

# AGRICULTURAL STATISTICS: REQUIREMENTS OF USERS\*

By P. S. LOKANATHAN

*Director-General, National Council of Applied Economic Research*

SINCE the inauguration by Rashtrapati Rajendra Prasad in December 1956, the National Council has been engaged in a number of research activities, the most important of which have been the Techno-Economic Surveys of various States and Supply and Demand Projections of Agricultural Commodities in India. The NCAER, therefore, has been a large user of agricultural statistics for various purposes. In this talk I shall refer to some of the difficulties that we have encountered (a) in getting reliable statistics and (b) in interpreting them.

If my observations are critical, I should not be understood as, in any way, minimizing the great efforts that have been made in recent years to improve the quality of statistics in the agricultural field. In fact, the improvements achieved recently have been substantial. At the same time it should be pointed out that we have to go a long way still. If in the rest of my talk I do not refer to the constructive and other fruitful efforts that have been made by the agricultural statisticians in the Ministry, in the CSO and in the ICAR, it is because we are all concerned with the future rather than with the past, and that our efforts should be directed towards securing the rapid improvements so essential for policy-making.

Plans for agricultural development can be based only on reliable and comprehensive agricultural statistics. Detailed and reliable statistics are needed for various purposes such as food administration, formulation of import and export policies (in respect of important commercial crops), import programmes in respect of foodgrains, price support, inter-State movement, and for formulation, implementation and assessment of plans for agricultural development. With each Plan, the economy becomes more complex and the problems of allocation of resources, the balance between different sectors of the economy and

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\* Technical Address delivered on Fourteenth Annual General Meeting of the Indian Society of Agricultural Statistics, from 9th to 11th January 1961, at New Delhi.

evaluation of results call for more and comprehensive data and for employment of a wider range of methods and techniques of study. The lack of essential and meaningful statistical data will cripple the efficient formulation and execution of plans.

The importance of the role of agricultural statistics in the conduct of research and for purposes of policy-making is gradually being realized. The matter has been engaging the attention of the Government, specially after the attainment of Independence. Various committees and conferences have thrashed out numerous issues and have made comprehensive recommendations with a view to ensuring uniformity in concepts and definitions of terms and adoption of standard forms with a view to improving the quality and content of agricultural statistics and to widen the scope of the information gathered.

The progress in the application of scientific methods to agricultural research and data collection owes a good deal to the pioneering efforts of the Indian Council of Agricultural Research in this direction; the eminent agricultural statisticians who have been or are currently associated with this work have played a praiseworthy part in the progress registered in the application of statistical methods to agricultural experimentation and research, particularly in the field of improving the quality of yield estimates.

The Directorate of Economics and Statistics of the Ministry of Food and Agriculture has been the chief co-ordinator of agricultural statistics and it has given valuable guidance to the States. The marked improvement in the sphere of agricultural statistics bears ample testimony to the well-planned and sustained efforts made by the Directorate, and the organization deserves the compliments of all engaged in using agricultural statistics. However, much still remains to be done by way of systematization and refinement before we could say that we had a body of usable and classified data covering the entire range of needs in the sphere of agricultural statistics.

## II

The defects in agricultural statistics are many. Complete absence of data on some important topics is a matter of serious consequence. Coverage is insufficient and data are deficient because of lack of uniformity in definition and classification; they also suffer from non-comparability over space and time. The divergence in figures supplied by various agencies leads to defects in planning and co-ordination. As would be obvious, the delay in collection and publication of the

data diminishes their utility to both the Government and the people. One interesting example was the publication of *Indian Agricultural Statistics* (Volume I) which had to use the previous year's figures for certain States, as the returns which were scheduled to be received in the Directorate of Economics and Statistics by 30th September 1959 were not received in time.

In most cases, agricultural statistics are still collected for meeting administrative requirements and this limited view-point leads to the collection of information which is neither based on uniformly sound concepts and meaningful classification, nor are they amenable to scientific categorization and economic analysis of facts.

An example of the defects of tabulation and processing can be cited in respect of data on transfer of agricultural property collected for each village based on mutation registers and the record of rights. In some States like the Punjab and Madhya Pradesh and in Delhi Administration, these data are not consolidated beyond the *tehsil* (subdivision) stage. In some States the information available in the land records is not being extracted. It is obvious, thus, that a good deal of data run to waste for lack of processing.

The method of presentation of data is also at times defective. The method of collection, and the underlying assumptions are not always specified.

In regard to areas, first of all, we must have complete coverage which is, as yet, inadequate. The coverage of acreage statistics was extremely limited before World War II. The former princely States did not have proper administrative machinery for the purpose. Primary reporting agencies were lacking and there was total or partial absence of survey and records. In British India also, there were non-reporting areas, substantial in size, and even for the reporting Provinces and States, there existed small pockets for which no returns were received.

Steps have, of late, been taken to extend the system of reporting to non-reporting areas by establishing suitable primary reporting agencies or special agencies. As a result, the reporting area has (in 1957) increased to 721 million acres accounting for about 89 per cent. of the total geographical area. For certain States, however, the reporting area is low and differs within the State. In 1955-56, Koraput District of Orissa had as low as 24 per cent. of the area covered under the reporting system, while reporting area for the State accounted for 80 per cent. of the geographical area. For non-reporting areas, estimates

are framed on the basis of local knowledge or by conducting special surveys. The information thus obtained is not, however, very reliable.

There are differences between the figures of total area given by the Surveyor-General and those given in land records. In some States, *e.g.*, West Bengal, the Punjab and Rajasthan, the geographical area according to the Surveyor-General is less than the area reported according to the village papers.<sup>1</sup> The two sets of figures are misleading. Even in the case of States where the whole State is reporting (*e.g.*, Madras), the area figures obtained from the two sources differ.

Two series of acreage statistics are available at present, *viz.*, (a) official series, and (b) NSS series. The official series relate to land utilization statistics giving the area under the various use-categories (forests, pastures, net sown area, etc.) as well as the area under different crops, and are almost continuously available since 1884. The NSS series, started very recently, relate mainly to the statistics of area under different crops. The two types of statistics, pertaining to broad categories of land utilization, and the cropwise details, may be briefly reviewed.

Since 1949-50, data on land utilization are available in respect of nine heads: (i) forests, (ii) land put to non-agricultural uses, (iii) barren and unculturable land, (iv) permanent pastures and other grazing lands, (v) miscellaneous tree crops and groves not included in the net area sown, (vi) culturable waste, (vii) current fallows, (viii) other fallows, and (ix) net area sown. However, the number of categories prior to 1949-50 was only five (adopted as early as 1890-91) and the data in respect of various States were not strictly comparable due to lack of uniformity in methods of classification and in definitions of the different classes.<sup>2</sup>

It would be interesting to enquire into the nature of the old and new classifications.<sup>3</sup> In the latter, the number of area categories is larger. The head "area not available for cultivation" has been subdivided into two broad categories: (i) land put to non-agricultural uses, such as essential buildings and roads, railways, etc., and (ii) barren and unculturable land, *i.e.*, land which cannot be brought

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<sup>1</sup> *Abstract of Agricultural Statistics*, Ministry of Food and Agriculture, Government of India, 1957, p. 8.

<sup>2</sup> *Guide to Current Agricultural Statistics*, Ministry of Food and Agriculture, Government of India, 1954, p. 3.

<sup>3</sup> Appendix I.

under cultivation except for a high cost. There has been similar subdivision of the classification, "other uncultivated land excluding current fallows", into (i) permanent pasture and grazing land, (ii) miscellaneous tree crops and groves, and (iii) culturable waste, which includes land available for cultivation but not taken up for cultivation or abandoned for one reason or another.

Even now it is observed, however, that the concepts laid down for the different land use classes are not strictly followed due to various reasons. For example, from some of the recent surveys of culturable waste lands, it is found that a considerable portion of the area at present shown as culturable waste is not really cultivable.<sup>4</sup>

The non-comparability of concepts and definitions creates difficulties in the way of determining land utilization trends over a period of time. Besides the changing definitions, another great difficulty in examining the trends for various land utilization categories is the fact that the increase under any category may be solely or partly due to an increase in the reporting area.

Inter-State non-comparability in area statistics is introduced by the fact that, whereas the figures generally relate to the agricultural year ending with 30th June, in the case of Assam and Madhya Pradesh, statistics relate to the years ending with 31st March and 31st May, respectively. Overtime non-comparability is augmented by the fact that prior to 1919-20, some of the former Provinces adopted the financial year, while others followed the agricultural year; for the former princely States, the year to which the figures relate differed from State to State.

Our present land classification suffers from the defect of being guided solely by physical considerations. Under it, the suitability of land for various purposes is not indicated, to say nothing of the economic and allied considerations that should find an important place in a system of meaningful and useful classification. In the U.S.A., for example, some advanced work has been done in this regard, using income-expectancy as a criterion.<sup>5</sup> In the interests of agricultural planning, land use capability and some important economic considerations should be introduced in the Indian land classification system without too much delay.

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<sup>4</sup> "Indian Agricultural Statistics—A Critical Review," *Agricultural Situation in India*, Annual Number, August 1960, p. 531.

<sup>5</sup> H. E. Conklin, "The Cornell System of Land Classification," *Journal of Farm Economics*, Vol. XLI, No. 3, August 1959.

Two broad divisions for classification<sup>6</sup> of crops are food crops and non-food crops. The food crops have been subdivided under five heads: foodgrains, pulses, sugar, condiments and spices, fruits and vegetables, and other food crops. The non-food crops have been put under seven subheads, namely, oilseeds, fibres, dyes and tanning materials, drugs and narcotics, fodder crops, green manure crops and other non-food crops. For temporarily settled areas, the information on crops is collected as part of land records on complete enumeration basis and is fairly reliable. In the other areas, however, this work is largely entrusted to 'untrained' people and is not perfect from the point of view of availability or reliability. Steps are being taken to improve the quality of these statistics through the adoption of the method of estimating crop acreages by random sample surveys and by extending the coverage under complete enumeration.

The position regarding coverage under different methods of reporting is interesting.<sup>7</sup> Reporting by complete enumeration is resorted to in most of the States. But the estimates of net sown area for some States, for example Kerala, are obtained by Sample Survey. In West Bengal nearly 80 per cent. of the crop area has been obtained by Sample Survey and the rest has been "estimated". Of the reporting area, returns for 12.5 per cent. of the area are based on subjective estimates and for about 3.7 per cent on sample surveys. Even in the States where these statistics are compiled by field-to-field enumeration, there are areas which are not cadastrally surveyed.

A serious limitation of these statistics stems from the non-comparability of figures owing to the gradual extension of the reporting area, changes in classification, concepts and definitions as well as due to changes in the method of estimation as in Bihar, West Bengal and Kerala. All this makes it impossible to effectively study the changes in cropping patterns, etc., over a period of time. The computation of index numbers of the area under principal crops (after making due allowances for changes in coverage and the concepts and definitions and methods of estimation), which have been engaging the attention of the Ministry of Food and Agriculture, should be expedited with a view to eliminating a major handicap in the study of cropping patterns over time.

Some investigations conducted in Bombay have shown that there is considerable scope for error in distinguishing between areas under

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<sup>6</sup> Appendix II.

<sup>7</sup> Appendix III.

*jowar* harvested as foodgrains and as fodder, and in recording the areas accurately.

The methods of estimation of areas under crop mixtures differ from State to State. In some cases, it has been observed that the method of recording areas under crop mixtures differs from region to region within the same State. This introduces another source of inaccuracy in the figures of total area under a crop grown separately and as a constituent of crop mixtures. A uniform procedure should be adopted by each State at the earliest possible time to overcome this difficulty.

The NSS also collects information on area under different crops during the regular rounds. The estimates are given for all-India and the population zones, and are based on random sampling. There are differences between these estimates and the official estimates of area under crops. For cereals, for example, even though there is close agreement in figures at the all-India level, zonewise and cropwise figures are not sufficiently close. Because of the differences in methods and techniques (differences in coverage of crops/seasons, non-comparability of the experience in the field work between the two agencies, misclassification of area under the grain crop and the fodder crop; differences in the methods of allocation of area under mixed crops and possible sampling errors) followed by NSS and the regular agencies, it is difficult to know the amount of unreliability in the official figures.

Differences in the increase in area figures relating to 1958-59 over 1957-58 as between NSS and official estimates are considerable in many cases and they are different from crop to crop and State to State.<sup>8</sup> Similarly official crop yield estimates also differ from those of the NSS. To cite an example, the percentage increase in the net area sown for *jowar* in Rajasthan is 49.6 by NSS and 3.2 according to official figures. In the case of U.P. for the same period the increase in yield rate of paddy is 29.9 per cent. according to NSS and 20.8 according to the official version. It is important that the discrepancies between two sets of figures are reconciled at an early date.

The prefinal estimates of crop acreages are based mainly on the impressions of the primary reporters. This subjectivity leads to considerable disparities between the prefinal estimates of area under crops and the actual figures based on crop inspections. Sample surveys have been initiated by the NSS since 1955-56 for improving the prefinal

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<sup>8</sup> Appendix IV.

estimates but the results are subject to large sampling errors and generally become available too late to serve the purpose in view. It is understood that since the return from the surveys in providing additional information was not commensurate with the effort required for organizing the surveys and for furnishing quick estimates, the NSS have discontinued these surveys.

As in the case of acreage statistics, two series of statistics on yield are currently available, *viz.*, the official and the NSS series. The official series relates to a very large number of crops, but the NSS series is at present limited only to cereals.

The official crop yield statistics are obtained by two methods, *viz.*, (i) the traditional or *annawari* method, giving yield as the product of area times the normal yield, adjusted by the correction factor, the normal or standard yield representing the average outturn on an average soil in a year of average character and the correction or condition factor expressing the condition of the crop during the current year in relation to the normal or standard yield, and (ii) the crop-cutting surveys based on sampling, where the yield per acre is estimated objectively on the basis of crop-cutting experiments conducted in randomly selected plots located in randomly selected fields.

Under the traditional method subjectivity is introduced in ample measure, normal yield and condition factor both depending upon personal judgment. Besides, the average of the condition factors taken over a series of years works out at a figure less than the corresponding *anna* equivalent of the normal. This might suggest that estimates based on this method are underestimates; this is, however, counteracted by the fact that the normal yields which were fixed long time ago are pitched at a higher level than what they should be. How much off the normal yield can be may be judged from the fact that, as a result of experiments conducted, the standard outturn of *ragi* was lowered from 981 to 459 lb, and of sesamum from 352 to 200 lb, in Mysore during the quinquennium ending 1941-42<sup>9</sup>.

However, this method is being gradually replaced by the method of crop-cutting surveys based on random sampling. For total cereals, the coverage under random sampling crop-cutting surveys amounts to 89 per cent. The coverage for most other crops (except jute), however, is low as compared to cereals.<sup>10</sup> It is important that crop-

<sup>9</sup> *The Average Yield per Acre of Principal Crops in India, 1937-38 to 1946-47*, Ministry of Food and Agriculture, 1950, p. 2.

<sup>10</sup> Appendix V.

cutting surveys are extended to pulses and non-food crops and to all areas as expeditiously as possible.

The conduct of these surveys and the supervision from outside agencies also leave a lot to be desired. The agencies for the conduct of these surveys are generally over-burdened with other duties and do not fully realize the importance of this work. Effective central supervision over State crop-cutting surveys is at present of the order of 1 to 2 per cent. only; the supervision over the conduct of surveys needs strengthening and the minimum scale of supervision, both State and Central, should be such as to yield independent yield estimates at the State level.

The methods and techniques followed by various States are not uniform, *e.g.*, the type of cut is not always the same. The variation in yield estimates might be partly due to difference in the methods and techniques, and this would obscure the true differences in yield rates. Uniformity in regard to procedures and method is of great importance and should be ensured as soon as possible.

Statistics of yield are available at present in respect of cereals, pulses, other crops, oilseeds and fibres; and also for some of the plantation crops like tea, coffee and rubber and for some minor crops such as indigo, tapioca, etc.<sup>11</sup> The absence of production estimates in respect of a number of minor crops including fruits and vegetables is a serious limitation. Even though the area under such crops and the quantum of production may be small, their importance from the point of view of export trade and, also, owing to the part these products play in human nutrition, makes it imperative to collect reliable information regarding these products on a regular basis. For this purpose, reliable methods of assessing the acreage and production of these crops need to be developed.

The enlarging geographical coverage and improvements in the methods of estimation of area and yield of crops while gradually improving the quality of absolute official estimates, have, at the same time, introduced an element of non-comparability over time. To overcome this difficulty, the Ministry of Food and Agriculture (Directorate of Economics and Statistics) has constructed a series of index numbers of agricultural products. The various State Governments are also issuing State indices of agricultural production but the coverage, base period, etc., of the State series differ from State to State. The analysis

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<sup>11</sup> Appendix VI.

of comparative State trends of agricultural production, therefore, becomes very difficult.

Data on yield of major cereal crops are also being collected on a sampling basis by the NSS during their regular rounds through the agency of general purpose investigators who collect all sorts of data on diverse topics—on consumer expenditure and incomes, population and over-population, family planning and farm planning and so on. This peripatetic agency does not appear to be very suitable for crop-cutting surveys. It has also been noticed that results of some experiments are lost as the investigators fail to reach the particular villages at the time of actual harvest of the selected fields.

Sample crop-cutting surveys (2,500 experiments in 500 villages) in Orissa to estimate the yield of rice, conducted by the State Bureau of Statistics in 1959–60, showed the production to be 70.9 per cent. higher (3.6 million tons as against 2.1 million tons) than the figures given in the final forecast of 1958–59. The magnitude of the difference is too large to be explained away as “statistical”, after having made adjustments for possible production increases.

A comparison between NSS estimates and the official estimates (which also are based on crop estimation survey conducted by State Governments under the overall supervision of NSS) reveals a wide divergence in the two sets of figures even at the all-India level. The discrepancies may be due to the differences in the shape and size of the cut resulting in border and location biases, difference in the drriage factors, differences in the methods of estimation and the varying amounts of supervision as between the two agencies.

But it is obvious that in regard to yield we are still very much in the sphere of uncertainty. We still do not know how much food we really produce. How much we have to import? Whether the country has sufficient for its domestic consumption, whether we can export—we have no absolutely reliable data and I think for a country like ours which had a long beckground of problems and statistical work, the lacuna is rather disturbing.

In respect of the forecast crops, usually two or three forecasts are issued (except in the case of wheat and cotton for each of which five estimates are issued), which contain information on area sown and quantitative estimates of the outturn expected to be harvested. Yield estimates obtained on this basis were not very reliable as recourse had to be taken to the traditional method of estimating the average yield,

either directly on the basis of visual observation or as a product of normal yield and the condition factor. In spite of the recent improvements in the procedures for determining normal yield and the condition factor, the pre-harvest estimates of production still remain largely undependable.

The estimates are delayed in a large number of cases. Final estimates of outturn of some crops for 1959-60, for instance, were delayed by months. For example, the due date of release of all-India estimate for rice was 20th February 1960. The actual date of release of all-India estimate of rice was 13th May 1960. Similarly the due date for wheat was 30th May 1960 and the actual date of release of all-India estimate was 14th July 1960.<sup>12</sup>

As may be observed from figures relating to 1952-53 to 1955-56, there are also significant variations<sup>13</sup> in the final, partially revised and the revised estimates of crop outturns, in respect of some important crops and categories of crops. For foodgrains, for instance, there was a difference of about 500,000 tons in the partially revised estimate and actual production for the year 1955-56. Take the most recent data relating to output of foodgrains. First, production estimates for 1958-59 placed the output at 73 million tons; subsequently it was stated that the country had produced as much as 75.5 million tons in that year. No one knows what was the actual output subject to a reasonable margin of error.

In the case of cotton, the assessment of the actual crop made by the Indian Central Cotton Committee on the basis of a post-mortem examination of the All-India Cotton Estimates reveals that official estimates of production are under estimates.

Crop	Due date of release of all-India estimate	Actual date of release of all-India estimate
Rice	.. 20th February 1960	13th May 1960
Wheat	.. 30th May 1960	14th July 1960
Cotton	.. 10th May 1960	4th August 1960
Sugarcane	.. 25th May 1960	15th July 1960

<sup>12</sup> Source: Directorate of Economics and Statistics, Ministry of Food and Agriculture.

<sup>13</sup> Appendix VII.

With a view to imparting objectivity to these estimates it is recommended that suitable systems of physical measurements during the various stages of crop growth be introduced<sup>14</sup>; this step would be amply justified in view of the importance of pre-harvest estimates in the context of price and food administration.

It is necessary to extend the scope of the all-India crop forecasts to such important crops as are not already covered and the coverage of forecasts should be extended to all areas.

### III

Not much information is available on farm prices at the moment. Data on farm harvest prices are collected only from a few selected centres and is not fully representative of prices obtaining in rural areas. Data on rural retail prices are non-existent (except for a few selected centres for which retail price relatives are compiled by the Labour Bureau). The series of harvest price data is not comparable over time as the definition of the term 'harvest price' and the method of averaging had not been uniform from State to State or for the different periods.

The States of Orissa, Assam, Mysore, the former Bombay State and the Union Territory of Delhi, are not collecting farm (harvest) prices according to the improved scheme in progress in other States (they have, however, agreed in principle to do so).

Much work has been done in regard to the difference between the price on which the farmers sell the goods and the price at which it is finally taken by the consumer, but there is no authoritative and certain information about it. We are still grouping rather than being sure about it. Data on retail prices will also be helpful for several other purposes, e.g., to determine the relationship between quantities demanded and the changes in relative prices.

Not much information is available on agricultural wages either. Statistics on agricultural wages are collected only from a few selected centres in the various States. There is no unanimity as to the meaning of "most common wage rate" and the coverage is not complete. Such data are not collected in Rajasthan, Jammu and Kashmir, Manipur and Delhi. It would be desirable to collect the information in respect of these States so that data on agricultural wages are available on a uniform basis in the country as a whole.

<sup>14</sup> Some of the advanced countries have evolved suitable methods for this purpose. See for example, "Crop Forecasting in Japan", *Agricultural Situation in India*, March 1959.

Irrigation data are characterized by non-uniformity in definitions and concepts for the country, or in some cases even in the same State, over a period of time. In Madhya Pradesh, the figures for both Government canals and tanks were shown under private canals up to 1948-49. In Uttar Pradesh, figures shown under Government canals include those under private canals except for the district of Basti, Budaun, Dehra Dun and Nainital for which separate figures in respect of areas irrigated by private canals are available. Figures for Assam and Coorg were incomplete for a long time and for West Bengal, Bihar, Orissa and parts of Madras and Uttar Pradesh, the figures for areas irrigated by sources other than Government canals are only rough estimates. Figures for wells in Uttar Pradesh include those for tube-wells. The definition of tanks is not uniform in the various parts of India.

The absence of information on cultivator's holdings is another serious gap in agricultural statistics. Some information is available on this topic,<sup>15</sup> but it does not go far enough; they are in any case not so detailed as to enable planning at lower levels. India is co-operating with the F.A.O. for purposes of the Agricultural Census by undertaking a survey of land-holdings during the 16th round of NSS. This survey will provide data at regional, State and all-India levels. It is very important, however, to have data below the regional level for purposes of micro-level planning and the question of tabulating some information from village records in respect of some of the important items should be seriously looked into.

Indeed, any measure of reform which the State may wish to push through in the sphere of agricultural development can, in the final analysis, be implemented only by the cultivator himself. Extension agencies cannot advise the farmers effectively in the absence of a clear statistical picture of the farm characteristics in the region relating to the pattern of land use, crop production, etc. Detailed and realistic planning at the macro-level also cannot be done in the absence of data on these farm characteristics. We would like to have information about Farm Management. Studies have been made under the auspices of ICAR, but these studies have not been fully collated and no comprehensive account is available for the country as a whole.

A complete enumeration on some aspects of holding (information on irrigated area and sources of irrigation, extent of double cropping,

<sup>15</sup> From *Farm Management Investigations, Akola Survey into Cost of Production of Crops, NSS Survey of Agricultural Holdings, Agricultural Labour Enquiry, and the Rural Credit Survey Reports.*

number of plots or fragments in the holding, details of livelihood and farm labour, etc.) could be conducted quinquennially by combining it with the Livestock Census. Some of the important items are already included in the Livestock Census and the extension of its scope will be worth the additional trouble and expense. Information on some items would be needed both in respect of ownership as well as operational holdings.

Information in regard to holdings is becoming very important because of policy reasons. One would like to know more, and have more information especially in the context of legislation for ceilings, co-operative farming and so many other economic and social changes which are on the anvil as it were. Some more precise data in respect of holdings will be essential and we do not have them.

An important lacuna in agricultural statistics is the absence of data on area under the various improved agricultural inputs and practices and the extent of benefits accruing therefrom. Only some piecemeal work of limited utility has been done on this topic. It is very important that such work is done on a more comprehensive and regular basis to yield data on the present methods and practices and the input-output coefficients for each input and practice. We know of new facilities that have been provided by way of irrigation and provision of improved seeds, fertilizers and so on and yet we have no data as to the precise amount of these inputs being utilized by different types of farmers for different crops in various regions. This is a serious lacuna. What responses have resulted from these new inputs? In the absence of such data we have to go by guesses and by generalized ratios which may or may not hold good. The greatest obstacle in assessing the future production potential (in connection with the study on "Long-term Projections of Supply and Demand for Selected Agricultural Products", in progress in the National Council) has been the absence of reliable and detailed techno-economic data on production aspects.

It is recommended that at the time of crop-cutting surveys, in respect of the plots selected for the purpose, ancillary information such as the use of manures, adoption of pest control measures, etc. be also gathered in addition to finding the area under improved varieties of crops.

The lack of information on crops movement, within the same State of principal trade blocks, has been a serious handicap, and, an unfortunate statistical lacuna.

For cotton, the quantity of raw cotton imported (exported) by rail and river into (from) each internal block of the State or area from (to) each external block and other internal blocks of the State or area is given in Cotton Trade Statistics. Trade blocks for each commodity or a group of commodities will be different and data in respect of trade between these would be highly beneficial.

Data on stocks and reserves of foodgrains relate only to Government stocks and offtake from the same. For commercial products like cotton, jute, etc., information on stocks held by trade are also available. It is suggested that stock data be collected in respect of all important agricultural commodities on a more comprehensive and regular basis. Information on stocks with farmers and traders is indispensable for purposes of food administration.

Marketable surplus has become another very crucial thing. The information about it is still inadequate. We don't have sufficient information as to what proportion of the producers have any surplus at all; it is not known as to how much is simply consumed by the subsistence farmers.

Data on the cost of production of crops are scanty but it is even more so in the case of livestock products for which only a very limited amount of information is available in *Indian Livestock Statistics*. Data on cost of production are important for purposes of price-fixation about which so much is being heard. In view of the anticipated success of agricultural development plans and the realization of increased agricultural production, with a possible tendency for a fall in agricultural prices, the need for data which would enable a clear analysis of the interests of the producers and the need for a stable price level is apparent.

Hence information on the cost of production is of fundamental importance from the point of view of farmers. In order to change the input-mix (quantitatively as well as qualitatively) and to decide the enterprise combination, data are required on the cost of various inputs and the margin of profitability for different outputs. Thus, for maximizing the individual farmer's revenue as well for improving the overall efficiency of our agricultural organization, information on the cost of production is indispensable.

The lack of sufficient and high quality data in regard to production costs was felt by us while working out the profitability of crops (which would determine the allocation of input-resources) and determining

the expected inter-crop relationships in connection with our long-term supply projections of selected agricultural commodities.

#### IV

Very little information is available at the moment in regard to savings and their disposal in the rural sector. Some data are available in the Rural Credit Surveys conducted by the Reserve Bank of India, but these give limited information for a few regions only. The problems of measurement and analysis of rural savings, and of determining the intra-sector and inter-sector flows, are quite complicated and call for the devising of suitable concepts and the use of specialized techniques and methods of data collection and their interpretation.

These problems arise because of the nature of the rural economy and the socio-economic complex of the rural population and particularly owing to the behavioural patterns of rural people in regard to savings. That non-monetary savings in rural areas are an important part of total savings is recognized by all, but we have no means of knowing their magnitude. A study of rural saving—both in respect of monetary and non-monetary components—would be useful in the context of overall plans of economic development and social progress and particularly from the point of view of capital formation, present and potential, for achieving the goal of increased agricultural production.

There has been a general feeling that India's rural economy has sufficient margin of savings not only to finance further programmes of agricultural improvements but even to finance the expansion of the other sectors of the economy. No one has the remotest idea as to the percentage of the savings in the agricultural sector. Particularly we know that the richer landlords and larger farmers save, but is not known as to how they dispose of their savings and so on.

In regard to investment we have very little definite data. This can be illustrated from the fact that the Planning Commission made an estimate for the Second Plan which was so totally in variance with the like estimates made by the Reserve Bank and we must add that neither the Reserve Bank estimates nor the Planning Commission estimates are in the region of certainty.

I may add that the National Council of Applied Economic Research is undertaking a pilot survey of rural savings which is expected to throw light on most aspects of the problem. The pilot survey would be followed by bigger surveys to be launched sometime around the middle of 1961,

## V

The introduction of the NSS was a welcome step inasmuch as it obviated the need to work through the States for obtaining statistics at the national level in regard to many topics, such as, expenditure and consumption patterns. However, the setting up of NSS has had a dampening effect on the enthusiasm for implementation of measures decided upon under the earlier plan to develop statistics at the source. A feeling was evidenced in certain quarters that any type of data can be collected through a sample survey. The net result was that the data collected through primary agencies lacked the support and confidence of those concerned, while the NSS supplied estimates on an *ad hoc* basis at the national and regional levels.

At present the situation is that both area and yield statistics are not being scientifically collected, although some beginning has been made in respect of the yield statistics. In principle, it is necessary that area be enumerated by complete coverage and not by sampling. The estimates of yield for different crops should be obtained by scientific crop-cutting experiments. If the area statistics are also obtained by sampling, further errors will be introduced in the estimates of agricultural production because according to the sampling techniques the errors in sample estimates of area and sample estimates of yields will add up. Area enumeration is actually being done by complete coverage in a number of States and where it is not so done, sample estimates of areas may be useful up to a point, but there is no justification for making sample estimates of areas under crops for the whole of India even when for a large part of the country estimates by complete enumeration are available.

Incidentally while I am on the National Sample Survey, may I make a comment? The NSS is, indeed, making a great effort in our country and all of us are proud of its work and achievements. However, we must recognize its limitations. In the first place, while great attention has been paid to the sampling techniques and minimizing sampling errors less than necessary attention has been given to the avoidance of non-sampling errors which indeed are much more serious especially in socio-economic enquiries for Savings, Consumption, Income and so on, where the methods of enquiry have to be on household basis using personal interview techniques.

Secondly, the NSS attempts to do too many things at a time. It is really a multipurpose agency. While for some purposes their techniques may be found satisfactory, by the very nature of the economic

data, the multipurpose agency cannot meet the requirements of specific enquiries into specific types of economic data. For this specialized purpose, different methods and techniques will have to be employed.

Also the NSS, because of its multipurpose nature, is not able to deal thoroughly and satisfactorily with particular types of information which one may seek. For example, although the NSS has been collecting data on incomes it has not been possible so far to get any idea of the income distribution in our country which is so essential for our planning. In this sense it attempts too much and the results are too little. I would also like to recommend that a conference be convened at expert level to examine critically the methods and results of NSS Expenditure Surveys and suggest improvements. For example, instead of repetitive once-a-year multipurpose expenditure surveys it may be desirable to experiment with other procedures, including continuous cross-section Surveys.

There are items, of course, in respect of which sample survey would give adequate information for purposes of planning. The variability among enumerators can be controlled because of the relatively small size of the staff and it is possible to train the staff better in general and adopt objective measurement techniques in case of a sample survey as against complete census. However, whenever a proper and detailed frame is available, the items of investigation are not very complicated in nature, the enumerators are drawn locally and are familiar with existing conditions and adequate supervision over the enumerators' work is possible, complete enumeration may be the appropriate method to adopt.

For basic agricultural statistics relating to land utilization and area under crops, I am clearly of the view that NSS should not be relied upon to supply the required information. Here too, however, sampling has an important role to play in controlling and improving the field work through rationalized supervision and regulation of the work done by primary agencies.

The *patwari* system, a local permanent agency system, has on the whole operated well in providing acreage statistics. Experience shows that land records agency being resident (stationary) is also more suitable for obtaining information on items like the yield rate. The existing land records agency, therefore, supplemented by the agency being set up under the Ministry of Community Development, appear to provide

promise in the collection and collation of statistics required for successful planning.<sup>16</sup>

Several years have been lost under the wrong notion that some kind of an all-purpose sample survey will provide all the data that we need in planning and that detailed statistics at the village level are unnecessary.<sup>17</sup> It is high time to come to grips with the problem and thus improve our basic agricultural statistics, which at present are quite unsatisfactory.

As a minimum programme, we should try to ensure that:

- (a) the statistics of land utilization and area under different crops become available in respect of the entire geographical area of the country;
- (b) the estimates of production are made available for all the important crops including fruits and vegetables and minor commercial crops and are based on sample crop-cutting experiments for all parts of the country.

The above steps would help to clear the confusion in the public mind where nobody knows for sure whether agricultural production has increased as planned and whether the setting of targets and the method of arriving at them have any validity.

There is no need to change radically the structure of machinery for the collection of agricultural statistics in areas where land records staff is doing the work. "While our examination has revealed the necessity of setting up suitable machinery for reporting where no machinery exists at present, and strengthening the existing machinery by reducing its burden and rationalizing its procedure, we are satisfied that the general pattern of the machinery as such is on correct lines and needs no radical alteration. The tempo of national development is placing a heavy strain on the whole machinery, and most of all on the *patwari*, who is its base, and it is essential that the Central, Provincial

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<sup>16</sup> This is also the view of P. V. Sukhatme, See "Statistics for Agricultural Planning: Developments in Agricultural Statistics during the last Fifteen Years"—Address delivered at the Twelfth Annual Meeting of the Indian Society of Agricultural Statistics at Gwalior on 28th January 1959, *Journal of the Indian Society of Agricultural Statistics*, Vol. XI, Nos. 1 and 2, 1959, pp. 23-24.

<sup>17</sup> V. G. Panse, "Agriculture with Special Reference to Statistical Aspects in the Third Plan": Symposium held during the Twelfth Annual Meeting of the Indian Society of Agricultural Statistics, *Journal of the Indian Society of Agricultural Statistics*, Vol. XI, Nos. 1 and 2, 1959.

and State Governments should take all necessary steps to reinforce it at every stage."<sup>18</sup> These views of the Technical Committee expressed over a decade ago hold good today as well.

Only qualified people should be appointed for the job of data collection, processing, interpretation and presentation of agricultural statistics. Practices like the one in Mysore under which the post of *patwari* is made hereditary are not desirable.<sup>19</sup>

Training ought to be given to the field staff engaged in the collection of agricultural statistics on a more comprehensive basis. This should include refresher courses from time to time. It is equally important that proper training is given to the supervisory staff.

Supervision over the work of primary agencies should be improved in nature and quality. The quality of supervision needs to be improved and its amount increased in respect of (i) departmental supervision, (ii) the supervision by State statistical staff and (iii) the supervision, by Central statistical staff. The work of the latter two agencies, besides leading to improvement in agricultural statistics, should help in obtaining independent estimates for pointing out the reliability of information collected. The scheme of rationalized supervision over the work of recording of area done by the primary reporting agencies should be started in all States where data are collected on complete enumeration basis for all crops and land use classes.

Time-lag in the collection of data and its release in a usable form should be reduced. This would enable timely processing of data and the quick publication of results. Of course, unless the work-load of various types of staff engaged at various levels, and particularly of the primary agency is reduced to manageable proportions, not much success can be expected in the efforts to stick to time schedules. Adequate staff should be engaged for compilation and processing of data at the various stages. Other facilities by way of the provision of mechanical equipment for handling data should also be made available.

There should be a consolidated plan for the improvement of agricultural statistics wherein the relationship of different components to each other and to the total plan should be carefully thought out

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<sup>18</sup> *Report of the Technical Committee on "Co-ordination of Agricultural Statistics in India"* (Chairman: W. R. Natu). Manager of Publications, Delhi, 1950, p. 74.

<sup>19</sup> A bill is pending in the State Legislature for abolishing the hereditary nature of the job and appointing a stipendiary agency.

and specified. It may not be possible to implement all the suggestions given here because of organizational or financial considerations. So priorities for the various measures should be worked out.

Simplification in official procedures and routines could go a long way in meeting the time targets. For example, submission of an advance copy of some of the returns by State Offices to the Ministry of Food and Agriculture at the Centre would help expedite matters. This would enable the time-lag between the finalization of returns and its formal approval by State Administration to be utilized for purposes of compilation.

Allied to the issue of the simplification of administrative procedures is the question of simplifying some statistical procedures; the latter is also important from the point of view of timely compilation and release of information. The estimation of data for small areas or for items of minor importance when actual figures are wanting is an example of the type of statistical technique that would come in handy to combat some of the difficulties which lead to delays in the release of agricultural statistics.

Extension of the work under schemes (sponsored by the Ministry of Food and Agriculture) launched during the Second Plan, *e.g.*, computation of index number series relating to agricultural economy, survey of culturable waste-lands, diagnostic studies for reconciliation of statistics collected by more than one agency, etc., is recommended on a more intensive basis.

Voluntary services of cultivators should be enlisted for reporting agricultural statistics. In U.S.A., U.K. and other western countries, it is the farmers themselves who assist in the collection of statistics. In view of the vast size of the country and its large population, voluntary co-operation assumes special significance in India. Owing to widespread illiteracy in the rural areas, it may be difficult for the farmers to submit returns, but their co-operation in the way of assisting the village record-keeper for crop inspection and other work would improve matters. This would be facilitated if a consciousness amongst cultivators is created and if they can be made to see the nexus between data collection and its practical usefulness towards increase in the efficiency of farm. So far, the supply of statistics has been largely linked up in their mind with the payment of revenue, kind levy on their produce, and the like, and in such circumstances not much response could be expected from them.

Of late, some data collection has resulted in the supply of needed materials and/or technical advice to the farmers, and as the developmental endeavours percolate to the lowest levels, farmers may be expected to appreciate the usefulness of data collection and thus respond amply by playing their part of the game. The co-operation of village *panchayats* and non-official Block Development Councils by way of educating the farmers in this regard would be very valuable; similar results can be expected from increased association of the non-official agencies like co-operative societies, etc.

Efforts should simultaneously be made to educate the officials engaged in data collection and supervision in regard to the importance of agricultural statistics; it is equally important for other officials whose co-operation is generally sought in the matter. The significance of reliable and timely information is not realized in all quarters and a change in the attitude of officials is a *sine-qua-non* of improved agricultural statistics. Some organizational changes would also be needed to make these effective.

The improvement in the organization of the machinery for data collection should comprise: (i) improvement in the conditions of service—reasonable salaries, established scales of pay and security of tenure, (ii) expansion of the scheme of rationalized supervision—checking based on random sampling methods, (iii) appointment of suitable senior staff and finally (iv) there should be delegation of powers to the proper persons.

In concluding, I must add in fairness to all those concerned with it that there is a steady and consistent effort to improve agricultural statistics; we have also got a body of highly trained and competent statisticians. With these additions we may legitimately hope that within a very short time our country should also compare favourably with other countries where agricultural data are more adequate and reliable.

## APPENDIX I

### OLD AND NEW CLASSIFICATION OF LAND FORESTS AND FALLOWS

Old classification	New classification	Definition
1 Forests	(i) Forests	These include all actually forested areas or lands classed or administered as forests under any legal enactment dealing with forests whether State-owned or Private. If any portion of such land is not actually wooded but put to some agricultural use; that portion is included under the appropriate heading of cultivated or uncultivated land
2 Area not available for cultivation	(ii) Land put to non-agricultural uses	This stands for all lands occupied by buildings, roads and railways or under water, e.g., rivers and canals and other lands put to uses other than agricultural
	(iii) Barren and unculturable land	This covers all barren and unculturable land like mountains, deserts, etc. Land which cannot be brought under cultivation unless at a high cost, is classed as unculturable, whether such land is in isolated blocks or within cultivated holdings
3 Other uncultivated land excluding current fallows	(iv) Permanent pastures and other grazing lands	These cover all grazing lands, whether they are permanent pastures and meadows or not. Village common and grazing lands within forest areas are included under this head
	(v) Miscellaneous tree crops and groves not included in the net area sown	Under this class is included all cultivable land which is not included under net area sown but is put to some agricultural use. Lands under casuarina trees, thatching grass, bamboo-bushes and other groves for fuel, etc. which are not included under orchards are classed under this category

## APPENDIX I (Contd.)

Old classification	New classification	Definition
4 Current fallows ..	(vi) Culturable waste	These include lands available for cultivation but not taken up for cultivation or abandoned after a few years for one reason or the other. Such lands may be either fallow or covered with shrubs and jungles which are not put to any use; they may be assessed or not assessed and may lie in isolated blocks or within cultivated holdings. Land once cultivated but not in succession is also included in this category
	(vii) Current fallows	This class comprises cropped areas which are kept fallow during the current year. If any seedling area is not cropped again the same year, it is also treated as current fallow
	(viii) Other land fallow	This includes all lands which were taken up for cultivation but are temporarily out of cultivation for a period of not less than one year and not more than five years. The reasons for keeping such lands fallow may be one of the following : (a) Poverty of cultivators, (b) Inadequate supply of water, (c) Malarial climate, (d) Silting of canals and rivers. (e) Soil erosion, and (f) Unremunerative nature of farming
5 Net area sown ..	(ix) Net area sown	This consists of net area sown with crops and orchards, areas sown more than once being counted only once

Source: *Guide to Current Agricultural Statistics, 1954.*

## APPENDIX II

### CLASSIFICATION OF CROPS IN LAND UTILIZATION STATISTICS

#### I FOOD CROPS

(a) Food grains :

(i) Cereals—rice : autumn, winter, summer and total ; cholam or jowar ; kharif, rabi and total ; cumbu or bajra, maize, ragi or marua-wheat, barley, other cereals and small millets—kharif, rabi and total.

(ii) Pulses—gram, *tur* or *arhar*, other pulses, kharif, rabi and total.

(b) Sugar .. Sugarcane, others.

(c) Condiments and spices .. Pepper (black), chillies, ginger, turmeric, cardamoms, betelnuts, others.

(d) Fruit and vegetables including fruit-fresh .. Mangoes, citrus fruit, bananas, grapes, pome fruit, others.

Dried .. Cashewnuts, others.

Vegetables .. Potatoes, tapioca, sweet-potatoes, onions, others.

(e) Other food crops ..

#### II NON-FOOD CROPS

(a) Oilseeds .. Groundnut, castor, sesamum (til), rape and mustard, linseed, coconut, others.

(b) Fibres .. Cotton, jute, mesta, sunnhemp, others.

(c) Dyes and tanning materials .. Indigo, others.

(d) Drugs, narcotics, etc. .. Opium, coffee, tea, tobacco, cinchona, Indian hemp, rubber, others.

(e) Fodder crops .. ..

(f) Green manure crops .. ..

(g) Other non-food crops .. ..

Source: *Agricultural Situation in India*, August 1960.

### APPENDIX III

#### COVERAGE OF LAND UTILIZATION STATISTICS ACCORDING TO DIFFERENT METHODS OF REPORTING (million acres)

	Area reported in Agricultural Statistics Returns					
	Total geo- graphical area	Sample survey	Complete enumera- tion	Estimated	Total	Non- reporting
1	2	3	4	5	6	7
Andhra Pradesh ..	67.9	..	63.8	2.7	66.5	1.4
Assam ..	54.4	..	33.0	2.8	35.8	18.6
Bihar ..	43.0	..	42.8	..	42.8	0.2
Bombay ..	122.2	..	109.6	11.3	120.9	1.3
Kerala ..	9.6	9.4*	..	..	9.4	0.2
Madhya Pradesh ..	109.6	N.A.	N.A.	N.A.	107.6	2.0
Madras ..	32.1	0.5	26.6	4.9	32.0	0.1
Mysore ..	47.4	..	46.2	..	46.2	1.2
Orissa ..	38.6	..	..	38.4	38.4	0.2
Punjab ..	30.1	..	30.3	..	30.3	..
Rajasthan ..	84.6	..	72.1	12.3	84.4	0.2
Uttar Pradesh ..	72.6	..	62.4	10.2	72.6	..
West Bengal ..	21.7	17.4*	..	4.4*	21.8	..
Jammu and Kashmir ..	55.0	..	5.8	0.1	5.9	49.1
Delhi ..	0.4	..	0.4	..	0.4	..
Himachal Pradesh ..	7.0	..	3.0	..	3.0	4.0
Manipur ..	5.5	..	..	0.3	0.3	5.2
Tripura ..	2.6	..	..	2.6	2.6	..
Andaman and Nicobar Islands ..	2.1	..	..	0.1	0.1	2.0
<b>TOTAL ALL-INDIA ..</b>	<b>806.4</b>	<b>27.3</b>	<b>496.0</b>	<b>90.1</b>	<b>721.0</b>	<b>85.7</b>

\* Provisional.

*Note.*—The total of columns (6) and (7) does not tally with column (2) in some cases due to differences in the method of estimation.

Source: *Agricultural Situation in India*, August 1960.

### APPENDIX IV

#### PERCENTAGE DIFFERENCE BETWEEN 1958-59 AND 1957-58 IN THE CASE OF NSS AND OFFICIAL ESTIMATES OF NET AREA AND YIELD RATE

State	Crop	Percentage Increase (+) or Decrease (-) in 1958-59 over 1957-58			
		Net area		Yield rate	
		In case of NSS	In case of Official*	In case of NSS	In case of Official*
Rajasthan	Jowar	(+)149.6	(+) 3.2	(+) 2.7	(-) 0.3
	Bajra	(+) 7.5	(+) 3.3	(+)63.1	(+)18.3
	Maize	(+) 41.0	(-) 1.1	(+) 5.7	(-) 3.3
	Wheat	(-) 15.0	(+)11.2	(+)20.6	(+)12.3
	Barley	(+) 0.7	(+) 6.3	(+)85.7	(+)10.6
Punjab, Delhi and Himachal Pradesh	Paddy	(-) 15.7	(+) 7.5	(-) 9.2	(-) 2.1
	Bajra	(+) 4.7	(+) 6.7	(-)48.2	(-) 7.2
	Maize	(-) 10.0	(+) 5.7	(-) 4.2	(-)24.3
	Wheat	(+) 3.3	(+) 5.9	(-)37.2	(-) .8
Uttar Pradesh	Paddy	(+) 77.1	(+) 5.7	(+)29.9	(+)20.8
	Jowar	(+) 48.7	(+) 6.7	(-) 7.4	(+)18.3
	Bajra	(-) 5.2	(-) 0.5	(-)12.6	(-) 6.8
	Maize	(+) 5.4	(+) 0.9	(+)78.0	(-)21.8
	Wheat	(+) 12.5	(+) 3.5	(+) 8.1	(+) 8.7
Madhya Pradesh	Barley	(+) 14.4	(+) 4.4	(+)14.2	(+) 5.3
	Paddy	(+) 22.7	(+) 0.9	(+)61.9	(+)54.1
	Jowar	(+) 21.8	(-) 2.7	(-)11.1	(-)10.1
	Maize	(+) 75.0	(-) 0.4	(+)32.4	(+)19.3
Bihar	Wheat	(-) 11.2	(+) 7.8	(+)83.1	(+)59.3
	Paddy	(+) 14.8	(+) 5.9	(+)13.7	(+)73.7
	Maize	(+) 58.2	(+)12.5	(+) 2.4	(+)12.8
	Wheat	(+) 44.7	(+)22.8	(+)21.7	(+)20.0
Orissa	Barley	(+) 76.6	(+)19.3	(-)28.3	(+)16.0
	Paddy	(+) 28.1	(+) 1.4	(+)52.2	(+)18.0

## APPENDIX IV (Contd.)

State	Crop	Percentage increase (+) or decrease (-) in 1958-59 over 1957-58			
		Net area		Yield rate	
		In case of NSS	In case of Official*	In case of NSS	In case of Official*
West Bengal	.. Paddy	(-) 17.1	(-) 3.5	(+) 8.9	(-) 2.5
Assam, Manipur and Tripura	do.	(-) 14.7	(+) 5.5	(+) 0.2	(-) 1.7
Andhra Pradesh	.. do.	(+) 5.3	(+) 4.7	(+) 1.1	(+) 4.8
	Jowar	(+) 22.0	(-) 4.5	(-) 7.2	(+) 18.5
	Bajra	(+) 39.0	(+) 3.2	(-) 23.1	(-) 2.8
Madras	.. Paddy	(+) 41.7	(+) 1.9	(-) 5.2	(+) 0.1
	Jowar	(+) 23.1	(+) 1.6	(-) 9.6	(+) 0.1
	Bajra	(+) 2.7	(+) 1.5	(+) 50.2	(-) 0.5
Kerala	.. Paddy	(+) 11.2	(+) 0.2	(-) 1.1	(+) 0.7
Bombay	.. do.	(-) 1.4	(+) 0.9	(-) 0.2	(+) 23.1
	Jowar	(+) 25.5	(+) 2.5	(-) 5.8	(+) 8.6
	Bajra	(-) 1.4	(+) 2.3	(+) 8.5	(+) 9.5
	Wheat	(-) 8.6	(-) 3.6	(+) 28.8	(+) 48.3
Mysore	.. Paddy	(-) 19.9	(+) 2.0	(+) 15.1	(+) 5.7
	Jowar	(+) 0.2	(+) 1.8	(+) 0.1	(-) 1.3
	Ragi	(+) 28.3	(+) 5.3	(-) 0.4	(-) 7.4

\* For 1958-59, Official Estimates relate to Final Estimates.

Source: Directorate of Economics and Statistics, Ministry of Food and Agriculture.

## APPENDIX V

### PERCENTAGE OF PRODUCTION BASED ON CROP ESTIMATION SURVEYS

Crop	Percentage of production based on crop estimation surveys
Rice ..	88
Wheat ..	98
Jowar ..	100
Bajra ..	99
Ragi ..	86
Maize ..	67
Barley ..	99
Total cereals ..	89

Source: *Agricultural Situation in India*, August 1960.

## APPENDIX VI

### DIFFERENT TYPES OF CROPS

- I. *Forecast Crops*—
- Cereals .. Rice, jowar, bajra, maize, ragi, small millets, wheat and barley.
  - Pulses .. Gram, tur, other kharif pulses and other rabi pulses.
  - Other crops .. Sugarcane, potato, pepper, ginger, tobacco and chillies.
  - Oilseeds .. Groundnut, sesamum, rape and mustard, linseed and castor.
  - Fibres .. Cotton, jute, mesta and sunnhemp.
- II. *Plantation Crops* .. Tea, coffee, rubber and coconuts.
- III. *Minor Crops* .. Bananas, indigo, papaya, sweet-potatoes, tapioca, turmeric, opium, lac, cashew-nuts, cardamom and betelnuts.

Source: *Agricultural Situation in India*, August 1960.

## APPENDIX VII

### COMPARATIVE ESTIMATES OF PRODUCTION IN INDIA

(In thousand tons)

Crops	1952-53			1953-54			1954-55			1955-56		
	Final estimate	Partially revised estimate	Actuals of production	Final estimate	Partially revised estimate	Actuals of production	Final estimate	Partially revised estimate	Actuals of production	Final estimate	Partially revised estimate	Actuals of production
1 Rice ..	23,424	22,495	22,537	27,079	27,561	26,769	24,209	24,531	24,821	25,474	26,846	27,122
2 Wheat ..	6,762	6,762	7,382	7,792	7,873	7,890	8,539	8,778	8,900	8,348	8,569	8,622
3 Total cereals ..	47,584	49,103	49,222	56,130	57,920	58,268	55,327	55,734	56,183	53,349	54,456	54,923
4 Total pulses ..	8,486	8,997	9,044	9,899	10,458	10,450	10,474	10,870	10,777	10,187	10,831	10,871
5 Total foodgrains	56,070	58,100	58,266	66,029	68,378	68,718	65,801	66,604	66,960	63,536	65,287	65,794
6 Tobacco ..	219	N.A.	241	256	268	268	248	244	251	259	295	298
7 Cotton* ..	3,050	3,131	3,194	3,935	3,965	3,944	4,298	4,227	4,250	3,998	4,001	3,998
8 Jute† ..	4,605	4,605	4,592	3,129	3,129	3,091	3,153	2,928	2,929	4,137	4,197	4,198

\* In thousand bales of 392 lb. each of cotton lint.

† In thousand bales of 400 lb. each.

Sources: 1. For final estimates and partially revised estimates, produce issues of *Agricultural Situation in India*.

2. For actuals of production, see *Area, Production and Average Yield per Acre of Principal Crops in India, 1949-50 to 1957-58*, issued by Economic and Statistical Adviser to the Government of India, Ministry of Food and Agriculture, September 1958.

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