6	6	6
33.	other fruits and vegetables[e]	161	183	162	196
34.	fodder crops	45	69	56	71
35.	other crops[f]	102	106	102	115
36.	straw	253	296	291	293
37.	rice bran and husk	28	40	26	34
38.	cotton seed	42	56	56	67
39.	farm yard wood	112	112	124	124
40.	other by-products[g]	43	46	40	43
	total	4207	5364	5015	6082

[a] 'other cereals' include small millets and cereals not mentioned above.

[b] 'other pulses' include all pulses other than gram and arhar.

[c] 'other oilseeds' include castor and other unspecified oilseeds.

[d] 'other spices and condiments' include cardamom, dry ginger, turmeric and other unspecified spices and condiments.

[e] 'other fruits and vegetables' include citrus fruits, grapes, tapioca and other unspecified fruits and vegetables.

[f] 'other crops' include sannhemp, mesta, unspecified fibres, indigo, unspecified dyes and tanning materials, opium, unspecified drugs and narcotics, rubber, miscellaneous food and non-food crops and grass.

[g] 'other by-products' include bagasse, cotton sticks, jute sticks, arhar sticks, sesamum sticks and sugarcane tufts.

use. During the past few years, however, certain useful material have become available on the subject from a number of sources, viz. (i) the NSS Report on 'Some Aspects of Cost and Cultivation (Report No. 32), (ii) Studies in Economics of Farm Management, (iii) Rural Credit Survey Report by the Reserve Bank of India (RBI), (iv) marketing reports on various crops issued by the DMI, (v) Bench-Mark Survey Reports of the Programme Evaluation Organisation (PEO) and (vi) Reports on various Agro-Economic Surveys sponsored by the Ministry of Food and Agriculture. The utility of these data has been examined in detail with a view to arriving at the best possible estimates of the above mentioned costs of production for the revised series. A brief review of each of these sources is given in the following paragraphs :

6.1.1. *Report on 'Some Aspects of Cost of Cultivation'* : For the first time in India, such a large-scale sample enquiry on cost of cultivation was undertaken by the NSS in their fifth to seventh rounds[45]. Information collected related to (i) acreage, production and value of crops harvested, (ii) quantity and value of seed and manure used, (iii) cost of water charges, (iv) animal and labour costs in agricultural operations, (v) current repairs and maintenance etc. of implements and equipment and (vi) other production costs. Information was, however, tabulated and published in respect of items (i) to (iv) only. As such the published estimates do not cover exhaustively all aspects of cost of cultivation. The output was evaluated at farm prices prevailing at the time of harvest and seed and manure were both evaluated at current market prices. The cost of household animal labour was imputed on the basis of the hire charges prevailing during the period of their use rather than on the basis of actual expenditure incurred on food and service charges for livestock maintenance. Cost of water charges related to actual payments and did not include the labour charges incurred by the cultivator for irrigation purposes. Since seed and manure have been evaluated at current market prices irrespective of whether they were purchased or home-supplied, the estimates are likely to be higher than the costs actually incurred on these items. Similarly, the 'estimates of value of production would also have serious limitation in view of the downward bias of production estimates'[46]. Estimates of selected costs are given on per acre basis by zones, each zone comprising of a number of States. In some cases, the estimates are given in a pooled form for two or three zones taken together, while in other cases they are given at all-India level only; due to the limited size of the sample at the zonal level the zonal estimates may not be sufficiently reliable. This limits their use particularly for estimating various costs of cultivation at State level.

6.1.2. *Studies in the Economics of Farm Management* : Studies in farm management, initially sponsored by the Research Programme Committee in the year

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[45] Total number of sample household selected from about 960 sample villages through the interview method was 4287, 4388 and 3144 in the three rounds, viz., fifth round (Dec. 1952-March, 1953) sixth round (May, 1953-September 1953) and seventh round (Oct. 1953-March, 1954).

[46] NSS Report on Some Aspects of Cost of Cultivation, Part III, page 2.

1954-55, are being co-ordinated by the DESAg. One object of these studies is to ascertain the relative merits of the cost accounting and the survey methods. Other objects are (i) to study input-output relationships and ascertain the relative efficiencies of different combinations of inputs, (ii) to study costs of production of field crops on 'per acre' and per unit of production basis and their structure, (iii) to measure the extent of employment and unemployment of family labour and capital equipment of farms and to co-relate them to various economic factors and (iv) to assess the potentiality of such resources for utilisation for efficient management of farms. The reports published so far relate to six States, viz. Bombay, Madras, Punjab, U.P., West Bengal and Madhya Pradesh. Data for the first five States relate to the three-year period, viz. 1954-55 to 1956-57 while for Madhya Pradesh they relate to 1955-56 and 1956-57. For each State two contiguous districts have been selected for the study in such a way that they represent the most important and typical soil-crop-complexes in the State. Being two contiguous districts, the estimates based on them may not be truly representative for the State as a whole. Further the data on inputs have been generally presented in money terms rather than in physical terms. In certain cases the concepts and definitions used are not strictly uniform over the States. These factors restrict the utility of these reports[47] in the present context even though alternative estimates have been framed by following the survey and the cost accounting approaches[48].

6.1.3. *Rural Credit Survey Report:* The Rural Credit Survey was conducted by the RBI during the period November, 1951, to August, 1952 in 75 selected districts spread all over the country. In all, about 600 villages were selected and a number of schedules canvassed in respect of 127 thousand households, the largest field investigation ever attempted in India. Being a 'policy-oriented' survey, it was planned and conducted in a manner so as to provide some factual basis for proper formulation of recommendations relating to rural credit rather than providing any State/national estimates of various economic characteristics. The survey did not aim at collecting data on cost of cultivation, though nearly 9 thousand cultivating families were investigated with a view to study a number of economic aspects of the 'cultivating families'. Data, collected for the reference period April, 1951 to March, 1952, related to area sown, current farm expenses and value of produce and its disposal. In respect of expenditure, data were collected on average cash and total expenditure on seed and manure, cash expenditure on fodder, 'other cash expenditure, cash and kind expenditure on wages and value of disposals in kind at the harvest time. In respect of income from farm produce, information was collected on the value of produce of all major crops harvested during the year 1951-52, excluding the minor crops altogether. The valuation was done at the harvest prices.

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[47] Only in respect of some items, results are available in a form readily useful for national income estimation purposes. Marginal improvements of the schedules, used at present, should considerably enhance the utility of these data for computation of national/State income estimates.

[48] There are striking differences in the two sets of estimates based on (a) the cost accounting method and (b) the survey method (see Tables 2.8 and 2.9).

Similarly, fodder was omitted, except where it was raised as a crop of considerable value. Straw was included only if certain crops provided it in a considerable measure[48]. The value of owned seed sown and owned farmyard manure used was taken as reported by the cultivator. In case the cultivator was unable to give the value figures readily, the valuation was made on the basis of the prices[50] of purchased seed and manure. Results on the basis of information thus collected. have been presented on 'per family' basis at district and village level in the All India Rural Credit Survey Report, Volume III. In the absence of any relatively firmer information of global validity, only limited use could be made of certain results presented in this Report.

6.1.4. Data provided by various marketing reports[50] issued by the DMI relate to seed requirements (as percentage of the total output and in some cases on 'per acre' basis also) for a number of crops. In certain cases data are also given on the proportions of a commodity used for purposes of cattle-feed. Most of these data relate to old set-up of States and as such had to be suitably adjusted to conform to the reorganised set-up of States. As the reference periods of these marketing reports often differ from commodity to commodity, the data was adjusted to the years of estimation in most cases by relating the bench-mark figures to the movement of total production of such commodities. As these data are generally collected by the DMI through *ad hoc* enquiries from knowledgeable traders etc., they are not as satisfactory as the results based on scientifically planned studies are expected to be.

6.1.5. ***Bench-Mark Survey Reports :*** The PEO has so far published nine reports[51] presenting the results of special surveys undertaken by it in various evaluation centres with the primary object of making assessment of acceptance of sponsored practices and certain aspects of rural economics as related to various development programmes during their first year of effective operation; the reference period generally relates to the agricultural year 1953-54. In the course of these surveys, some cultivators' families were investigated through personal interview method. Among other items the information collected related to (i) fixed capital formation in agriculture and its composition by type of assets (ii) output and disposal of agricultural commodities during the reference period, usually one full agriculture year and iii)) practices regarding sale of produce and current purchases of certain important input items like seed, manure etc. As these surveys are mostly local in character with centres[52] hardly representing the country or a State and with their primary

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[48] These limitations make it difficult to establish any valid relationships between value of output and various cost deductions.

[50] If the cultivator did not remember the prices paid by him the prices of seed and manure prevailing in the village at the time of their use, were used for evaluation.

[51] List of these reports has been given in the bibliography.

[52] All these centres were exclusively selected from the project areas of Community Development & National Extension Survey programmes only.

objective other than the investigation of costs of cultivation[53], the data provided by these surveys are found only of limited use in the present context.

6.1.6. *Reports of the Agro-Economic Research Studies:* These studies, sponsored by the Union Ministry of Food and Agriculture, are conducted by individual research workers and research institutions, and are mostly directed towards studying the general economic conditions of people residing in certain selected localities. Mostly descriptive in nature, these reports are deficient in statistical data for arriving at the net value of agricultural output.

6.2. In view of the various limitations of these source materials, none has been singly used for building up the estimates of various costs. Different sources have been pressed into service for estimating value of individual items. The exact procedure followed in respect of each item is described below.

6.2.1. *Seed:* The Farm Management Survey Reports have not been used directly but only as a check[54] because they neither give the seed rates in physical terms nor cover the entire range of field crops. The NSS seed rates on per acre basis are mostly available on zonal/all-India basis and not at Statelevel. To the extent information on quantity of seed used per acre was not available from the MRs, the NSS data have been used on the assumption that the zonal rates hold true for each individual State within a zone. The crops thus covered are jowar, bajra, small millets other cereals, masur, other pulses, other oilseeds, sweet potato and spices and condiments. For most of the principal crops and some minor crops, the marketing reports contain data on the quantity of seed required per acre sown, which have been directly used for such purpose. In certain cases, however, where the seed requirements are available in the form of percentages of production during a specific period, seed rates in physical terms have been indirectly estimated by relating the total estimated seed requirement to the total acreage under the crop in the given year. The crops thus covered[55] are rice, wheat, barley, maize, gram, arhar, urid, moong, linseed, sesamum, groundnut, rape and mustard, castor, potato and sugarcane. The two sources, i.e. the various marketing reports and the NSS Report No. 32 have, thus, provided information on 95 per cent of total value of seed. For the remaining 5 per cent, however, the rates have been assumed arbitrarily[56]. In the case of a number of crops, viz. opium, sannhemp and fruits no allowance has been made for seed specially because its value is very insignificant and also because the value

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53 This is clear from the nature of data collected which hardly touch upon the economics of agriculture.

54 Independent estimates on the basis of average value of seed per acre for the period 1954-55 to 1956-57 given in these reports and the total gross area sown under all crops, were worked out by suitably weighting the State estimates. The State estimates have been arrived at by taking the simple mean of the two district estimates separately for the irrigated areas and the unirrigated areas which are combined by assigning weights proportional to the total irrigated and unirrigated area of each State. Similar procedure has been followed in working out the all-India estimates from the State estimates. It will be observed that differences between the estimates based on the two approaches, viz. the cost accounting method and the survey method are appreciable; (see Table 2.8).

55 The overall seed rates do not differ very much from the NSS rates. The former are preferred as they are available at Statelevel.

56 Crops thus covered are other vegetables, fodder, miscellaneous food and non-food crops.

of these products does not include the bye-products, i.e. seed. The all-India estimates of seed rates are reproduced in Appendix 2.4. The per acre estimates of value of seed finally adopted, have been compared with other independent estimates, based on other source material, as given in Table 2.8.

TABLE 2.8 : VALUE OF SEED ACCORDING TO DIFFERENT SOURCES

source	year of reference	value of seed (in rupees per acre)
(1)	(2)	(3)
1. estimates adopted (NSS Report No. 32 and various marketing reports)	1955-56	6.30
2. Rural Credit Survey (survey method)	1951-52	8.34
3. Farm Management Study Reports		
(i) cost accounting method	average over the 3 years 1954-55 to 1956-57	8.41
(ii) survey method		13.13
4. NSS Report No. 32 (survey method)	average of 1951-52 and 1952-53	8.99

6.2.2. *Manure :* This consists of inorganic manure (e.g. ammonium sulphate, superphosphates, urea, ammonium sulphate nitrate etc.) and organic manure (e.g. compost and farmyard manure, dung manure, blood and fish meal, oil cakes etc.). As regards inorganic manure, quarterly State-wise data on the actual quantitative off-take and the pool release prices of ammonium sulphate and superphosphates are regularly maintained by the Fertiliser Section of the Ministry of Food and Agriculture. These are also published in the 'Fertiliser Statistics' issued by the Fertiliser Association of India. Data in respect of imported fertilizers are, however, available in the Monthly Statistics of Foreign Trade of India issued by the Director General of Commercial Intelligence and Statistics. Transport charges, decided in consultation with the Ministry of Food and Agriculture, are, however, added to the c.i.f. values of imported fertilisers[57]. On the basis of these data the value of chemical fertilizers has been estimated for each year. Information on value of manures (of all kinds) used per acre, are taken from the NSS Report No. 32, Farm Management Survey Reports and Rural Credit Survey Report. In view of extensive coverage of the NSS survey on cost of cultivation, crop-wise rates of quantity and value of manure per acre taken from the NSS reports have been applied on the total

[57] In the case of imported fertiliser it has been assumed that there are no variations in stocks.

estimated acreage under each crop during the reference period to arrive at the total value of manure (organic and inorganic both). From the total value of manure thus arrived at, the value of inorganic manure, based on current available data, has been subtracted to estimate the total value of organic manure during the reference period. These estimates have been projected to subsequent years in relation to the movement of total gross area sown. Independent estimates of this item are also framed on the basis of other available sources (viz. the Farm Management Survey Reports and the Rural Credit Survey Report) to provide checks on the estimate based on the NSS data. Table 2.9 summarises the results obtained on the basis of different sources.

TABLE 2.9: ESTIMATED COST OF MANURES ACCORDING TO DIFFERENT SOURCES

source	year of reference	value of manure of all kinds (in rupees per acre)
(1)	(2)	(3)
1. Farm Management Survey Reports	average of 3 years 1954-55 to 1956-57	
(i) cost accounting method		5.18
(ii) survey method		12.90
2. NSS Report No. 32 (survey method)	average of 1951-52 and 1952-53	4.38
3. Rural Credit Survey Report (survey method)	1951-52	6.59

6.2.3. *Current repairs and maintenance of implements and various operational costs:* This item includes current repairs and maintenance of farm implements[58], rural carts, other farm equipment as also the current costs of maintenance of bunds, irrigation work and fencing etc. It also includes other costs like the miscellaneous materials (other than seeds, fodder and manure), necessary for cultivation and cost of acquisition of new equipment with a life of less than two years. Apart from the Rural Credit Survey Report, there is hardly any other source permitting global estimates of this item of expenditure. The RBI data, which are given on per family basis, have been suitably adjusted to per acre basis by relating the expenditure per family to the average size of operational holding per family. As the estimates relate to the year 1951-52, they have been suitably adjusted to subsequent years on the basis of the index numbers of earnings of rural skilled workers specially constructed from average daily wages of these workers[59]. The total estimates are framed by multiplying the value per acre figures by the total gross area sown each year.

6.2.4. *Irrigation charges (payable to government):* The irrigation charges considered here are the total payments made by the producers to the government

[58] Repairs costing more than Rs. 10/- have been debited to capital account in the Rural Credit Survey Report.

[59] The data are collected and published by the DESAg.

in lieu of the water supplied to them from government owned canals and other means of irrigation. The cost of maintaining water lift equipments etc. has been covered under the operational costs discussed above. Data on irrigation charges are available in the State budget documents on the basis of which all-India estimates have been framed.

6.2.5. *Cost of feed of livestock required on farm :* The methods of estimation of total cost of livestock feed and its allocation among the various consuming sectors, viz. agriculture, livestock etc. have been described in detail in paragraphs 9.1 to 9.3 of Chapter III.

6.2.6. *Marketing charges :* The NIC had framed estimates of market charges on the basis of scattered information available in different marketing reports. These data related to a distant past, the year of reference differing from crop to crop. Some useful data were collected by the RBI in their Rural Credit Survey in respect of market charge which consist of (i) transport charges for marketing, (ii) sale commissions and (iii) storage and other marketing costs. The estimates of cash expenditure per family on each item have been given separately in the Rural Credit Survey Report. As the major part of such expenses are usually incurred in cash, the RBI data are useful particularly in view of their comprehensive character and the non-availability of relevant data from any other source. Accordingly the estimates of total market charges for the year 1951-52 were obtained by multiplying the market charges per family by the estimated number of cultivating families given in the Report. The ratio of market charges to the total value of agricultural output in 1951-52 has been used in arriving at the current value of market charges for each of the subsequent years.

6.2.7. *Depreciation of implements and other fixed assets :* Reliable data in respect of these are available only in the Farm Management Survey Reports which give the value of farm implements including rural carts, machinery, buildings etc. on per acre basis for all the six States covered under the scheme. For the remaining States, however, the value of these assets has been estimated by using the data relating to the adjoining States. The figures of depreciation of implements and other fixed assets have been estimated by assuming the average life of implements and machinery to be 10 years and of other fixed assets such as farm buildings, wells tanks etc. to be 25 years on the basis of information available in these reports.

6.2.8. *The cost estimates :* The estimated value of each input item, the market charges and depreciation for the years 1955-56 to 1958-59 are presented in Table 2.10.

6.3. *Adjustment for under-reporting/non-reporting of crop production :* In view of the fact that the land-use statistics were not fully reported for the country, the NIC had made an overall allowance at the rate of 4 p.c. of the total net output for non-reporting areas. From the year 1952-53, as a result of increased coverage in Agricultural Statistics in India, adjustment on this account was made at the

rate of 2 p. c. only. A comparison between the two estimates of area under individual food and non-food crops at State level for the year 1956-57 reveals that in respect of principal crops the area reported for the regular crop forecasts are, in certain cases, underestimates, compared to the area reported in the AgStat. The two sets of data have been analysed in detail by us for each State and for each principal crop and the absolute differences aggregated over crops and States, constitute about 2.0 p. c. of the total gross area under these crops[60]. In value terms, however, the percentage of underestimation on this account, works out at 2.2 p. c. of the value of yield in the reporting areas. Most of the difference seems to be accounted for by the erstwhile Bombay State[61]. In addition to the difference on account of this under-reporting of area, there is a possibility of some cultivation, however small, being carried on in the hilly regions which are not reported at all either for the AgStat or for the non-foodgrain principal crops[62]. In view of this it has been considered desirable to continue making an *ad hoc* allowance on the total output figures so as to ensure complete coverage in respect of this sector. The adjusted estimates of total net output from agriculture proper are presented in Table 2.10.

TABLE 2.10: NET VALUE OF OUTPUT IN AGRICULTURE: 1955-56 TO 1958-59

(at current prices) (in rupees crores)

	Item	1955-56	1956-57	1957-58	1958-59
	(1)	(2)	(3)	(4)	(5)
1.	value of agricultural output	4095	5252	4891	5958
2.	less adjustment for lower value of procured foodgrains	—	—	−2	−5
3.	less adjustment for net output of rice milling	−7	−7	−8	−6
4.	adjusted value of output	4088	5245	4881	5947
5.	deductions for netting	793	897	883	974
	5.1 seed	227	283	274	314
	5.2 chemical fertiliser	20	22	30	37
	5.3 organic manure	148	161	147	161
	5.4 market charges	16	20	19	23
	5.5 repair, maintenance and other operational cost	59	60	60	63
	5.6 depreciation	133	135	133	140
	5.7 irrigation charges	16	20	20	23
	5.8 cost of feed of livestock required on farm	172	206	200	223
6.	net output of agriculture	3295	4348	3998	4974
7.	add 2 p.c. of item 6 for non-reporting	66	87	80	99
8.	add imputed value of timber and fuel wood removed from farm yards etc.	112	114	123	124
9.	adjusted net output of agriculture	3473	4549	4201	5196

[60] These differences were considered for all such crops/States wherever the land-use figures were reported to be higher than the figures released by the DESAg in their regular crop forecasts; the absolute differences thus arrived at have been presented for each crop separately in Appendix 2.5.

[61] Bombay accounts for nearly 51 per cent of this difference.

[62] The claim that the official estimates of food production are complete in respect of their geographical coverage does not seem to be strictly valid therefore.

7. *Preliminary estimates for 1959-60 :* For the year 1959-60 estimates of gross value of output have been framed on the basis of the total estimates of area and outturn of the principal crops, released by the DESAg. As neither the estimates of output nor of acreage under the minor unspecified crops are readily available, the value of output has been estimated by adjusting 1958-59 estimates in respect of these crops by assuming the overall increase in prices and in production, as observed in the case of major crops. The prices of major crops for the year 1959-60 were estimated by adjusting the 1958-59 weighted all-India average prices on the basis of the index numbers of wholesale prices of each of these crops. Monthly index numbers of wholesale prices of each of these crops for the years 1958-59 and 1959-60 were collected from the records of the EA's Office and averaged over the approximate harvesting periods[68]. Obviously these estimates are based on partial data and short-cut methods of estimation and as such may be regarded as tentative and subject to revision on the basis of detailed collection of data on prices and the revised data on production. From the gross value of output, overall deductions have been made for various costs of production by assuming the previous year's ratio of gross value to net value of output. Accordingly the value of net output (inclusive of the allowance for non/under-reporting of area) for the year 1959-60 works out at Rs. 5112 crores.

8. *Comparison with conventional estimates :* The two sets of estimates, viz. the estimates prepared on the revised lines and those published earlier in the Estimates of National Income have been presented by their broad components in Table 2.11. It will be observed from the figures presented in this table that the revised estimates have undergone downward revision appreciably as compared to the conventional estimates. The differences are comparatively small for the years 1955-56 and 1956-57 but large enough for the years 1957-58 and 1958-59. This is mainly due to the upward revision of the production figures in respect of major crops for 1955-56 and 1956-57, both being based on 'revised' estimates' rather than on 'partially revised' estimates of outturn. The downward revision of other oilseeds, though marginal in nature, is mostly due to the downward revision of the value of yield per acre of unspecified oilseeds. The estimates of production of sugar-cane (including indigenous production of gur), fibres and coffee, are almost unchanged. The estimates of tea for post-1955-56 years have substantially undergone upward revision mainly as a result of the availability of actual data on the quantity and value of raw tea leaf, which were earlier estimated by projecting 1953 figures on the basis of movement of production of processed tea regardless of any price changes therein. Value of tobacco has been revised upwards, due to the inclusion of production of stalks and straw for such States, which do not usually report their production for the official crop estimates. The increase in the value of spices and condiments is mostly due to the availability of independent data on production and prices of arecanuts whose

[68] The consolidated all-India harvesting periods of the principal crops were adopted from the Indian Crop Calendar published by the DESAg and the special returns referred to in para 5.3 of this chapter.

TABLE 2.11 : COMPARISON OF THE REVISED AND CONVENTIONAL ESTIMATES : 1955-56 TO 1958-59

(at current prices) (in rupees crores)

crop group	1955-56		1956-57		1957-58		1958-59	
	revised	conventional	revised	conventional	revised	conventional	revised	conventional
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. cereals	1867	1853	2527	2526	2420	2430	2916	2923
2. pulses	339	332	432	436	315	330	603	636
3. foodgrains	2206	2185	2959	2962	2735	2760	3519	3559
4. oilseeds	341	343	490	491	468	467	563	567
5. sugarcane	203	207	251	237	251	251	308	308
6. fibres	242	240	270	269	254	254	254	253
7. tea	53	50	67	54	71	54	72	55
8. coffee	13	12	14	14	14	14	14	14
9. tobacco	99	97	146	135	123	116	120	127
10. spices and condiments	164	160	177	152	132	121	150	115
11. fruits and vegetables	328	329	360	374	349	372	425	442
12. rubber	5	7	4	6	5	7	5	7
13. other crops	117	116	142	154	132	150	158	158
14. straw	253	592	286	639	291	639	293	689
15. other by-products	71	113	86	120	66	106	77	123
16. total (cultivation proper)	4095	4451	5252	5607	4891	5311	5958	6417
17. farmyard wood	112	—	114	—	123	—	124	—
18. total gross income	4207	4451	5366	5607	5014	5311	6082	6417
19. total net income	3473	3686	4549	4723	4201	4450	5196	5434

value was earlier estimated in an indirect manner, i.e. by applying certain assumed 'value of yield per acre' figures to the total estimated acreage under arecanuts. Similar is the case with 'fruits and vegetables' group where it has been possible to prepare independent estimates of value of output of mangoes and 'other fruits and vegetables'. By far the largest revisions have been effected in respect of straw and other by-products, which have undergone a significant downward revision, due to similar revision of these by-products compared to the earlier series. This significant downward revision, however, has been partly offset by the inclusion of the imputed value of farmyard wood (timber and fuel wood both) which was not taken into account in the earlier series, mainly due to the paucity of data. The extent of the downward revision in the yield rates of other minor crops and stalks and straw is brought out in Appendices 2.6 and 2.7. As the estimates of production of major crops for the years 1957-58 and 1958-59 are based on the partially revised estimates only, it is probable that they may undergo an upward revision when the corresponding revised estimates become available from the DESAg.