

CHAPTER 8

AGRICULTURE

The Agriculture Sector occupies centre stage in Indian economy containing three thrust areas as (1) to promote inclusive growth, (2) to enhance rural income, and (3) sustain food security. India is one of the world's largest agrarian economies. Although, the agriculture sector (including allied activity) in India accounted for 15.7 of the Gross Domestic Products (GDP) (at constant price 2004-05) in 2008-09 compared to 18.9% in 2004-05, which shows the share of Agriculture sector in the GDP has been declining over the years, its role remains critical as this sector provides employment to around 52% of the work force. The agriculture sector contributed approximately 10.2% of the total export during 2008-09.

The Directorate Economics and Statistics under the Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India releases estimates of area, production and yield in respect of principle crops of the foodgrains, oil seeds, sugarcane, fibres and important commercial and horticultural crops. These crops together account for nearly 87% of agricultural output. The estimates crop productions are obtained by multiplying area estimate by corresponding yield estimates. The estimates of area and yield rates assume prime importance in the entire gamut of agriculture statistics.

Estimates of Areas: To collect the information of Areas under various Land Uses, the States have been divided into three broad categories: The first category covers States and Union Territories which have been cadastrally surveyed and where areas under the land uses are built up as part of the land records maintained by the revenue agencies (referred to as "Land Record States" or temporally settled States). The system of land records is followed in 21 States & Union Territories of Andhra Pradesh, Assam (excluding hill districts), Bihar, Chandigarh, Chhattisgarh, Delhi, Dadra & Nagar Haveli, Gujarat, Haryana, Himachal Pradesh, Maharashtra, Pudducherry, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and Uttarakhand. These States & Union Territories accounts for 86% of the reporting areas and covered under Timely Reporting Scheme (TRS) under which 20% villages are selected at random to complete area enumeration. The second category covers States where area is collected on the basis of sample surveys. A scheme for Establishment of an Agency for Reporting of Agricultural Statistics (EARAS) has been introduced in these States. Under this scheme, there are 7 States, namely, Arunachal Pradesh, Kerala, Nagaland, Orissa, Sikkim, Tripura and West Bengal and accounting to 9% of reporting areas. The EARAS envisages, inter-alia, estimation of area through sample surves in a sufficiently large sample of 20% villages/investigator zones. The third category covers the hilly district of Assam and 7 States & Union Territories, namely, Andaman & Nicobar Islands, Daman & Diu, Goa, Lakshwadeep, Manipur, Meghalaya and Mizoram, accounting to 5% reporting area, where no reporting agency has been functing. The work of collection of agricultural statistics is entrusted with village headmen and the area statistics in these States & Union Territories are based on impressionistic approach.

Estimation of Yields: The yield estimates of major crops are obtained through analysis of Crop Cutting Experiment (CCE) conducted under scientifically designed General Crop Estimated Survey (CGES). At present 95% of the production of foodgrains is estimated on the basis of yield rates obtained from the CGES. Field Operation Division of National Sample Survey Organisation is providing technical guidance to the States and Union Territories for organizing and conducting Crop Estimation Surveys for estimating yield rates of principal crops. In addition, NSSO in collaboration with States and Union Territories implements sample check programme on area enumeration work, area aggregation and conduct of crop cutting experiments under the Scheme for Improvement of Crop Statistics (ICS).

Advance Estimates of Area and Production: The period of an agricultural year is from July to June. Final estimates of production based on complete enumeration of area and yield through crop cutting experiments become available much after the crops are actually harvested and final estimates are prepared in December or January of the following agricultural year. However, the Government requires advance estimates of production for taking various policy decisions relating to pricing, marketing, export, import, distribution, etc. The four advance estimates of the crop production are released at four points of time during a year. The first advance estimates of Kharif crops are prepared and released in the month of September every year based on the rough estimates made by the State Governments. The second advance estimates of Kharif crops and first advance estimates of Rabi crops are prepared in the month of January. The third advance estimates are prepared at the end of March or at the beginning of April. The fourth advance estimates are prepared in the month of June or July every year.

Index of Agricultural Production: The index of agricultural production in India is with base "Crop years-triennium ending 1993-94=100". The index is divided into two main groups viz. (Food grains & Non Foodgrains) and 8 sub-groups viz. (Cereals, Pulses, Oilseeds, Fibres, Plantation Crops, Spices, Fruits & Vegetables and other items namely, sugarcane, tobacco, guar seed).

Cost of Cultivation: The Comprehensive Scheme for Studying the Cost of Cultivation of Principal Crops in India was initiated during the year 1970-71 as a 100% Central Sector Plan Scheme on the recommendations made by the Standing Technical Committee (STC) on Indices of Input Costs. The STC was constituted in 1967 under the chairmanship of Dr. Ashok Mitra, the then Chairman of 'Agricultural Prices Commission', now called the 'Commission for Agricultural Costs and Prices (CACP)'. This scheme was initially started with a study of only two crops viz. wheat and bajra. Later on, other important crops were included under the scheme in a phased manner depending upon need for fixation of Minimum Support Price (MSP) or for implementation of Market Intervention Scheme (MIS) for a specific commodity. As on date, there are 27 crops for which estimates of cost of cultivation and production are generated.

The Directorate of Economics and Statistics (DES) in the Ministry of Agriculture is getting the Scheme implemented through 16 Agricultural/General Universities/Colleges. Besides, the Directorate of Tobacco Development undertakes a special study on VFC tobacco in the state of Andhra Pradesh. These 17 Implementing Agencies collect and compile data pertaining to the cost of cultivation and production of various crops in different states and send it to the DES for generating the crop wise & State wise, annual estimates of cost of cultivation/production.

These estimates, as originally envisaged, provide one of the most important factors that are behind Minimum Support Price (MSP) recommendations of Commission for Agricultural Cost and Prices (CACP). MSPs, which provide protection to farmers in the event of adverse market conditions, have been one of the most important boosters of Agriculture Production and promoters of farmers' welfare. Needless, therefore, to mention that cost of cultivation and production estimates are as important and critical to agricultural growth and farmers' welfare as MSPs themselves.

Initially the scheme began with the coverage of only two crops namely wheat and bajra during 1970-71 and paddy was incorporated during the year 1971-72. The crop coverage has further widened and the cost estimates based on the data collected under the Scheme are currently generated for 27 crops given below. These crops are selected for a block period of three years. The combination of crops covered in each state varies from state to state depending upon their importance in terms of its relative contribution in the production of the relevant crop at all-India level. Crops covered under the Comprehensive Scheme for Studying the Cost of Cultivation of Principal Crops in India are:

- Kharif Season: Paddy, Jowar, Bajra, Maize, Ragi, Arhar, Urad, Moong, Cotton, Groundnut, Soyabean, Sunflower, Sesamum and Nigarseed.
- Rabi Season: Wheat, Rapeseed & Mustard, Safflower, Gram, Barley, Masur and Peas.
- Cash Crops: Sugarcane, Jute and VFC Tobacco.
- Horticultural Crops: Onion and Potatoes
- Perennial Crops: Coconut.

The Scheme envisages collection of representative data on inputs and outputs in physical and monetary terms on a comparable and comprehensive basis following uniform methodology. The field data are collected on the Cost Accounting Method by 17 implementing agencies from 8400 sample holdings spread over 19 states namely Andhra Pradesh, Assam, Bihar, Chattisgarh, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengal. Under the scheme, daily entries of debit/credit for the expenditure/income are made in order to assess the total cost/benefit incurred/accrued to each farmer covered under the scheme. The supervision of collection of the field-data is done by the Field Supervisors. Each Field Supervisor, on an average, supervises work of 10 field-men. Overall supervision of data collection process, scrutiny and validation is with Field Officer. Data are collected for every agriculture year (July-June).

The items of cost of cultivation cover both the paid-out costs (out-of-pocket expenses) and the imputed costs. Paid-out Costs are expenses on hired labour (human, animal and machinery); maintenance of owned animals and machinery; material inputs such as seed (home grown and purchased), fertilizer, manure (owned and purchased), pesticides and irrigation; depreciation on implements and farm buildings (such as cattle sheds, machine sheds, storage sheds); land revenue; rent paid for leased- in land and miscellaneous. Imputed Costs are expenses on value of family labour; managerial input of family; rent of owned land and interest on owned fixed capital, for which the farmer does not incur any cash expenses. Cost A2 includes all actual expenses in cash & kind incurred in production by owner and rent paid for leased in land. Cost C2 includes all actual expenses in cash & kind incurred in production by owner, interest on value of owned fixed capital assets (excluding land), rental value of owned land (net of land revenue), rent paid for leased-in land and imputed value of Family Labour (FL). FL is imputed on the basis of statutory wage rate or the actual market rate, whichever is higher.

The concept and definition of various terms are as under:

Classification of Land: Data are taken from latest Forestry Statistics Publication, Agriculture Census or are estimated based on latest available year data received from the States/Uts respectively. The nine-fold classification land uses are as under:

- **Forest Area:** This includes all land classified either as forest under any legal enactment, or administered as forest, whether State-owned or private, and whether wooded or maintained as potential forest land. The area of crops rose in the forest and grazing lands or areas open for grazing within the forests remain included under the “forest area”.
- **Area under Non-agricultural Uses:** This includes all land occupied by buildings, roads and railways or under water, e.g. rivers and canals, and other land put to uses other than agriculture.
- **Barren and Un-culturable Land:** This includes all land covered by mountains, deserts, etc. Land, which cannot be brought under cultivation except at an exorbitant cost is classified as unculturable whether such land is in isolated blocks or within cultivated holdings.
- **Permanent Pasture and other Grazing Land:** This includes all grazing land whether it is permanent pasture/meadows or not. Village common grazing land is included under this category.
- **Land under Miscellaneous Tree Crops, etc.:** This includes all cultivable land, which is not included in ‘Net area sowed’ but is put to some agricultural use. Land under casuring trees, thatching grasses, bamboo bushes and other groves for fuel, etc. which are not included under ‘Orchards’ are classified under this category.
- **Culturable Waste Land:** This includes land available for cultivation, whether taken up or not taken up for cultivation once, but not cultivated during the last five years or more in succession including the current year for some reason or the other. Such land may be either fallow or covered with shrubs and jungles, which are not put to any use. They may be accessible or inaccessible and may lie in isolated blocks or within cultivated holdings.
- **Fallow Lands other than Current Fallows:** This includes all land, which was taken up for cultivation but is temporarily out of cultivation for a period of not less than one year and not more than five years. "Fallow land" has been split up into (i) "current fallow land"; and (ii) "other fallow land". Land lying fallow for a period of one year, are included under "current fallows", those lying fallow for more than one year but less than five years, are included under "other fallow land" while those fallow beyond a period of five years, are included under "culturable wastes" or under "miscellaneous tree crops and groves" (not included under net area sown) as the case may be.
- **Current Fallows:** This represents cropped area, which is kept fallow during the current year.
- **Net Area Sown:** This represents the total area sown with crops and orchards. Area sowed more than once in the same year is counted only once.

Reporting Area: The Reporting area stands for the area for which data on land use classification is available. In areas where land utilization figures are based on land records, reporting area is the area according to village papers, i.e. the papers prepared by the village accountants. In some cases, the village papers may not be maintained in respect of the entire area of the State. For example, village papers are not prepared for the forest areas but the magnitude of such area is known. Also there are tracts in many States for which no village paper exists. In such cases, estimates of classification of area from agricultural census, 1995-96 and 2000-01 are adopted to complete the coverage.

Area under Crops: The figures related to Total Cropped Area are either estimated based on the latest available data received from States/UTs or are based on advance/forecast estimates received from the States/UTs.

- **Gross Cropped Area:** This represents the total area sown once and/or more than once in a particular year, i.e. the area is counted as many times as there are sowings in year. This total area is also known as total cropped area or total area sown.
- **Area Sown more than once:** This represents the areas on which crops are cultivated more than once during the agricultural year. This is obtained by deducting Net Area Sown from Gross Cropped Area.

Irrigated Area: The figures used in this chapter related to irrigated area are either estimated based on the data for the latest available year received from the States/UTs or are estimated/taken from Agriculture Census. The area is assumed to be irrigated for cultivation through such sources as canals (Govt. & Private), tanks, tube-wells, other wells and other sources. It is divided into two categories as (a) Net Irrigated Area: It is the area irrigated through any source once in a year for a particular crop. (b) Total Net Un-irrigated Area: It is the area arrived at by deducting the net irrigated area from net sown area.

Gross Irrigated Area: It is the total area under crops, irrigated once and/or more than once in a year. It is counted as many times as the number of times the areas are cropped and irrigated in a year

Total/Gross Un-Irrigated Area: It is the area arrived at by deducting the gross irrigated area from the gross sown area.

Agricultural Land/Total Culturable Land /Total Cultivable Area/Total Arable land: This consists of net area sown, current fallows, fallow lands other than current fallows, culturable waste land and land under miscellaneous tree crops.

Cultivated Area: This consists of net area sown and current fallows.

Un-Cultivable Area: It is the area arrived at by deducting the total cultivable area from the total reported area.

Area not available for cultivation: Area not available for cultivation is the land which is absolutely barren or uncultivable or covered by building, water, roads, railways, mountains, deserts or otherwise appropriated for non-agricultural purposes. Other uncultivated land excluding current fallows, include the following categories:

- Permanent pastures and other grazing lands which cover all grazing land whether they are permanent pastures and meadows or not and village common grazing land.
- Land under miscellaneous trees, crops and groves not included in the net area sown which includes all cultivable land, not included under area sown but put to some agricultural use. Land under casuarina trees and others groves for fuel, etc. which are not included under orchards, are also included in this category.
- Cultivable Waste land which includes all land available for cultivation but not taken up for cultivation or taken up for cultivation once but not cultivated during the year and the last five years or more in succession.

Area and Production under Crops: Regular all India forecasts are issued in regard to most of these crops viz., all food grains, oilseeds, fibres, potatoes, sugarcane, ginger, black pepper, chillies and tobacco. The estimates of area and production of coffee, tea and rubber are based on special returns received from the State Governments in connection with the all-India publications on these crops. For some recent years, however, in the absence of necessary data from the State Governments, figures as available from Coffee Board, Tea Board & Rubber Board have been provisionally adopted. The data relate to crop year ending June unless otherwise stated. Figures for the latest year are the final forecasts.

Average Yield of Crops: Average yields per hectare of principal crops have been obtained by dividing the total production by the corresponding total area under each crop. All India and State average yield per hectare has generally been calculated on the basis of area and production figures rounded up to hundreds in the case of forecast crops, i.e. foodgrains, potato, sugarcane, groundnut, castorseed, sesamum, rapeseed & mustard, linseed, safflower, nigerseed, sunflower, soyabean, coconut, cotton, jute, mesta, sannhemp, tobacco, black pepper, ginger, chillies, turmeric, coriander, cardamom, garlic, guarseed, arecanut, banana, sweet potato, tapioca and onion. In the case of tea, rubber and minor crops, average yield has been calculated on the basis of area and production figures upto the unit place. In the case of coffee, yields per hectare relate to sowing or plucked area and in the case of rubber to tapped area.

Highlights:

- The reporting area under land utilization increased from 305.18 million hectares in 2000-01 to 305.67 million hectares in 2007-08. The area not available for cultivation increased from 41.48 million hectares to 43.22 million hectares, whereas, the net sown area decreased from 141.36 million hectares to 140.86 million hectares and the total cropped area increased from 185.34 million hectares to 195.84 million hectares during the same period.
- The area under foodgrains increased from 121.05 million hectares in 2000-01 to 122.83 million hectares in 2008-09. The area under cereals remained almost at the same level during the period under reference, whereas, the area under pulses increased from 20.35 million hectares to 22.09 million hectares during the same period. The area under oilseeds increased from 22.77 million hectares in 2000-01 to 27.56 million hectares in 2008-09.
- The production of foodgrains increased from 196.81 million tonnes in 2000-01 to 234.47 million tonnes in 2008-09. The production of cereals increased from 185.74 million tonnes to 219.90 million tonnes, whereas, the production of pulses increased from 11.08 million tonnes to 14.57 million tonnes during the same period. The production of oilseeds increased from 18.44 million tonnes in 2000-01 to 27.72 million tonnes in 2008-09.
- The average yield of food grains per hectare increased from 16.3 quintals in 2000-01 to 19.1 quintals in 2008-09. The average yield of cereals per hectare increased from 18.4 quintals to 21.8 quintals, whereas, the average yield of pulses per hectare increased from 5.4 quintals to 6.6 quintals during the same period. The average yield of oilseeds per hectare increased from 8.1 quintals in 2000-01 to 10.1 quintals in 2008-09.
- Area under cotton increased from 8.54 million hectares in 2000-01 to 9.41 million hectares in 2008-09, the production of cotton increased substantially from 9.52 million bales to 22.28 million bales over the same period signifying a vast increase in the yield of the cotton, which increased from 1.9 quintals per hectare to 4.0 quintals per hectare.
- Area under sugarcane increased from 4.32 million hectares in 2000-01 to 4.42 million hectares in 2008-09, whereas, the production of sugarcane decreased substantially from 295.96 million tonnes to 285.03 million tonnes over the same period. The yield of the sugarcane decreased from 685.8 quintals per hectare to 645.5 quintals per hectare during the same period.
- The Index Number of Agricultural Production (INAP) (with base: Crop Year Triennium ending 1993-94=100) of all crops decreased from 167.8 in 2006-07 to 154.5 in 2008-09. The INAP of foodgrains increased from 158.8 to 170.9, whereas, INAP of cereals increased from 164.1 to 177.2 and INAP of pulses increased from 130.3 to 134.5 during the same period. While INAP of non-food grains decreased from 155.4 in 2006-07 to 132.5.4 in 2008-09, the INAP of oilseeds increased from 148.2 to 160.2 during same period.
- The Index Number of Agricultural Area (INAA) (with base: Crop Year Triennium ending 1993-94=100) of all crops increased from 127.5 in 2006-07 to 127.7 in 2008-09. The INAA of foodgrains decreased from 128.5 to 128.0, whereas, INAA of cereals increased from 130.0 to 130.4 and INAA of pulses decreased from 122.1 to 117.8 during the same period. While INAA of non-food grains increased from 126.6 in 2006-07 to 128.2 in 2008-09, the INAA of oilseeds increased from 124.8 to 128.7 during same period.

- The Index Number of Agricultural Yield (INAY) (with base: Crop Year Triennium ending 1993-94=100) of all crops decreased from 131.6 in 2006-07 to 121.0 in 2008-09. The INAY of foodgrains increased from 123.6 to 133.5, whereas, INAY of cereals increased from 126.3 to 135.8 and INAY of pulses increased from 106.7 to 114.2 during the same period. While INAY of non-food grains decreased from 122.8 in 2006-07 to 103.3 in 2008-09, the INAY of oilseeds increased from 118.7 to 124.4 during same period.
- Among the five major producing States of paddy, the maximum cost of cultivation amounting to ₹37443.61 per hectare were realized in Andhra Pradesh, whereas, the maximum cost of production amounting to ₹668.34 per quintals was realized in West Bengal during 2007-08. However, among the five major producing States of wheat, the maximum cost of cultivation amounting to ₹32380.45 per hectare were realized in Haryana, whereas, the maximum cost of production amounting to ₹779.37 per quintal was realized in Madhya Pradesh during 2007-08.
- Among the five major producing States of gram, the maximum costs of cultivation and cultivation amounting to ₹18256.08 per hectare and ₹1820.35 per quintal were realized in Uttar Pradesh. However, among the five major producing States of arhar, the maximum cost of cultivation amounting to ₹22102.50 per hectare were realized in Maharashtra, whereas, the maximum cost of production amounting to ₹2192.98 per quintal was realized in Andhra Pradesh during 2007-08.
- Among the five major producing States of rapeseed & mustard, the maximum cost of cultivation amounting to ₹23888.94 per hectare was realized in Haryana, whereas, the maximum cost of production amounting to ₹1534.32 per quintals was realized in Madhya Pradesh during 2007-08. Among the five major producing States of sugarcane, the maximum costs of cultivation and production amounting to ₹83204.91 per hectare and ₹106.06 per quintal respectively were realized in Andhra Pradesh during 2007-08.

This chapter contains the following tables:

- Table 8.1:** presents year-wise land utilization classified by various parameters since 2000-01 and state-wise land utilization classified by various parameters during 2007-08.
- Table 8.2:** presents year-wise area under principal crops since 2000-01 and state-wise area under principal crops during 2008-09.
- Table 8.3:** presents year-wise production of principal crops since 2000-01 and state-wise production of principal crops during 2008-09.
- Table 8.4:** presents year-wise average yield of principal crops since 2000-01 and state-wise average yield of principal crops during 2008-09.
- Table 8.5:** presents year-wise index number of principal crops since 2006-07 categorized by production, area and yield.
- Table 8.6:** presents cost of cultivation, cost of production and yield of major crops in five major producing States during 2007-08.