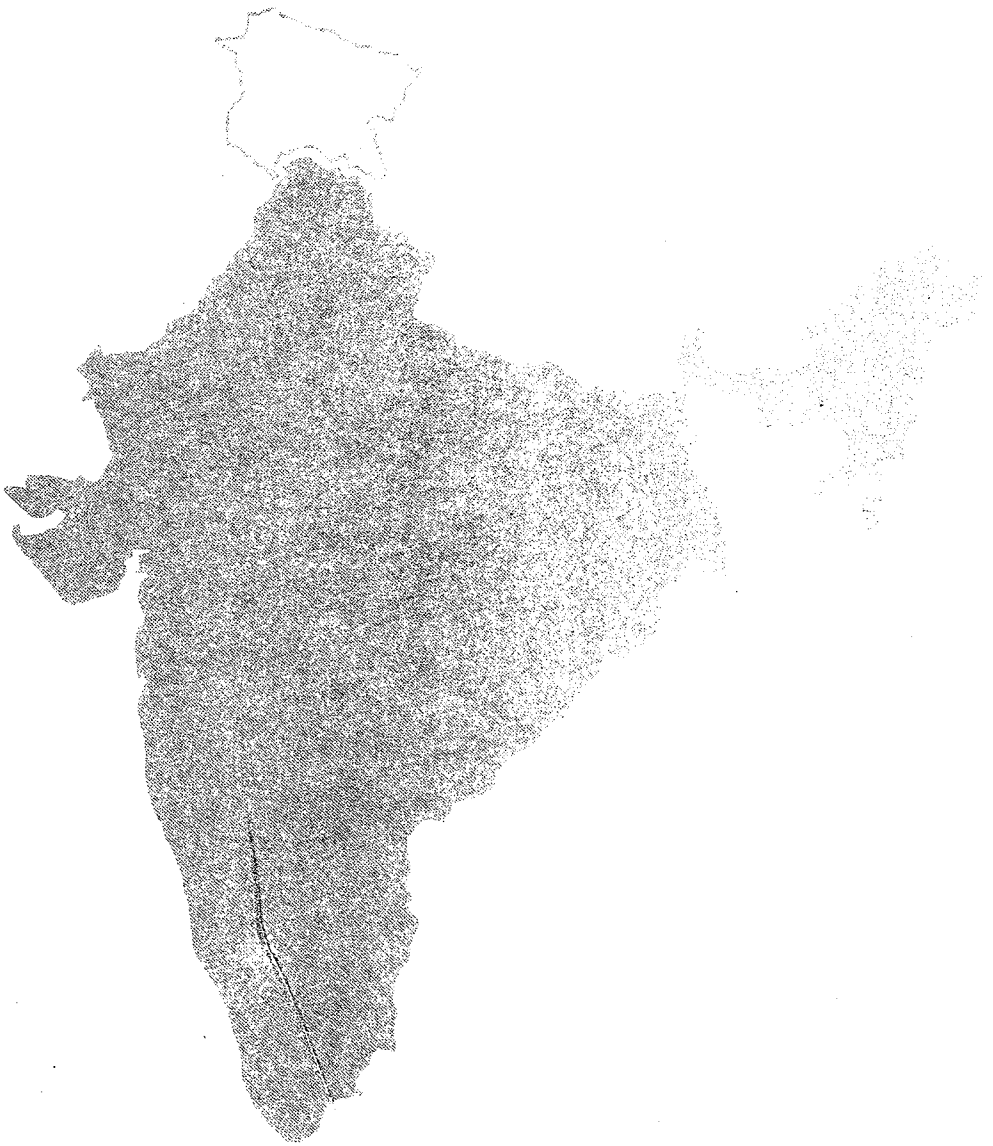
AGRICULTURE IN INDIA



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UNITED STATES DEPARTMENT OF AGRICULTURE
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SUMMARY

India is primarily an agricultural country. Over two-thirds of the people depend on farming for their livelihood; nearly half the national income is derived from agriculture. A large percentage of all exports are agricultural products, principally tea.

Food production comes close to meeting consumption. But the deficit in food grains, though small in relation to total supplies, is large in absolute terms. India is a net importer of cotton most years, but is a net exporter of wool and of hides and skins.

India has a land area less than half that of the United States but a population more than twice as large. It occupies the greater part of the South Asian subcontinent. Forming a rim on the north are the Himalayas, the source of the rivers that furnish the rich agricultural Indo-Gangetic Plain with irrigation water. These mountains also modify the winter climate, making it possible to produce crops throughout the year. Availability of water is the critical agricultural factor; most crops cannot be sown until the arrival of the southwest monsoon in June. Failure of the monsoon to arrive on time or to furnish enough precipitation has meant drought and crop failure many times.

About 50 percent of the land area is classified as used for agricultural purposes. This amounts to a little more than 1 acre per person of India's nearly 300 million farm population.

Pressure of population on the land for the past century and a half has resulted in extreme subdivision of farms. The majority of farms are too small to provide the farm family an acceptable minimum subsistence level of living or to keep it fully employed. Even so, millions of farmworkers have been denied access to any land either as owners or tenants, and their number is growing. Without alternative sources of employment, they are forced to live as chronically underemployed landless laborers.

The small size and fragmentation of most farms make them ill adapted for modern farming techniques. Poverty hinders the adoption of improvements that could be effectively introduced. Living on the margin of subsistence, large numbers of farmers are heavily burdened with debt incurred through consumption needs. They cannot save to invest in selected seed, fertilizer, and better implements. Many seek not the biggest crop but the surest crop and rely on time-proven methods for obtaining it.

During the last decade, the Government has made a concerted effort to initiate changes in the farm economy that would stimulate production, raise living levels, and reduce economic and social inequalities in the countryside. Emphasis has centered on reform of the tenure system and land consolidation, provision of irrigation and fertilizer, expansion of cooperative credit, improvement of marketing service, and promotion of community development, including agricultural extension and education.

Most of the sown area is planted in subsistence crops, chiefly grains and pulses. Less than a sixth is devoted to commercial crops, including oilseeds, sugarcane, cashews, tobacco, spices, vegetable fibers, and the plantation crops--tea, coffee, and rubber. Tea and spices are grown principally for export. India leads the world as a producer and exporter of tea.

Livestock production, carried on by small farmers, is far less important than crop production. India has large numbers of cattle and buffalo--there are about half as many of them as people--that are used mainly for farm power. Few are slaughtered because in the Hindu religion cows are regarded as sacred, and the killing of living creatures is generally forbidden. (Over 80 percent of the people are of the Hindu faith.) As a result, the bovine population includes a large proportion of old and unproductive animals, which are a heavy drain on the limited feed supplies. Since many of these animals are strays, they also present a threat to growing crops. Milk, principally from buffaloes, and some meat, principally from sheep and goats, are consumed, but some hides, skins, wool, and animal hair are exported.

Food consumption levels are low. The national average per capita, in terms of energy value, is estimated at little more than 2,000 calories a day. Grains provide the bulk of the calories. Grains and pulses are the basic foods in all parts of India.

Self-sufficiency in food grains is the prime goal of development plans for agriculture. Toward the end of the First Five Year Plan (April 1951-March 1956) this goal appeared to have been reached. But production since then has failed to cover requirements swelled not only by the rapid increase in population but also by the increase in per capita demand as economic development brought rising incomes. In recent years, India has had to import annually between 1.4 and 5.1 million tons of food grains.

The need to produce more food is basic to the sustained growth of the economy as a whole. This need has spurred the Government to intensify efforts to promote agricultural development. The Third Five Year Plan calls for an increase in farm production sufficient to cover the country's food need and its requirements of agricultural raw materials for domestic use and for export.

Agricultural production is scheduled to increase by 30 percent, or at an implied annual average rate of 6 percent. This would be almost double the rate of increase for 1953-1962.

Such progress during the Third Plan period would require not only more irrigation and more fertilizer, but also marked improvements in farming methods and in credit and marketing facilities, which can be brought about only slowly. But though production goals appear somewhat high, farm output may well increase at a rate somewhat faster than the rate achieved for the 1953-62 period. At the same time, however, population will be increasing at more than 2 percent a year, and economic development will stimulate further increases in per capita demand. In consequence, the gap between production and requirements of farm products, particularly food, may become larger in the years immediately ahead.

AGRICULTURE IN INDIA

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AGRICULTURE IN THE ECONOMY

India ranks eighth among the world's industrial countries and is second to Japan in Asia. However, India's economy is primarily agricultural and will continue to be so in the foreseeable future. Agricultural production normally contributes close to 50 percent to the country's national income, industry 20 percent, and services 30 percent. Any significant transfer of underemployed rural labor to industry will take years to accomplish (39). 1/

The 1951 census shows that there were 142.3 million persons in the labor force that were completely or partially self-supporting. In agriculture there were 71.0 million self-supporting persons and 31.1 million earning dependents. In the nonagricultural sector there were 33.4 million self-supporting persons, the majority of whom were self-employed, and 6.8 million earning dependents (4).

AGRICULTURE AND GOVERNMENT

Since 1951 the Indian economy has been directed by the Government through the Five Year Plans for economic development. The overall aim has been to surmount the problem of poverty and economic backwardness, particularly in the rural areas. Intensified efforts to alleviate these problems are continuing under the Third Five Year Plan (1961-66). These plans are implemented by Indian fiscal years that run from April 1 to March 31. The First Five Year Plan period was from April 1, 1951, to March 31, 1956, the Second Five Year Plan was from April 1, 1956, to March 31, 1961, and the Third Five Year Plan began on April 1, 1961, and is to end on March 31, 1966.

Through these plans the Government has attempted to obtain higher agricultural output through land reform, application of technological improvements, improved credit and marketing facilities, and expansion of agricultural research, education, and extension systems. Although Government plays an increasing role in agriculture, farming in India is predominately a free enterprise undertaking today (10).

1/ Underscored figures in parentheses refer to items in Literature Cited, page 61.

POPULATION GROWTH

India's mid-1962 population is placed at 450 million. The annual compound rate of population growth for the 1953-62 period is 2.1 percent (11). The Government projects an even higher rate of growth during the Third and Fourth Five Year Plan periods. According to provisional estimates from the Third Five Year Plan, India's population will reach 492 million in 1966, 555 million in 1971, and 625 million in 1976 (table 1). These estimates imply that the population will increase over the next 15-year period by 187 million, a population about the size of the United States in 1962. These may be contrasted with a population increase between 1951 and 1961 (about 85 million) which was greater than the increase (about 82 million) during the two preceding decades (34).

The Third Plan recognizes that stabilization of the population growth over a reasonable period should be at the very center of planned development. Although family planning programs were included in the First Five Year Plan, there has been no appreciable decline in the birth rate for India during the past decade. But the death rate has been reduced significantly. According to estimates made by the National Council of Applied Economic Research, India's birth rate for 1956-61 was 40.7 per thousand and the death rate was 20.8 per thousand (table 2). These rates may be contrasted with the birth rate of 45.2 and the death rate of 31.2 for 1931-41 (32,6).

Table 1.--India: Population within the present boundaries, 1891-1976

Year	Millions	Year	Millions
1891	235.9	1962	1/450.0
1901	235.5		
1911	249.0	Projected	
1921	248.1		
1931	275.5	1966	492.0
1941	312.8	1971	555.0
1951	356.9	1976	625.0
1961	1/441.6		

1/ Economic Research Service estimates.

Source: Government of India (15,34) except as noted.

Table 2.--India: Average annual birth and death rates by intercensal decades, 1891-1941 and average 1956-61

Decade	Births per 1,000 population	Deaths per 1,000 population
1881-1891	48.9	41.3
1891-1901	45.8	44.4
1901-11	49.2	42.6
1911-21	48.1	47.2
1921-31	46.4	36.3
1931-41	45.2	31.2
1956-61	40.7	20.8

Source: Coale, Ansely J. and Hoover, Edgar M. (6) and National Council of Applied Economic Research (32).

PHYSICAL ENVIRONMENT

Location and Area

Except for the Pakistan borders, India is separated from the rest of Asia by natural barriers--the Himalayan mountain chain in the north, the Bay of Bengal on the east, and the Arabian Sea on the west. The country extends 2,000 miles from north to south, where it ends in the Indian Ocean, and is separated from the Island of Ceylon by the Gulf of Mannar. India is 1,850 miles wide from east to west at the maximum point. It has over 9,000 miles of land border and a coastline of over 3,000 miles. India ranks as the world's seventh largest country in area with 1.3 million square miles (fig. 1).

Topography (7, 27)

India consists of three distinct topographical regions that are unlike in climate and land use. These regions are the Himalaya mountain system, the Indo-Gangetic Plain, and the Deccan Plateau. Each of these regions may in turn be further divided by topographic features and agricultural patterns.

The Himalayas consist of a series of parallel ranges with large plateaus and valleys; they extend over 1,500 miles from Jammu and Kashmir in the northwest to Assam in the northeast for a width of 150 to 200 miles. These mountains rise to a height of over 29,000 feet. Agriculture is limited in this region by high elevations, steep slopes, and cool weather. However, the narrow river valleys do afford some fertile land that is planted in rice and tree crops. Tea is produced on the lower slopes in West Bengal and Assam.

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Figure 1.--Orientation Map of India

The Indo-Gangetic Plain, also about 1,500 miles long and 150 to 200 miles wide, is formed by three river basins--the Indus, Ganges, and Brahmaputra. This is one of the largest alluvial plains in the world and has been very important to India's agriculture. It is one of the world's most densely populated areas. It accounts for about half the country's rice area and production. Sugarcane, jute, and wheat are other important crops of the region.

The Deccan Plateau encompasses most of India south of the Indo-Gangetic Plain. It is separated from the Plain by mountain and hill ranges varying in height from 1,500 to 4,000 feet. This peninsular plateau is flanked on one side by the Eastern Ghats, where the average elevation is about 2,000 feet, and on the other side by the Western Ghats, where the elevation averages 3,000 to 4,000 feet and rises to over 8,840 feet in places. Between the Western Ghats and the Arabian Sea lies a narrow coastal strip; between the Eastern Ghats and the Bay of Bengal there is a broader coastal area. The Plateau comes to a point in the south were the Eastern and Western Ghats meet. This Plateau slopes eastward allowing the three rivers, the Cauvery, the Kistna, and the Godavari, which rise in the Western Ghats, to flow east into the Bay of Bengal. Since their flow depends on the seasonal or monsoon rains, they are less suited for year-round irrigation than rivers with a source of melting snow.

The central part of the Plateau is a comparatively dry area that supports many types of millets and sorghums, along with peanuts, tobacco, and cotton. The east coast portions that receive heavy rainfall are ideal for rice; the southwest coast abounds in spices, coconuts, rubber, and plantation crops.

Climate (7, 27)

The climate throughout most of India is essentially monsoon-tropical, despite the great latitudinal extent of the country. The Himalayas moderate the winter weather by keeping out much of the cold air from the north so that, except at the higher elevations of the north and northwest, temperatures are favorable for year-round crop production. The three main seasons during the year are the very hot and dry summer from March to June, the monsoon or rainy season from June to October, and the temperate winter, much like cool summer weather in the United States, which lasts from October to March.

Annual unpredictable variations in the arrival, duration, distribution, and intensity of the monsoon impose considerable hardship on farms which lack irrigation facilities and must depend on the monsoons. When the monsoons delay sowing, yields decline. Therefore, expansion of irrigation facilities is of great importance.

The areas of heaviest precipitation are the lower Ganges Valley, northeastern India, and the coastal area along the Western Ghats. Rain falls as many as 114 days a year, and annual precipitation totals as much as 120 inches in these areas. Over much of the Deccan Plateau the rainfall is moderate, ranging from 30 to 51 inches. Areas of scant rainfall are located mostly in western India. Little precipitation occurs on the Thar Desert, which lies

in the western part of the State of Rajasthan. The desert includes about 37 million acres; about half of it is complete wasteland. (See fig. 2 for rainfall pattern.)

The principal growing seasons in India are the summer (called kharif) and winter (called rabi). The kharif season begins in June with the arrival of the southwest monsoon, and the rabi begins in November after summer temperatures begin receding. In Northern India temperate crops such as wheat, barley, linseed, and rape are grown during the rabi season, November to February. Most other crops are grown during the kharif season.

Soils

Three-fourths of India's soils fall into one of two major categories--Latosols, and an association of Noncalcic Brown soils, Grumusols, and Latosols. Other agricultural soils include Alluvial soils and Reddish Brown and Chestnut soils.

Latosols are the most extensive soils in India. These soils, extending over the plains, hills, and mountains, are as a group predominately red, deeply weathered, and strongly leached. They are usually suitable for tillage and plant growth but are low in plant nutrients. On the Plains these soils are used for jowar (grain sorghum), millets, pulses, wheat, barley, corn, and rice wherever water is available or where the land can be bunded to conserve rainfall.

Alluvial soils are the most productive agricultural soils in India. These soils are distributed over most of the Indo-Gangetic Plain from the Punjab eastward to Uttar Pradesh, West Bengal, and parts of Orissa. The coastal tracts of southern India are also alluvial, especially near the mouths of the rivers. Alluvial soils are especially important in the hill and mountain valleys of Kashmir and Assam.

LAND

Use

Estimates on land use are not available for all the Indian states. However, data available through 1956/57 indicate that 51 percent of the area can be classed as agricultural land (table 3). The proportion may be closer to 60 percent, since a large part of the unreported area probably consists of crop and pasture land.

Most farmers in India use the bulk of their cultivated land to grow grains and pulses. Rice accounted for 22 percent of the reported area sown (including multiple-cropped land) in 1956/57, other grains accounted for 37 percent, and pulses for 16 percent, making a total of 75 percent of all reported land sown. Oilseeds occupied another 9 percent and cotton 5 percent.

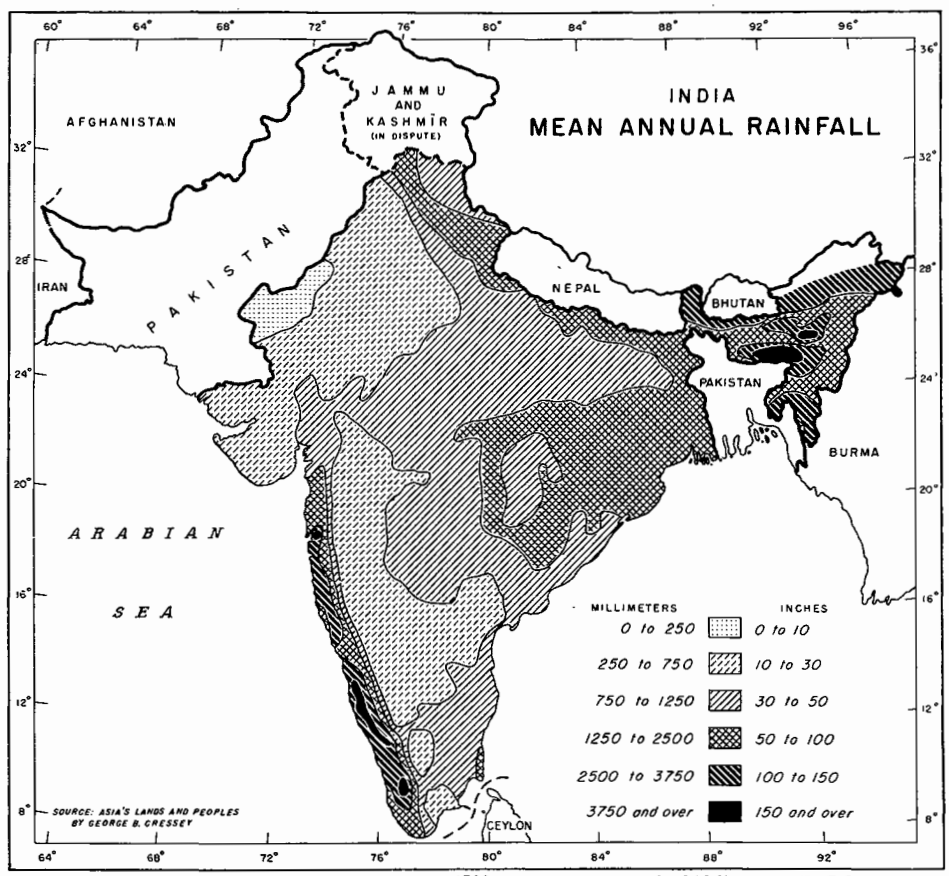
INDIA
MEAN ANNUAL RAINFALL
AFGHANISTAN
JAMMU AND KASHMIR (IN DISPUTE)
PAKISTAN
IRAN
NEPAL
BHUTAN
PAKISTAN
BURMA
ARABIAN SEA
CEYLON
MILLIMETERS
INCHES
0 to 250
0 to 10
250 to 750
10 to 30
750 to 1250
30 to 50
1250 to 2500
50 to 100
2500 to 3750
100 to 150
3750 and over
150 and over
SOURCE: ASIA'S LANDS AND PEOPLES BY GEORGE B. CRESSEY
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Figure 2

Table 3.--India: Land use 1956/57

Category	Area	Percentage of total
	1,000 acres	Percent
Reported area:		
Land in field and tree crops	1/322,433	40.0
One-year fallow	29,687	3.7
Other fallow 2/.....	28,804	3.6
Total arable land	380,924	47.3
Permanent pastures	30,163	3.7
Total agricultural land	411,088	51.0
Forests 3/	126,098	15.6
Other wooded land 4/	14,465	1.8
Unused cultivable 5/	53,089	6.6
Barren and uncultivable land 6/	83,157	10.3
Land under buildings, roads, railroads or water	33,069	4.1
Total reported area	720,966	89.4
Unreported area	85,296	10.6
Grand total	806,262	100.0

1/ Of which 46,025 were sown more than once.
2/ Land out of cultivation 1 year and not more than 5 years.
3/ Includes only reserved and protected forests.
4/ Casuarina trees, thatching grasses, bamboo bushes, and other groves for fuel, etc.
5/ Source defines this category as land under brush and trees not put to any use, including land once cultivated but not put to any use for more than 5 years.
6/ Includes land which can be brought under cultivation but only at a high cost.

Source: National Council of Applied Economic Research (31).

Sugarcane, jute, tobacco, tea, coffee, spices, rubber, and all other crops occupied the remaining 11 percent of the land.

Assam, Jammu and Kashmir, Himachal Pradesh, Manipur, and the Island groups are the only states or territories that have less than 10 percent of their total area under cultivation. Except for Tripura, which cultivates close to 20 percent, all the other states and territories cultivate over 40 percent of their land area. West Bengal, Delhi, Madras, Uttar Pradesh, and the former State of Bombay (now Gujarat and Maharashtra) have over 60 percent of the total area under cultivation.

Reclaimable Land

The Central and State Governments assume the principal responsibility for reclaiming land for cultivation. Privately-owned waste land is often restored to productivity by individual owners but their efforts are not significant. The Central and State Tractor Organizations reclaimed 4.2 million acres of land to usefulness between 1950/51 and 1957/58. This work is continuing under the Five Year Plans.

However, because there is little land suitable for cultivation that is not being used, future expansion of the cropped area will have to come from land that is now either fallow or considered waste. Out of the 53.1 million acres reported as "unused cultivable land" probably little more than 6 million acres can be reclaimed for agricultural purposes over the next 15 years (32).

Distribution

India is primarily a country of small subsistence farms. A sample survey of 1950/51 found that nearly 60 percent of the country's 60 million farms have no more than 5 acres of cultivated land each; nearly 94 percent have less than 25 acres. A number of large plantations produce tea, coffee, and rubber, and there are also some large military and other Government farms.

Farms are not only small but are further handicapped by being fragmented. Excessive fragmentation of small farms materially reduces the possibility for introducing improved farm practices; it also wastes land and limits effective use of irrigation.

Efforts to improve the farm layout through land consolidation, begun several decades ago in some parts of India, have been intensified under the country's Five Year Plans. Most states have adopted legislation to consolidate holdings and prevent fragmentation, but relatively few have made much progress. By the end of 1959/60, about 23 million acres had been consolidated and work was progressing on another 13 million acres (34).

The Five Year Plans imply that cooperative village management is the solution to the problem of small farms. During the First Plan period (April 1951-March 1956) almost all states passed laws designed to encourage the establishment of cooperative farming societies. In mid-1959 there were 3,600 such societies registered. About 2,000 of these were tenant farming or field labor societies in which land was individually cultivated. Pooling of land and joint management was practiced on the remaining 1,600.

Tenure

There is little precise statistical information available on land tenure in India. A 1950/51 survey indicated that tenant-operated farms accounted for at least 35 percent of all farms and 36 percent of the cultivated land (table 4).

Many of the tenant farms were on land which was held under intermediary tenures and which was often let out to farmers through several intermediaries. Rents in India are usually paid in kind. Although the share of the crop taken by the landlord varies widely, the most common division prior to reforms of the last decade or so was half the crop to the landlord and half to the tenant. The tenant provided his own labor and bullocks for power while the landlord provided the land and sometimes half the seed. Rents were high and tenants in many areas had little security of tenure.

Legislation to improve the tenant farmer's position relative to the land has been a major part of the land reform program that the Government of India has promoted since 1947 in the interests of both economic development and social justice. The abolition of intermediary tenures has received the main emphasis. By 1959 nearly all states had passed the necessary legislation and most had implemented it; intermediaries remained in possession of only 5 percent of the total land area of holdings, compared with 43 percent in the late 1940's. Some tenants were given full ownership rights to the land they cultivated. The majority pay rent directly to the states.

Most states have legislation to regulate rents and provide security of tenure. Several fix maximum rent at one-fourth the crop or less; others have set it between one-third to one-half. These rent levels are not universally observed in practice throughout the country.

Table 4.--India: Farm holdings by tenure, 1950/51

Tenure of farm holdings	Percent of total		Average size
	Holdings	Area	
	Percent	Percent	Acres
Owner-operated	34.7	52.4	11.4
Tenant-farmer	34.8	35.7	7.7
Farm laborer 1/	20.6	7.8	3.0
Other 2/	9.9	4.1	3.2
All classes	100.0	100.0	7.4

1/ Holdings owned, rented, or obtained free of rent by families of farm laborers, defined as persons who worked as farm laborers for more than half the total days they actually worked during the year.

2/ Persons whose activities in agriculture were not sufficient to qualify them as farmers or farm laborers.

Source: Government of India (30).

AGRICULTURAL REGIONS

India may be divided into six agricultural regions based on rainfall, temperature, altitude, latitude, natural vegetation, soils, crops, and livestock. Transition from one region to another is gradual and only in the central areas are the differences fully contrasted (7, 35):

1. The Eastern Temperate Himalayan region (upper Assam) has a heavy rainfall. Tea is the main agricultural crop; rice is cultivated in some places.

2. The Western Temperate Himalayan region (northwestern Uttar Pradesh, part of Punjab, and all of Himachal Pradesh and Jammu and Kashmir), though drier than the Eastern Temperate Himalayan region, has more winter rainfall. Horticulture is important to the region's agricultural economy.

3. The Dry Northern Wheat region (Punjab, western Uttar Pradesh, western Madhya Pradesh, Rajasthan, most of Gujarat, and a small part of Maharashtra) has an annual average rainfall in most places of less than 30 inches and in many places has less than 8 inches. Wheat, barley, pulses (principally gram), corn and cotton are the chief crops.

4. The Eastern Rice region (lower Assam, West Bengal, Bihar, Orissa, eastern Madhya Pradesh, eastern Uttar Pradesh, and parts of Maharashtra, Andhra Pradesh, and Madras) has an annual rainfall averaging over 60 inches in most places. The main crops are rice, jute, sugarcane, and tea.

5. The Malabar Coconut region (Kerala, western Mysore, and adjoining coastal areas) has an annual rainfall that averages over 90 inches in most places. Plantation agriculture is dominant, with coconuts, coffee, rubber, and spices the major crops.

6. The Southern Millet region (western Madras, western Andhra Pradesh, eastern Mysore, most of Maharashtra, and small parts of Gujarat and Madhya Pradesh) has an average annual rainfall which ranges from as little as 20 inches in some parts to as much as 40 inches in others. Millets, sorghum, cotton, and peanuts are the principal crops.

CROP PRODUCTION (9)

India grows a wide variety of tropical, subtropical, and temperate crops for subsistence and commercial use. Production of subsistence crops--principally rice, wheat, other cereals, and pulses--falls short of domestic requirements by several million tons. India produces a surplus, however, of commercial crops which brings in much of the country's foreign exchange earnings. By far the principal export crop is tea. Other important commercial crops include oilseeds, cotton, jute, sugarcane, nuts, tobacco, and spices.

Food crops

Rice - India produces only one-fifth of the world's rice but has one-third of the world acreage in rice. Rice is grown to some extent in all Indian states. However, Bihar, West Bengal, Madhya Pradesh, Orissa, and Uttar Pradesh lead in area and production.

Three rice crops are produced--autumn, winter, and summer. The winter crop accounts for about 90 percent of total output, the autumn crop for less than 10 percent, and the summer crop for the negligible remainder.

Three methods of cultivation are common in India: dry, semi-dry, and wet. Dry cultivation is widely practiced in the unirrigated tracts of Orissa, Madhya Pradesh, Assam, Bihar, and West Bengal. A serious limitation of the dry method is that weeds tend to smother the young rice plants. Hence, yields are lower than under the other two systems.

Annual rice production was in excess of 25 million metric tons (milled basis) in the calendar years 1958-62 (table 5). However, rice imports have averaged 400,000 metric tons annually during the past decade, mostly from Burma.

Wheat - The area under wheat in India constitutes about 11 percent of the total food grain area. Wheat is grown mainly in northern and central India. Uttar Pradesh, Punjab, Madhya Pradesh, Rajasthan, Maharashtra, Bihar, and Gujarat are the principal wheat-producing States, collectively accounting for about 90 percent of the area under wheat in India.

India's wheat season is relatively short, from 4 to 6 months between sowing and harvesting. Wheat is sown in the months of October and November and harvested between March and June. Wheat is mostly harvested with a one-hand sickle. Threshing is done on the ground by using oxen to tramp out the grain. The wheat is separated from the chaff by winnowing.

According to current estimates nearly one-third of the total wheat area is under irrigation. Wheat is irrigated in the Punjab, part of Uttar Pradesh, Maharashtra, Gujarat, Rajasthan, and Madhya Pradesh. In Bihar, eastern Uttar Pradesh, and western Bengal wheat is generally dependent on rainfall.

Wheat cultivation expanded sharply during most of the 1950's. Production has risen from an average of 7.2 million metric tons in 1952-54 to 11.8 million metric tons in 1962 (table 5).

Minor cereals - Minor cereals include jowar (grain sorghum), bajra, ragi, small millets, barley, and corn. All of these but the latter two are included in the category "millet and sorghum" in table 5. The minor cereals collectively account for about one-fifth of India's total cropped area. Although one-third or more of the barley area and fairly large shares of the ragi and corn areas are irrigated, these grains are generally grown on relatively infertile soils, where water resources are very limited. For jowar, bajra, and small millets, the irrigated area makes up only 2 to 3 percent of the total sown area. Minor cereal output accounts for about one-third of the total food-grain production.

Crop	Average 1952-54	1957	1958	1959	1960	1961	1962 1/
	1,000 metric tons						
Rice, paddy	39,546	37,961	46,303	47,232	51,344	51,275	51,800
Wheat	7,233	9,402	7,893	9,934	10,252	10,992	11,812
Barley	2,749	2,863	2,274	2,715	2,717	2,866	3,116
Corn	2,961	3,085	3,435	4,070	4,015	4,064	4,200
Millets and sorghum	15,145	14,886	16,310	15,890	15,129	15,439	15,630
Pulses	9,553	11,430	9,832	13,050	11,645	12,634	11,045
White potatoes	1,887	1,724	1,997	2,356	2,766	2,699	2,800
Sweet potatoes	1,308	1,112	1,063	1,555	1,281	1,600	1,600
Cassava	4,207	4,080	4,209	4,370	4,096	4,370	4,370
Sugarcane	51,380	71,156	71,583	76,408	104,127	97,562	103,000
Peanuts, shelled	2,478	3,297	3,422	2,805	3,123	3,330	3,290
Copra	635	665	671	670	668	680	650
Sesame	545	360	519	365	321	372	400
Cottonseed	1,902	2,244	2,130	1,687	2,350	2,055	2,130
Flaxseed	363	390	253	454	438	395	397
Rape and mustard	891	1,042	933	1,042	1,064	1,356	1,306
Castor beans	106	126	88	144	108	90	103
Jute	632	742	936	825	853	1,137	998
Cotton	812	963	914	724	1,008	882	914
Bananas	1,674	1,747	1,856	1,900	2,000	2,200	2,200
Chili	314	355	368	331	344	372	369
Rubber	21	24	25	24	27	27	28
Tobacco	242	299	241	265	286	2/299	2/305
Tea	283	308	324	324	316	350	2/363
Coffee	25	41	44	47	48	68	45
Spices	160	197	162	166	169	172	172

1/ Forecast. 2/ ERS Estimates.

Source: U. S. Department of Agriculture, Economic Research Service (11).

Ragi, or finger millet, has many useful features which distinguish it sharply from other food-grain crops. It is one of the hardiest crops suited for dry farming, as it can be grown with very little rainfall. Both the plant and the grain tend to remain free from pests and diseases, and it can be stored for many years without major damage.

Numerous other millets, important in various parts of India, are reported as small millets. Andhra Pradesh and Madhya Pradesh are the principal producing States for these millets.

Jowar is the leading minor cereal; cultivation is concentrated in west-central India. Like rice, jowar is planted at different seasons in different parts of the country. It is grown under both the southwest monsoon (kharif jowar) and the northeast monsoon (rabi jowar). It is often grown in a mixture with small millets, upland rice, pulses, oilseeds, fiber plants, or vegetables. It is the most important crop grown for green fodder. The varieties grown for fodder differ from the grain types.

Bajra, or pearl millet, follows jowar in importance as a coarse grain. Rajasthan, Gujarat, and Maharashtra account for 62 percent of the total area. The crop is grown mainly in the summer season. Like rice, bajra must be hulled.

Corn production has risen about 37 percent above the pre-World War II average. Most of the corn is grown in Uttar Pradesh, Bihar, Rajasthan, Madhya Pradesh, and Punjab. Flint corn is the principal type grown in India, although the area sown to hybrid dent types is now rapidly increasing. Corn is grown mainly during the kharif season.

Barley is an important cereal in northern India, especially in Uttar Pradesh, which accounts for 60 percent of the total area sown. Barley is cultivated in the winter (rabi) season.

Pulses - In recent years about 15 percent of the sown area of the country has been under pulses. Annual production has regularly accounted for about 16 percent of total food-grain output. Pulse production has increased from the 1952-54 average of 9.6 million metric tons to 11.0 million metric tons in 1962 (table 5).

Gram (chickpeas) is the leading pulse of India. It is produced mainly in Uttar Pradesh, Punjab, Madhya Pradesh, Rajasthan, and Bihar. It is sown as a winter (rabi) crop between September and November and harvested between February and April. Production averaged 4.7 million metric tons during the 1951-56 period and the area sown averaged 20.3 million acres.

Tur (pigeonpea) is another important pulse. Although it is grown throughout India, it is consumed principally in South India. Tur is sown in the summer (kharif) season from May to July, and is harvested 6 to 8 months later. Other pulses include mungbeans, urd, lentils, peas, and kulthi. These are grown throughout India in both the summer and winter seasons.

Oilseeds - About one-tenth of the sown area in India is in oilseed crops, excluding copra (coconuts). They provide edible and industrial oils. The major oil-bearing crops are peanuts, rape and mustard seed, sesame seed, castorbeans, flaxseed, and copra. Very little cottonseed is crushed for oil in India because most people will not use it. Oilseeds and vegetable oils are among India's important foreign exchange earners.

Oil is extracted in villages in old-fashioned wooden rotary oil mills (ghanis), although in recent years these have been replaced to some extent by iron rotary mills. Considerable oil remaining in the oilcake after pressing enhances the value and usefulness of the cake. Oilcake is mostly fed to livestock, but some is used for food and fertilizer, and some is exported as animal feed.

India is the world's leading producer of peanuts, that are called groundnuts in India. They are grown mainly in Gujarat, Andhra Pradesh, Maharashtra, Madras, and Mysore, which account for 90 percent of the total area. They are cultivated primarily for oil, but considerable quantities are consumed as nuts. The oil is used for cooking, directly or after conversion into vegetable ghee, known as vanaspati (hydrogenated oil). Large quantities of peanuts, oil, and oilcakes are exported, mostly to the United Kingdom, France, and the Federal Republic of Germany. Peanuts are grown under both dry and irrigated cultivation. They are sown between May and July and harvested between September and December.

India is one of the world's leading sources of castor oil and as the second largest producer of castorbeans contributes 20 to 25 percent of the total world output. Andhra Pradesh accounts for over 60 percent of the area sown in catorbeans. Castorbeans are grown both in the summer (kharif) and in the winter (rabi) seasons, mostly as a rainfed crop. The summer crop is sown between May and July and harvested in January and February. The winter crop is sown between September and November and harvested in March and April.

India is the world's second largest producer of sesame seed (til or gingelly). This is an important oilseed for domestic consumption, especially in south India. Cultivation is concentrated in Uttar Pradesh, Madhya Pradesh, Rajasthan, Gujarat, Andhra Pradesh, and Madras; together these States account for about 90 percent of the total area sown.

The summer crop (kharif) is sown between May and August and harvested between August and December. The winter (rabi) crop is sown in January and February and harvested from May to July.

In India rape and mustard seed are important for oil consumption, especially in Uttar Pradesh, Bihar, West Bengal, and Assam. The term rape and mustard seed is used to cover four similar oilseeds of the crucifer family. In India this includes colze, rapeseed, mustardseed, and taramira.

Flaxseed is grown principally for oil (linseed oil) rather than fiber. Nearly 12 percent of the world's total flaxseed output is produced in India. The main flaxseed producing States are Madhya Pradesh and Uttar Pradesh,

followed by Maharashtra, Bihar, and Rajasthan. West Bengal, Mysore, Andhra Pradesh, Orissa, Jammu and Kashmir, and Punjab are minor flaxseed-producing States. Flaxseed is planted between September and November and harvested February through April.

Sugarcane - As a producer of sugarcane, India has ranked first in the world since 1958/59. Sugarcane is an important cash crop; the sugar industry is the second largest in India, following the textile industry. It is concentrated in Uttar Pradesh, Bihar, and Punjab, where more than 80 percent of the sugarcane is produced.

Sugarcane acreage has expanded appreciably during the last decade, and yields per acre have increased on the average. Consequently, production of sugarcane has gained steadily. With the increase has come rising consumption. And with the high production levels reached in 1959 and 1960 India has shifted from a net importer to a net exporter of sugar.

Three kinds of sugar are produced in India from sugarcane--gur (unrefined noncentrifugal), khandsari (unrefined centrifugal), and white (refined centrifugal) sugar. Over half of the cane produced is converted into gur. About 90 percent of the cane used for making gur is crushed in bullock driven, three-roller iron mills. Since the average cultivator does not own a crusher, he must rent one.

All centrifugal sugar is produced in factories. In 1951/52, 139 factories were engaged in processing sugarcane. In the 1960/61 season there were 174 sugar factories in operation, of which 30 were cane-grower cooperatives. These cooperative factories produced 15 percent of the national output. An additional 11 cooperatives were under construction in the 1960/61 season.

Fruits, nuts, and vegetables - India produces tropical, subtropical and temperate fruits, including mangoes, bananas and plantains, citrus fruits, guava, papaya, pineapples, and jackfruit. Fruit area and production are not regularly or fully reported. The only official figures published for the kinds of fruits specified above indicate a total production of 6,625,000 metric tons in 1954 from an area of 3,180,177 acres.

Mangoes are the most ancient tropical fruit indigenous to India. They are the most popular and perhaps the choice fruit in the country. Mango trees, cultivated all over India, occupy about 60 percent of the reported area under fruits.

Bananas and plantains are extensively cultivated on a small scale as a "backyard crop" and on a large scale as a field crop. About 13 percent of the area in fruits is reported in bananas.

Citrus fruits rank third, occupying 6 percent of the area reported under fruits. Sweet oranges and mandarins are the principal kinds.

Vegetable production is scattered and unorganized. Potatoes, cassavas, sweetpotatoes, cabbage, cauliflower, squash, cucumbers, beans, peas, tomatoes, and onions are grown throughout India.

Marketing facilities are quite primitive for fresh fruits and vegetables. There is no well-organized system for handling transportation and marketing of such produce. Commercial supplies are mostly grown near and around the large cities where they are marketed.

India's reported output of nuts (other than coconuts) consists mostly of cashews, an important commercial crop, acreca nuts (also called betelnuts), and lychee nuts. A native of South America, the cashew nut was introduced into India some 400 years ago by Portuguese settlers. India is now one of the leading world producers and also accounts for nearly 90 percent of world trade of cashew kernels and cashew shell oil. Cashews are grown chiefly in the coastal districts of India, and nearly three-fourths of the production comes from the west coast between Bombay and the southern tip of India.

Coconuts - In India, as in most other countries where coconuts are grown, every part of the palm is utilized. The nuts provide copra, coconut oil, coconut oilcake, and coconut fiber (coir), which are of great commercial importance. The trunk is used in house construction and the plaited leaves in thatching. The unopened spadices (leaves) are tapped to extract a juice (toddy), which is converted into jaggery, sugar, vinegar, and sweet or fermented drinks. In Kerala, a large industry employing hundreds of laborers manufactures coir fiber and coir products on both a cottage and a large industrial scale. The shell is used largely as fuel and for the production of charcoal.

The coconut palm requires 30 inches of well-distributed rainfall annually. Coconut plantations in India generally are pure stands, although in some areas other crops are planted between the palms.

It is recommended that 1-year old seedlings with the nut attached be planted in 3'x3'x3' pits at distances of 25 to 30 feet either way in straight rows (arranged in square or triangular fashion). Planting too close will result in crowding and low yields.

During the first years seedlings have to be properly watered, shaded in summer, and protected against goats, cattle, white ants, cutworms, rhinoceros beetles, and water stagnation. Mature coconut trees begin to bear fruit in 6 to 7 years after planting, give full yield from about the 10th year and bear fruit up to their 50th or 60th years.

Nonfood Crops

Rubber - Although large-scale cultivation of rubber did not start until the early part of the present century, it is now an important and flourishing industry, though as yet a small one. The plantations cover large areas in south India, chiefly in Kerala, Madras, and Mysore. Annual production over the last few years has been between 24,000 and 28,000 metric tons (table 5).

Until recently, rubber was raised primarily as an export crop; now it is a commodity in great domestic use. Plantations are expanding output to meet the country's rapidly growing requirements.

The rubber tree grows on a variety of soils but flourishes better in fine alluvial soil. In areas of very heavy rainfall rubber trees are vulnerable to 'secondary leaf-fall' caused by Phytopthera palmivora; this reduces latex yields.

Tapping of latex is started when the trees have reached a girth of 20 inches or more at about 3 feet height from the ground in the seventh or eighth year after planting.

Rubber trees are propagated from the seed as well as vegetatively. Budded (vegetatively reproduced trees) yield two to three times as much as the ordinary seedling trees.

The processing of rubber involves three operations. First, the freshly drawn latex is congealed or coagulated by adding acetic or formic acid. Next, the coagulated rubber is washed and passed through roller presses to remove water and dissolve impurities. Last, the sheets are partially dried in the sun, then smoked and dried.

Tea - India is the largest tea grower in the world, producing 35 percent of the world's output in 1959; Ceylon followed with 20 percent. In the same year India accounted for 41 percent and Ceylon for 33 percent of world tea exports.

In India, tea is cultivated in hilly tracts up to an altitude of 7,000 feet. Principal areas in the north lie in Assam and in the northern part of West Bengal. In the south, cultivation is confined mainly to the hilly region of the western coast, especially in Kerala. Tea is grown mainly on plantations; a large number of the tea estates are owned by foreign interests, mostly British. Annual output during 1957-62 exceeded 300,000 metric tons.

The bulk of the crop is processed into black tea and the rest into green tea. For black tea, the leaves must be withered, rolled, fermented, and dried. These operations require a high degree of skill and expensive equipment, and production is therefore confined to factories. For green tea, the leaves are heat treated, rolled, dried, and polished; the withering and fermentation steps are omitted.

Tea is a species of evergreen. The important tea bushes cultivated in India are the Assam and China varieties. The former is a tall plant with soft leaves while the latter is a dwarf bush with leathery leaves. Many hybrids of these are under cultivation.

In North India, tea is plucked at intervals of 7 to 10 days from April to December. In South India, plucking continues throughout the year, at weekly intervals during March to May (the peak season) and at intervals of 10 to 14 days during the other months.

Coffee - Indian coffee, though only 1.5 percent of the world production, is of a quality which commands an excellent price in international markets. Cultivation is confined to Mysore, Madras, and Kerala. Annual production for the 5 calendar years 1958-62 fluctuated between 44,000 and 68,000 metric tons (table 5).

In contrast to many other coffee-producing countries, India grows most of its crop in the shade, which protects the coffee from extremes of temperature and rainfall and from hailstone damage. The shade is said to check leaf disease, stem borer attack, weed growth, and soil erosion.

Three species of coffee are produced in India; Coffea arabica, C. robusta, and C. liberica. Arabica, occupying the largest portion of the coffee area, is well suited to high elevations ranging from 2,500 to 5,000 feet.

Coffee begins bearing in the third or fourth year and continues to yield for over 50 years. Coffee berries take eight to nine months to ripen. Arabica is ready for picking in October-December and robusta in January-March.

Tobacco - India produces about 7 percent of the world's tobacco. Area and production expanded slightly during the 1950's but yields remained about the same. Annual production increased from 299,000 metric tons in 1957 to 305,000 metric tons in 1962 (table 5). The country is a net exporter of tobacco. Imports averaged about 1,500 metric tons a year in 1957-59, as against nearly 4,000 tons in 1948-52, and consisted mostly of high quality flue-cured leaf from the United States to be blended with local leaf for the manufacture of good quality cigarettes. Exports of flue-cured Virginia type, principally to the United Kingdom, have accounted for about 80 percent of the total unmanufactured tobacco exports in recent years. Net exports of all tobacco have been 34,000 metric tons or more each year since 1955.

Fibers World supplies of jute are produced almost entirely in India and Pakistan. Pakistan is a large exporter of raw jute, and India leads in production and export of manufactured jute products.

When India and Pakistan were initially set apart, all jute mills remained in India but the major jute-growing areas went to Pakistan. India had only 642,460 acres producing about 300,000 metric tons in 1947/48. The Government launched an intensive Grow More Jute Campaign to minimize dependence on imports from Pakistan. Thereafter, the jute area expanded rapidly. In 1956/57 the production of jute and mesta was sufficient to satisfy 80 to 90 percent of the Indian jute industry's needs. With a further marked increase in jute production in 1958/59, Indian mills needed practically no Pakistani jute.

Jute is sown between March and May and harvested between July and September. It is grown under a system of rotation. On lowlands, jute-fallow-winter rice constitutes the usual rotation, while on higher land the crop is grown in rotation with gram, peas, other pulses, wheat, barley, oats, mustard, or fall rice. Jute requires a warm and damp climate with not too much rainfall. Nearly all the jute area is at sea level, and 90 percent of the area is in West Bengal, Assam, and Bihar.

Cotton is grown mostly as a dryland crop; only about a tenth of the cotton acreage is irrigated. Cultivation is undertaken both in flat open country and on rough hill tracts with an average growing-season temperature above 70° F. Maharashtra, Gujarat, Madhya Pradesh, Andhra Pradesh, Punjab, and Mysore are the main producing States, accounting for 90 percent of the total crop.

The total area under cotton, which followed an upward trend in the early 1950's, has remained more or less constant since 1955. Production has varied from 4.2 million bales in 1957 to 4.6 million bales in 1960. The average annual production in 1956-60 was 24 percent higher than in 1951-55. India exports short-staple cotton and imports longer staple cotton.

Cotton in India is sown between March and August, and harvested between September and April. Practically all picking is done by women and children. Most of the cotton produced is sold by the grower as unginned cotton. Itinerant traders buy part of the crop in the village and the rest is taken to marketing places by the producer. In 1952 there were some 3,000 gins and compresses. Charges for ginning and pressing constitute a substantial proportion of the final price.

Among other vegetable fibers produced in India, the two most important are mesta and sunn hemp. Cultivation of the former developed during World War II in an attempt to provide a substitute for jute, when jute supplies fell short of the large wartime demand. Production has since expanded strikingly, rising from less than 125,000 metric tons in 1953/54 to a peak of 285,000 tons in 1960/61. Unlike jute, mesta thrives in dry areas.

Sunn hemp, a fiber used extensively for cordage, rope, and finishing nets, is also grown as a green manure and as a fodder crop. Andhra Pradesh, Madhya Pradesh, and Maharashtra are the principal States of production.

Other fibers, not regularly reported by the Government, include sisal, kapok, and palmyra fiber.

Spices - The pepper plant is indigenous to the forests of Kerala and has been cultivated in India for centuries. Large-scale cultivation of the crop is concentrated in the submontane tracts in and below the Western Ghats.

Chili, also known as cayenne or red pepper, is an important condiment crop. It is easily cultivated as an ordinary field crop, either in the rainy season or in the hot weather, over a wide range of tropical and subtropical conditions.

India has a near monopoly on world production of cardamon and supplies 90 percent of the total entering international trade. Cardamon grows wild in many parts of the Western Ghats, and is cultivated in the region at an altitude ranging from 2,500 feet to 5,000 feet. It grows in a warm, humid atmosphere, thriving best in the shade of tall forest trees.

India ships 85 percent of the world's exports of dry ginger. In 1959, exports reached 3,650 metric tons, nearly 50 percent going to the Middle East. Kerala leads in production and processing of ginger. Though perennial, ginger is usually cultivated as an annual crop, taking 9 to 10 months to mature.

Tumeric is an important condiment in almost every Indian home and has been cultivated from ancient times. The principal tumeric-growing areas are on the east coast, mainly in Andhra Pradesh and Orissa.

LIVESTOCK INDUSTRY

India has a very large livestock population, including about one-fifth of the world's bovines, one-sixth of the world's goats, and close to one-twentieth of the world's sheep. Cattle are used for draft power, but religious beliefs, reinforced by legal prohibitions or restrictions on cattle slaughter in many of the India States, forbid their use as food.

Bovines

The livestock population consists mainly of bovines, with cattle, mostly of the Zebu species, outnumbering buffaloes by more than 3 to 1 (table 6). Bovines are indispensable to the rural economy in nearly all parts of India. Their primary use is to provide power for agricultural operations, including irrigation and transportation. Secondarily they are a source of manure for fuel and fertilizer, and of milk and dairy products, which supply most of the animal protein for India's predominately vegetarian population.

Because slaughter is restricted, the cattle population includes large numbers of old and unproductive animals that serve no economic purpose. These useless cattle, it has been estimated, consume about one-third of the nation's already scant feed supply. Moreover, many are stray cattle which seriously menace crop production.

The government instituted the cattlehouse (gosadan) program to mitigate this problem. Under this program, unproductive and useless cattle are segregated and allowed to live on grazing lands in the forests. Programs have also been adopted to increase the work and milk-producing capacity of bovines used on farms (34).

Table 6.--India: Livestock numbers 1951, 1956, and 1961

Livestock	1951	1956	1961
	Thousands		
Cattle	155,239	158,651	175,670
Buffaloes	43,401	44,916	51,140
Sheep	38,962	39,246	40,260
Goats	47,116	55,405	60,810
Horses and ponies	1,514	1,483	1,350
Donkeys and mules	1,310	1,095	
Camels	629	776	7,300
Pigs	4,424	4,932	
Poultry	1/73,481	2/94,683	116,910

1/ Includes 67,194,000 chickens and 6,287,000 other poultry, mostly ducks.
2/ Includes 86,433,000 chickens and 8,250,000 other poultry, mostly ducks.

Source: Government of India (23, 26).

Sheep and Goats

Next in economic importance to bovines are sheep and goats. They furnish the greater part of India's meat output and some milk as well as wool, hair, and skins for local use and export.

Goats are more widely distributed over the country than sheep; in 1956 Madras, Mysore, and Andhra Pradesh had nearly half of the sheep population and Rajasthan alone nearly a fifth.

Both sheep and goats are kept mainly for their meat. The brown-headed Bikaneri sheep of Rajasthan has the highest wool yield, but most breeds there are good producers of carpet wool which forms the bulk of the wool exported.

Most Indian goats are nondescript, but some breeds with a marked milk producing ability have been developed. Most widely known is the Jamunapari, kept for meat as well as milk. The diminutive Pashmina goat produces the softest and warmest fiber, which is used for high quality fabrics made in India (35).

Poultry

Poultry numbers average only about one bird to each 4 persons. Most of the birds are raised by small farmers or villagers who generally keep less than a dozen layers. The usual chicken produces little meat and a few small eggs. Imported breeds have been acclimatized in India but constitute less than 2 percent of total poultry numbers.

Hogs

Swine constitute only a small part of the livestock population. Some are produced in nearly all States, but Uttar Pradesh has almost a fourth of the total number. During the Second Five Year Plan a pig-development plan was instituted with the dual purpose of increasing food producion and improving the economic situation of the harijans (untouchables), who account for most of the people engaged in this industry.

Dairy

India is one of the world's largest producers of milk and has a higher output per capita than any other Far Eastern country. The quantity produced per milk animal or per head of human population, however, is extremely low.

Cows and buffaloes are the main contributors to the milk supply. Milk buffaloes, though less than half as numerous as milk cows, contribute more than half of the total milk output. In 1962 the number of animals milked and the production of milk were as follows:

	Animals milked Millions	Milk production Million metric tons
Cows	52.1	9.45
Buffaloes	24.8	12.57
Goats	12.4	.71

Milk is used in the preparation of several products, such as butter, ghee (clarified milk fat), dahi (curded milk), khoa (partly evaporated milk), ice cream, and cream. Milk utilization in 1962 was as follows:

	Million metric tons
Fluid	8.73
Ghee	8.91
Butter	1.36
Dahi	1.96
Khoa	.96
Ice cream	.11
Other	.70

Programs for improving the dairy industry and organizing the production and distribution of milk have been underway for some time. Bombay has the famous Aarey Milk Colony. There are also six other large modern dairy and two milk product factories in operation. Other projects are underway. There are now 28 milk supply schemes in various stages of implementation and 55 more will be undertaken during the Third Five Year Plan. There were 2,257 cooperative milk supply societies and 77 milk supply unions in the country by 1958/59. There are three rural creameries in operation; under the Third Plan eight more will be constructed and four milk product factories will be established to develop milk sources (34).

Wool

Indian sheep are producing about 34,000 metric tons of wool annually. The greater part of the clip is hairy and coarse and includes a considerable quantity of offcolor wool. The yield of wool ranges from 3/4 to 4 pounds per sheep a year, averaging only about 1 1/2 pounds.

Rajasthan is the leading wool-producing State, with about 45 percent of the total clip. The southern States of Andhra Pradesh, Madras, and Mysore follow; together they produce over 20 percent of the wool.

Hides and skins

India is one of the world's largest producers of hides and skins; they are an important item in India's agricultural exports. It is estimated that 87 percent of the raw cattle and buffalo hides are obtained from naturally stricken animals, because slaughter is prohibited in many areas of India. For sheep and goat skins, however, 80 percent of the production originates from slaughtered animals. In 1958, 26 million tanned hides and 52 million fresh skins were marketed, and about 15.6 million tanned hides and 43 million fresh skins were exported.

Meat

Goats, sheep, cattle, buffaloes, and pigs, in that order, constitute the principal sources of red meat in India. Official estimates of meat output by kind in 1949, the latest year for which data are available, were as follows:

	Long tons	Percent of total
Goat meat	155,638	33.8
Mutton	112,150	24.3
Beef	95,847	20.8
Buffalo meat	73,977	16.0
Pork	23,633	5.1

Though few cattle were slaughtered--less than 1 percent of the cattle population--beef accounted for a fifth of the meat produced in 1949. This proportion has probably declined since then, reflecting a considerable change in the beef trade following partition in 1947. Delhi, Punjab, and other areas, once flourishing centers of beef production, have suffered a severe setback since the division of the country and the migration of a large number of beef-eating communities to Pakistan.

Poultry and eggs play a minor part in the total food production of India. The limited commercial production reflects a demand that is small mainly because purchasing power is low but also because religious beliefs prevent orthodox Hindus and Jains from eating poultry or eggs. However, under various public and private programs, poultry production is being developed.

LEVEL OF TECHNOLOGY

The small size and fragmentation of most farms make them ill adapted for modern farming techniques. Poverty hinders the adoption of better technology that could otherwise be effectively introduced. Indian farmers living in large numbers on the margin of subsistence are frequently heavily burdened with debt. They can seldom save to invest in selected seed, fertilizer, and better equipment. Therefore, many seek not the biggest crop possible but the surest crop and believe that time-proven methods are the best way to attain this. And even assurance of bigger crops through increased investment has little appeal to tenant farmers in many areas, for they lack security of tenure and under crop-sharing arrangement would get only a small return on their investment.

Farm implements

A strong public resistance to mechanized agriculture arises from farmers' dependence on the land and their fear of joblessness. This opposition is weakening somewhat under the pressure of changing economic conditions. The government is striving to bring more mechanization to agriculture, but this is a slow process that depends on development in other sectors before agriculture can be fully modernized along western models.

The typical farmer in India does not now have the usual mechanical devices for farming that are in common use on farms in more developed countries. In 1956, the following farm equipment was reported (23):

Type of equipment	Thousands
Tractors	21
Plows:	
Wooden	36,300
Iron	1,400
Carts	11,000
Sugarcane crushers	568
Irrigation pumps, electric and engine powered	177

In 1955/56 only one tractor was available for each 17,265 acres sown and only one plow for each 10 acres. The 1960/61 census shows the number of tractors at 34,000 for an estimated ratio of one tractor per 11,265 acres of sown crops for 1960/61 (26). In contrast, United States farmers reported a total of 5,139,000 tractors in 1959--yielding a tractor-cropland proportion of 1 to 70 acres.

Use of fertilizer

The continuous cropping of land without adequately replenishing the supply of plant nutrients has progressively depleted soil fertility in most parts of India. It is estimated that growing crops annually remove 4.2 million tons of nitrogen, 2.1 million tons of phosphoric acid, 7.3 million tons of potash, and 4.8 million tons of lime from the soil in India.

Prior to the Second World War the use of chemical fertilizers in India was limited to plantation crops, with annual utilization amounting to no more than 16,000 tons of nitrogen and 1,700 tons of P_2O_5. Although the 1960/61 level of fertilizer consumption was about four times that of 1951/52, consumption is still very low--2.4 pounds of nutrients per acre of agricultural land for 1960/61. This may be contrasted with approximately 94 pounds per acre in the United Kingdom and 235 pounds in Japan.

Total annual requirements for fertilizer and manure--based on applications at the rate of 30 pounds of nitrogen and 15 pounds of P_2O_5 per acre to the reported 1958/59 sown area (including multiple-cropped land)--would be more than 5 million metric tons of nitrogen and 2.5 million tons of P_2O_5 (31).

India's Third Five Year Plan calls for the application of 1 million tons of nitrogen, 400,000 tons of P_2O_5 and 200,000 tons of K_2O by 1965/66. The domestic production targets for the first two nutrients have been set at these levels. All potash must be imported. And until known sources of pyrite are developed, all sulphate rock and sulphur for superphosphate manufacture must also be imported. There is some doubt that these production and consumption goals will be achieved by 1965/66. The supply of chemical fertilizers in India in 1947-59 is provided in table 7.

Table 7. India: Supply of chemical fertilizers, 1947-59

Year	Nitrogenous 1/	Phosphatic 2/	Potassic 3/
	1,000 long tons		
1947	30.9	2.2	1.8
1948	33.8	3.4	1.1
1949	43.6	7.5	2.4
1950	23.7	8.4	5.7
1951	31.3	9.8	7.7
1952	80.6	7.5	3.1
1953	85.9	7.4	8.5
1954	90.7	17.6	14.2
1955	132.1	12.6	10.8
1956	135.2	13.3	10.9
1957	181.6	23.2	15.5
1958	177.1	26.8	16.5
1959	238.1	39.4	21.6

1/ In terms of fixed nitrogen.
2/ In terms of P_2O_5.
3/ In terms of K_2O.

Source: National Council of Applied Economic Research (32).

The use of organic fertilizers to restore nutrients to the soil is well know to Indian farmers. The major sources of organic fertilizers in India have been from green-manure crops and farmyard manure. Other sources include compost manure, bonemeal, and oilcake. The estimated level of availability of these materials for 1955/56 and 1960/61 is provided in table 8 (32).

Chemicals

The use of chemical insecticides and fungicides is retarded in India by economic and religious considerations. The low yields for most crops make the use of chemicals economically prohibitive, and the vast majority of Indians are Hindu, part of whose philosophy, ahimsa, prohibits the killing of any animal life (13). Therefore, plant protection measures directed toward the destruction of insect and animal life have two formidable deterrents to overcome before widespread progress can be made.

However, some progress has been made toward controlling crop losses due to insects and animals. For example, the locust, which invades in varying intensity, has been controlled somewhat but is still a hazard to crops. For cereals, the use of plant pesticides is not generally considered economically justifiable, but some grain seed is sometimes treated to control smut and seedling diseases. Nematode diseases are recognized as a threat to efficient agricultural production. It has been demonstrated that considerable losses

Table 8.--India: Estimated availability of organic manures 1955/56 and 1960/61

Source	1955/56	1960/61
	1,000 metric tons	
Green manures:		
Absolute quantity	10,872	29,059
Plant nutrient (N)	305	813
Farm yard manure:		
Absolute quantity	219,469	244,362
Plant nutrient (N)	658	734
Compost manure:		
Absolute quantity	2,134	3,048
Plant nutrient (N)	21	47
Bonemeal:		
Absolute quantity	35	60
Plant nutrient (P_2O_5)	8	15

Source: National Council of Applied Economic Research (32).

in crop yields, formerly attributed to drought and nutrient deficiencies, have actually been caused by nematode diseases, and also that poor fertilizer response may be due to the same cause. For some crops the use of herbicides for the control of weeds has begun. Studies have been conducted at the Central Rice Institute at Cuttack on the control of weeds in rice fields with herbicides.

Irrigation

India is rich in river-water resources, but only a small portion has been effectively utilized. Out of an annual water flow of some 1,356 million acre-feet, about 450 million acre-feet are usable for irrigation and power. Up to 1951 only 76 million acre-feet had been used. It was estimated at the end of the Second Five Year Plan in March 1961 that 119 million acre-feet had been put to use. This represents about 26 percent of the usable flow. The Third Five Year Plan sets a target for an additional 41 million acre-feet to be utilized by 1965/66, making the proportion about 35 percent.

In 1959/60 India had a net irrigated area of 58.7 million acres and a gross irrigated area (counts double-cropping)of 67.7 million acres. The gross area irrigated in 1959/60 is up 7 percent from 1956/57. Much of this represents land receiving partial or supplemental irrigation, which is needed for maximum production of most farm crops even in many areas with a relatively high annual rainfall.

The major sources of irrigation water in India are canals, tanks, and wells. The predominate source in 1959/60 was canals, which accounted for 41.9 percent of the irrigation water; 19.8 percent came from tanks, 28.9 percent came from wells, and the remaining 9.4 percent originated from other devices.

The use of water is not carefully controlled. Only a few irrigation districts sell water on a volume basis. Usually the cultivator buys water by acreage only, as for sugarcane, rice, or other crops to be irrigated.

Sugarcane is irrigated to a far greater extent than any other crop. In 1956/57, the latest year for which data are available, over one-third of the rice area was irrigated (table 9). The proportion was about the same for barley as for rice and somewhat lower for wheat. It was much lower for other crops.

Irrigation development has been heavily stressed by the Government since independence in 1947 when a large irrigated area of the former Punjab was transferred to Pakistan. This transfer accentuated India's food problem, and new irrigation projects were quickly undertaken. By 1950, the need for integrated development was fully accepted, and a comprehensive plan was drawn up for irrigation development.

Improved seeds

Improved seeds are widely used by growers of cotton, but have not as yet reached most growers of subsistence crops. Programs for multiplication and distribution of improved seed have been included under the Five Year Plans. It is estimated that 55 million acres of food crops in 1960/61 were planted with improved seeds (34).

By 1960, a seed farm of about 25 acres reportedly had been established in each of some 3,100 community development blocks that include about 370,000 villages. The seed required for each village has to be produced in the village itself from a foundation stock supplied by these seed farms.

The Government is considering the establishment of 10 large mechanized seed farms patterned after a Soviet-aided farm in Rajasthan set up in 1956. These farms would range in size from 6,000 to 9,000 acres and would be the principal sources for improved seed in the country.

AGRICULTURAL DEVELOPMENT

National planning has been a policy of India's governing party since the 1930's. When the party was working for independence, Prime Minister Jawaharlal Nehru, now chairman of the National Planning Commission, was chairman of the Congress Party's National Planning Committee (33).

Table 9.--India: Irrigated area of selected crops 1956/57

Crop	Area sown 1/	Area irrigated 1/	Percent of sown area irrigated
	1,000 acres		Percent
Rice	79,759	28,352	36
Wheat	33,418	9,889	30
Barley	8,693	3,267	38
Jowar	40,124	1,399	3
Corn	9,286	1,243	13
Ragi	5,631	927	16
Bajra	27,801	855	3
Other grains	12,296	306	2
Gram	23,904	2,597	11
Tur	5,666	20	Insig.
Other pulses	28,263	1,668	6
Sugarcane 2/	4,564	3,148	69
Cotton	19,815	2,221	11
Oilseeds 3/	30,754	872	Insig.
Tobacco	1,035	210	20
Other crops	37,448	6,551	17
Total	368,457	63,525	17

1/ Includes multiple cropping.
2/ 1955/56.
3/ Peanuts, castorbeans, sesame, and rape and mustard seed.

Source: Government of India (25) and National Council of Applied Economic Research (31).

India gained independence in 1947, at that time the Government and people faced critical economic problems. Among the outstanding were insufficient agricultural production, widespread poverty, and underdevelopment of most of the country's natural resources. A Planning Commission was established in 1950 by the Government to assess the country's resources and to formulate a plan for economic development (33).

The Planning Commission presented in July 1950 its First Five Year Plan for economic development (April 1951-March 1956). This Plan included a number of development projects already under way and additional ones to be implemented.

Expenditure and Investment (16)

India invested a total of $21.2 billion in development projects over the First and Second Five Year Plans (April 1951-March 1961). The total was about equally divided between public and private sources for that period. This emphasizes the combination of both public and private enterprise in the development of India's economy (table 10).

In the public sector, Government expenditures for agriculture and irrigation amounted to 31 percent of total expenditures in the First Plan and to 20 percent in the Second Plan period. This reflects the shift from an emphasis on agriculture in the Second Plan. Government allocations to heavy industry went from 4 percent of the total in the First Plan to 20 percent in the Second.

The Third Plan (April 1961-March 1966) calls for an investment of $21.8 billion, $600 million more to be spent in 5 years than was allocated to investment over the previous 10-year period. For the Third Plan the public share of total investment will be 60 percent. Government allocations to agriculture and irrigation are 80 percent larger than under the Second Plan and represent 23 percent of total allocations instead of 21 percent. The share of Government expenditures in heavy industry for the Third Plan will be the same as in the Second.

Agricultural Production

Some indication of progress toward meeting agricultural targets may be obtained by showing annual production and target production over the First, Second, and Third Plan periods (table 11). Another indication may be obtained by showing annual production for the same period on a per capita basis (table 12).

A better means of measuring how well Indian agriculture is progressing toward meeting the country's food and fiber needs is to compare the annual rate of increase in agricultural production in general with the annual rate of increase in population over relatively long periods of time (see section on "Productivity").

Agricultural Programs

Various programs to expand agricultural production during the First and Second Five Year Plans are discussed under the headings "Agricultural Institutions" and "Level of Technology." However, under the Third Plan, a new program was initiated. This program, the Intensive Agricultural District Program, popularly called the Package Program, embodies the Ford Foundation's recommendations on how to increase agricultural output as contained in its 1959 report (13).

The Intensive Agricultural District Program has been introduced in one district in each of 7 States and will be introduced in the remaining 8 States over the Plan period (April 1961-March 1966). This program seeks to raise agricultural production within these districts from 40 to 60 percent. All factors of production are to be concentrated in effective combinations in the most naturally productive areas to accomplish this. Food grains will receive primary attention, but all other crops will be considered.

In addition to the Package Program, the Third Plan strategy for meeting the high agricultural targets (table 11) is to irrigate an additional 25 million acres, introduce soil conservation to 148 million acres, supply 191 million tons of compost, and plant 50 million acres with improved varieties of seeds by 1966 (34).

Table 10.--India: Expenditure and investment during the First, Second, and Third Five Year Plans, April 1951 through March 1966

Sector	First Plan April 1951-March 1956	Second Plan April 1956-March 1961	Third Plan April 1961-March 1966
	- - - - - - - Million dollars - - - - - - -		
Public sector			
Agriculture 1/	611.1	1,113,0	2,242.8
Irrigation 2/	651.0	882.0	1,365.0
Power	546.0	934.5	2,125.2
Small industry	90.3	367.5	554.4
Organized industry	155.4	1,890.0	3,192.0
Transportation and communications	1,098.3	2,730.0	3,120.6
Social services and other	963.9	1,743.0	3,150.0
Total expenditures 3/	4,116.0	9,660.0	15,750.0
Total investment 4/	(3,276.0)	(7,665.0)	(13,230.0)
Private sector			
Total investment 4/	(3,780.0)	(6,510.0)	(8,610.0)
Grand total public and private investment 4/	(7,056.0	(14,175.0)	(21,840.0)

1/ Includes the Community Development Program.
2/ Only major and medium irrigation projects.
3/ Expenditures herein are referred to as "outlay" in the various Five Year Plan documents.
4/ The figures in parentheses are the amounts that correspond to capital formation expenditures, for example, money used to create physical assets (buildings, plants, and equipment).

Source: Government of India, Planning Commission (34).

Table 11.--India: Agricultural production during the First, Second, and Third Five Year Plans 1951-62

Year 1/	Food-grains	Oilseeds	Sugarcane	Cotton	Jute	Tea
	- - - - - - - - - - - - 1,000 metric tons - - - - - - - - - - - -					
First Plan						
1951	55,737	4,875	57,052	557	849	275
1952	58,151	4,785	50,993	652	833	281
1953	68,514	5,343	44,408	826	561	275
1954	65,276	6,210	58,739	871	531	291
1955	68,909	5,879	60,544	824	761	303
1955 target 2/ ..	62,600	5,600	64,000	3/747	4/980	5/
Second Plan						
1956	68,312	6,121	69,057	903	778	302
1957	66,948	6,628	71,156	963	742	308
1958	70,582	6,682	71,583	914	936	324
1959	77,116	5,976	76,408	724	825	324
1960	77,953	6,392	104,127	1,008	853	316
1960 target 2/ ..	81,800	7,700	88,000	3/1,159	4/998	318
Third Plan						
1961	80,144	6,970	97,562	882	1,137	350
1962	80,302	6,906	103,000	914	998	363
1965 target 2/...	101,600	10,000	102,000	3/1,247	4/1,125	408

1/ Calendar years.
2/ Target years are agricultural years beginning in July.
3/ Targets originally expressed in million bales of 392 pounds each.
4/ Targets originally expressed in million bales of 400 pounds each.
5/ No target established.

Source: United States Department of Agriculture, Economic Research Service (8) and (9) and Ministry of Food and Agriculture, Government of India (24).

Table 12.--India: Agricultural production per capita during the First, Second, and Third Five Year Plans 1951-62

Year 1/	Foodgrains	Oilseeds	Sugarcane	Cotton	Jute
	Kilograms per capita				
First Plan					
1951	153.8	13.4	157.4	1.5	2.3
1952	157.8	13.0	138.3	1.8	2.3
1953	182.7	14.2	118.4	2.2	1.5
1954	170.9	16.3	153.8	2.3	1.4
1955	177.1	15.1	155.6	2.1	2.0
1955 target	160.8	14.4	164.4	1.9	2.5
Second Plan					
1956	172.2	15.4	174.0	2.3	2.0
1957	165.3	16.4	175.7	2.4	1.8
1958	170.8	16.2	173.2	2.2	2.3
1959	182.6	14.2	180.9	1.7	2.0
1960	180.6	14.8	241.2	2.5	2.0
1960 target	189.5	17.8	203.8	2.7	2.3
Third Plan					
1961	181.5	15.8	220.9	2.0	2.6
1962	177.7	15.3	227.9	2.0	2.2
1965 target	210.7	20.7	211.5	2.6	2.3

1/ Calendar years.

Source: Derived from table 11.

National Income

Over the period of the First and Second Five Year Plan, national income (at constant 1960/61 prices) increased by 42 percent (table 13). Per capita incomes increased from $60 in 1951 to $70 in 1961, an increase of 17 percent. The national income in 1951 was $21.5 billion and in 1961 $30.5 billion (at 1960/61 prices). India's national income is not as great as income of many States in the United States. Agricultural production and related industries still account for about 50 percent of the national income even though expanded industrial development was more highly emphasized in the Second Plan.

Table 13.--India: National and per capita income during the First and Second Five Year Plans, April 1951-March 1961

Year 1/	Current prices 2/		1960/61 prices 2/	
	National income	Per capita income	National income	Per capita income
	Million dollars	Dollars	Million dollars	Dollars
1951	20,013	56	21,504	60
First Plan				
1952	20,937	58	22,082	61
1953	20,622	56	22,953	62
1954	22,008	58	24,339	65
1955	20,181	53	24,948	65
1956	20,958	54	25,473	65
Second Plan				
1957	23,751	60	26,691	67
1958	23,919	59	26,439	65
1959	26,460	64	28,371	68
1960	26,964	63	28,728	68
1961	30,450	70	30,450	70
Third Plan				
1966 target	---	--	39,900	82

1/ Indian fiscal years ending March 31.
2/ Originally data in million rupees; converted to dollars using $0.21 to the rupee.

Source: National Council of Applied Economic Research (32).

PRODUCTIVITY

Historical

Indian agricultural production according to Joseph's analysis was not increasing as fast as population growth for the period 1901 to 1941. According to his figures, the average growth rate in population for those 5 decades was 6.4 percent while the total crop production growth rate was only 2.3 percent. Thus, population was increasing about 3 times as fast as total crop output (21).

Indian agricultural production for the 25-year period 1937-62 has apparently outpaced the rate of population growth, but only by a small margin (8). (The word "apparently" is used because agricultural statistics for India before partition are much less complete than for recent years, and the indexes may therefore exaggerate the increase in output.) Because the growth rates of agriculture and population have been at or near the same level for the 25-year period (1937-62), the country is still extremely vulnerable to the variation of monsoon rain. Either too much or too little rain will result in food shortages, as in 1951 and 1952.

Levels of Production

A decline of 2 percent is estimated in the index (1952-54=100) of total agricultural production for calendar year 1962. Per capita agricultural production declined in 1962 by 4 percent from 1961 (table 14).

There was a consistent improvement in food-crop production during the period 1951-61, but in 1962, there was a decline and food production in 1963 was not much better than 1962.

Prospects for Improvement

Agricultural production over the period 1951-62 has expanded substantially. For example, the predominantly important food grains expanded from 55.7 million tons in 1951 to 80.3 million tons in 1962. The expansion in agricultural production can be attributed principally to the notable progress in improved or expanded services to farmers over the period. These include the extension of irrigation facilities, expanded fertilizer production, wider coverage by the Community Development Program, land reclamation projects, and land reform.

Table 14.--India: Selected agricultural production indexes, average 1952-54, annual 1957-62

Category	Average 1952-54	1957	1958	1959	1960	1961	1962 *
Agricultural production	100	109	114	119	127	130	128
Per capita agricultural production	100	101	104	105	110	110	106
Food production	100	108	114	120	127	130	128
Per capita food production .	100	100	104	106	110	110	106
Population index	100	108	110	113	115	118	121

* Revised index.

Source: U.S. Department of Agriculture, Economic Research Service (11).

However, on the basis of past production trends it is unlikely that the Third Plan agricultural targets can be attained by 1965/66 (17). The Plan implies (on an index basis) that an average annual increase of 6 percent a year between 1960/61 and 1965/66 will be needed to obtain target level production (34). Over the 25-year period 1937-62, the rate of increase in agricultural output has been about 2 percent. And for the past 9 years (1953-62) the annual rate of increase in agricultural production has been about 3 percent, only half the Third Plan's expected rate of growth.

The achievements in Indian agriculture for the last decade (1951-61) are encouraging, but the basic agricultural problems remain unsolved. India has one of the world's largest areas under crop production, but yields are among the lowest anywhere.

Indian agriculture faces several formidable obstacles to attaining self-sufficiency in food and fiber production. The principal of these is the country's vulnerability to drought without adequate irrigation facilities. The 21 percent of the agricultural area that is irrigated accounts for about half the total crop output. Another basic limitation is widespread illiteracy. Extension workers cannot effectively promote improved agricultural practices among illiterate farmers. Other deterrents to the expansion of production include inadequate fertilizer production and distribution, slow progress in the distribution of improved seeds, insufficient agricultural credit, and inadequate storage and marketing facilities for agricultural produce.

ECONOMIC ASSISTANCE

World Total (18)

India received a total of $6.3 billion (equivalent) in foreign assistance between 1951 and March 31, 1961, according to a Reserve Bank of India report (37). The United States has been the greatest single source of assistance, accounting for nearly $4 billion or 61 percent of the total received. The World Bank, consortium countries (United Kingdom, West Germany, Canada, and Japan), the Soviet Bloc, and other countries account for the remaining 39 percent. The Soviet Bloc has contributed 14 percent of the total economic assistance to India. Although total assistance provided India may seem large, its effectiveness has been diminished by the magnitude of the task of making India's economy self-sustaining. A summary of aid by source is provided in table 15.

U. S. Aid to India (18)

The United States began its aid to India with a $189.7 million dollar emergency wheat loan in 1951 to alleviate serious food shortages. Through June 30, 1961, total U S. aid amounted to $3.5 billion, of which agricultural commodities under Public Law 480 accounted for 61 percent. A summary of United States aid programs to India is provided in table 16.

Table 15.--India: Foreign aid commitments through March 31, 1961

Source	Total authorized	Amount used in the First Plan	Amount used in the Second Plan	Balance for use in the Third Plan	Totals authorized as percentage of grand total
	Million dollars				Percent
United States	3,797	354	1,726	1,717	60.6
Loans	946	195	319	432	
Grants	447	148	268	31	
P.L. 480 & 665	1/2,404	11	1,139	1,254	
World Bank	678	71	476	140	10.8
Other Consortium 2/	801	41	680	80	12.8
United Kingdom	259	0	257	2	
West Germany	261	0	231	30	
Canada	223	41	158	24	
Japan	58	0	34	24	
Soviet Bloc	887	0	158	729	14.2
Russia	808	0	158	650	
Czechoslovakia	49	0	0	49	
Poland	30	0	0	30	
Other countries	102	13	25	64	1.6
Grand total 3/	6,265	479	3,056	2,730	100.0

1/ Public Law 665 accounts for $67 million and the remainder is under Public Law 480 in Rupees. Over 85 percent of the P.L 480 amount is earmarked for loans and grants to India.

2/ The consortium of governments and institutions interested in development assistance to India include the United States, Canada, France, West Germany, Japan, United Kingdom, World Bank (I.B.R.D.), and the International Development Association (I.D.A.).

3/ The foreign aid included is limited to aid commitments made to India by March 31, 1961; thus only a small amount of aid committed at the April-June 1961 Consortium Meeting is included in this total.

Source: Derived from Reserve Bank of India (37).

Table 16.--United States: Aid to India, July 1, 1950, through June 30, 1961

Program and Agency	Loans	Grants	Total	Program funds as percent of grand total	Agency funds as percent of program funds
	Million dollars			Percent	Percent
Mutual Security Program ...	553.3	298.3	851.6	24.1	100.0
Agency for International Development 1/	130.0	2/298.3	428.3	---	50.3
Development Loan Fund ...	423.3	---	423.3	---	49.7
Other Economic Aid	1,704.2	923.9	2,628.1	74.4	100.0
Public Law 480 3/	1,248.3	923.9	2,172.2	---	82.7
Title I	1,248.3	788.2	2,036.5	---	---
Title II	---	5.2	5.2	---	---
Title III	---	130.5	130.5	---	---
Export-Import Bank	246.2	---	246.2	---	9.4
Other Economic Aid	4/209.7	---	209.7	---	7.9
Private U.S. Foundations ..	---	5/41.0	41.0	1.2	---
Private U.S. Banks	6/12.5	---	12.5	.3	---
Grand total	2,270.0	1,263.2	3,533.2	100.0	---

1/ Formerly International Cooperation Administration; net obligations.

2/ Includes $67.7 million in surplus agricultural commodity purchases under sections 550 and 402 of the Mutual Security Act, Public Law 665.

3/ Excludes U. S.-use reserves; amounts are dollar equivalents of rupees earmarked for loans and grants as specified.

4/ Loan from the Asian Economic Development Fund in FY 1958 accounts for $20 million and 1951 wheat loan the remainder.

5/ Rockefeller and Ford Foundations only.

6/ Total of two loans for Boeing jet aircraft for Air-India International made in 1957 and 1958 in cooperation with the U.S. Export-Import Bank.

Sources: Derived from Agency for International Aid (1), and (2).

India has been the principal recipient of agricultural commodities under Public Law 480. The commodities programed for India since 1956 have amounted to more than $2 billion, over one-fourth of the total market value of all products included in Public Law 480, Title I agreements with all countries through December 31, 1962 (12).

United States agricultural products under this program have supplied needed food and fiber in times of reduced production in India and funds for economic development as well.

Public Law 480 commodities exported between August 1956 and December 1960 contributed an average of about 75 calories per day per capita to the Indian diet for the period, or the equivalent of about 3.5 percent of the average daily per capita caloric intake (16).

Out of the more than $2 billion value (market value and ocean transportation) of Title I agreements with India, over 80 percent has been set aside for loans and grants for economic development. As of May 31, 1962, $639.5 million had been obligated for specific development projects under the Five Year Plans, and $454.5 million had been used. A summary of these projects is provided in table 17.

Selected examples of projects contributing to India's agricultural and industrial development follow:

River Valley Development: Twelve valley development projects are under construction in various States of India. These will provide irrigation for additional food production, dams for control of floods, and hydroelectric power. From eight of these projects alone over 1.2 million kilowatts of electricity will be produced and some 9 million acres will be benefited by irrigation.

The Uttar Pradesh Agricultural University: This university has been aided by a $2.1 million grant and is being patterned after the U. S. land-grant colleges with the assistance of educators from the University of Illinois. This institution was inaugurated in November 1960, with Prime Minister Nehru and former Ambassador Bunker officiating.

The Refinance Corporation: This corporation was established in accordance with the first Title I agreement with India that reserved the rupee equivalent of $55 million for relending to private enterprise through established banking facilities. For this purpose, the Government of India established the Refinance Corporation as a private limited company whose capital subscriptions have been made up by the Reserve Bank of India, State Bank of India, Life Insurance Corporation of India, and the larger Indian scheduled banks. To be eligible for refinancing, loans made by the participating banks must be to medium-sized industrial plants for periods of 3 to 7 years for the purpose of providing increased production within the private sector.

Public Law 480 is only one of several sources of United States aid to India, but it has been an important multipurpose element in the country's economic development. It has enabled India to buy, in rupees, the additional food and fiber its perennially low foreign exchange balances would not otherwise have permitted. These commodities have sustained the Indian diet at levels of caloric intake that would not have been possible without using scarce foreign exchange. And the funds generated by the Public Law 480 sales have gone mostly into economic development programs.

Table 17.--United States: Aid to India under Public Law 480, by projects, as of May 31, 1962

Projects	Grants	Loans	Total	Percent of grant total
	- - - - Million dollars - - - -			Percent
River valley development 1/ ..	12.4	343.7	356.1	55.7
Malaria eradication	65.1	---	65.1	10.2
Refinance Corporation	---	55.0	55.0	8.6
National highways	42.0	---	42.0	6.6
Trombay fertilizer plant	---	28.2	28.2	4.4
Food grain storage	21.7	---	21.7	3.4
Industrial Finance Corp.	---	21.0	21.0	3.2
Industrial Credit and Investment Corp	---	21.0	21.0	3.2
Other projects 2/	18.3	---	18.3	2.9
Dairy development	7.5	---	7.5	1.2
Uttar Pradesh Agricultural University	2.1	---	2.1	0.3
Institute of Technology at Kanpur	1.0	---	1.0	0.2
Indian Investment Center	0.5	---	0.5	0.1
Grand total obligated ...	170.6	468.9	639.5	100.0
Total expended 3/	105.5	349.0	454.5	71.1

1/ Including the Sharavathi power project.
2/ Includes ground water exploration, other education, soil conservation, and All-India Institute of Medical Science projects.
3/ March 31, 1962.

Source: Agency for International Development (16).

Research (29)

The Indian Council of Agricultural Research, established in 1929, undertakes, aids, promotes, and coordinates agricultural and animal husbandry education and research in India.

The Indian Agricultural Research Institute, New Delhi, is the oldest institution devoted to research in agricultural science. It has well-equipped laboratories and extensive farms for carrying out large-scale investigations on food crops.

The Indian Veterinary Research Institute, Izzatnagar, deals with animal diseases and their cure, while the National Dairy Research Institute at Karnal concerns itself with research on milk quality analysis and quality control. The Central Rice Research Institute at Cuttack and the Central Potato Research Institute at Simla devote themselves to problems of research relating to rice and potatoes, respectively.

Nine commodity committees devote themselves to research in specific commodities--cotton, jute, sugarcane, coconuts, tobacco, oilseeds, arecanuts, spices, and lac. These committees have their own laboratories and research institutions.

The Central Marine Fisheries Research Station, Mandapam, carries out biological investigations in edible fish found in the coastal waters of the country.

The Central Inland Fisheries Research Station, Barrackpore, conducts research on freshwater inland fish.

The Central Fisheries Technological Research Stations at Cochin and Ernakulam undertake studies in fishing-gear material, gear design, fishing methods, and preservation of fish and fish products.

Education

Considerable progress has been made in the field of education in India over the decade of the First and Second Five Year Plans. This progress is reflected in the increases in literacy rates, number of schools and colleges, and enrollment.

In 1951 the literacy rate was 16.6 percent; it was 23.7 percent in 1961. The literacy rate is higher for men than women. The rate for men was 24.9 percent in 1951 and 33.9 percent in 1961. For women the rate was 7.9 percent in 1951 and 12.8 percent in 1961 (28, 29).

The facilities and enrollment in primary and secondary eduction expanded over the decade. Schools in the primary and secondary school system increased by an estimated 73 percent over the period of the First and Second Plans (table 18). Student enrollment for the same period expanded by an estimated 86 percent.

However, even by 1960/61 not more than 60 percent of the children 6 to 11 years old were in school, and only 12 percent of the children aged 14 to 17 years were in school.

Agricultural training is available at the secondary level in vocational agricultural high schools. In 1956/57, however, there were only 97 of these schools, with an enrollment of 6,347 (5). Special training is provided agricultural extension workers at the village and block levels.

The Indian university and college system has been greatly strengthened over the past decade. In 1960/61 there were about 46 universities but only 51 agricultural colleges and 17 veterinary and animal husbandry colleges. In 1960/61, enrollment in the agricultural colleges numbered 5,574 and in the veterinary colleges 1,301.

India's first agricultural university (Uttar Pradesh Agricultural University), established on the general pattern of the U. S. land-grant colleges, began its first academic year in July 1960. This institution is located in Uttar Pradesh, in the center of a 16,000 acre State-owned farm.

Establishment of this agricultural university was an important step in agricultural education in India. Previously, practically all college training was academic, and most of the graduates had sought clerical Government employment. The combination of agricultural education, research, and extension work in the university should go a long way toward developing practical agricultural leaders. Currently five American universities, under United States Agency for International Development contracts, are assisting selected agricultural colleges in India to develop, strengthen, and coordinate their teaching, research, and extension programs. 2/

One difficulty confronting Indian educators is the diversity of languages spoken. The 1951 census revealed 845 languages and dialects, but 720 of these were spoken by less than 100,000 persons. The current State subdivisions of India conform to the predominate language spoken. At the national level, English and Hindi carry official status and are the two most widely understood in India today.

Extension

Agricultural extension is an integral part of the community development program, launched in October 2, 1952, with the objective of promoting the individual and collective welfare of India's vast rural population. This program is implemented in block units; each block normally comprises 100 villages with an area of 150 square miles and a population of 60,000 to 70,000. Under the pattern developed, after the first year, each new block is incorporated into the National Extension Service; the blocks pass from an initial stage to a second, more intensive, stage, before becoming fullfledged community development blocks. Thus, extension and community development are related aspects of the same program.

2/ The five universities are: University of Illinois, University of Missouri, Kansas State University, Ohio State University, and University of Tennessee.

Table 18.--India: Education facilities, enrollment, and teaching staff 1950/51, 1960/61, and 1965/66 (target)

Item	Unit	1950/51	Estimated	
			1960/61	1965/66
Schools				
Primary	Number	209,671	342,000	415,000
Middle	do.	13,596	39,600	57,700
High	do.	7,288	16,600	21,800
Total	do.	230,555	398,200	494,500
Enrollment				
Primary	Million	19.2	34.3	49.7
Middle	do.	3.1	6.3	10.0
High	do.	1.2	3.0	4.6
Total	do.	23.5	43.6	64.3
Teachers				
Primary	Number	537,918	910,000	1,266,000
Middle	do.	85,496	230,000	360,000
High	do.	126,504	229,000	290,000
Total	do.	749,918	1,369,000	1,916,000
Institutions of Advanced Study				
Teacher training schools	Number	782	1,307	1,424
Universities	do.	27	46	58
Other schools 1/	do.	542	1,050	1,400

1/ Arts, science and commerce colleges.

Source: Government of India, Planning Commission (34).

The Community development program has been rapidly expanded. By the end of the Second Five Year Plan in March 1961, it was estimated that about 3,100 blocks, representing about 370,000 villages and 200 million people, were established, and initial work was begun in 500 more blocks. Nearly 1,000 of the established blocks are more than 5 years old and have entered the third stage of the program.

Every community development block is intended to be an area of intensive effort, in which all development agencies work together as a team in cooperation with the local leadership represented in village assemblies and cooperatives. Working with the local leadership is the village-level worker, who has 10 villages in his charge and acts as a multipurpose extension agent. He is backed at the block level by a block development office, which has a team of eight extension officers, among them crop and animal husbandry specialists. The role of the extension organization at the village and block level is twofold: to carry information to the villagers and make available to them resources and facilities provided by the Government. It also transmits the villagers' problems back to the research organizations for special study.

Apparent failure to get effective village group participation in community development has been ascribed to various causes. Because of the rapid expansion of the program, many blocks and villages could only be minimally staffed by inadequately trained personnel. Equally important is the fact that plans and programs have been formulated at the upper administrative levels, and not by the people whose interest was to be served. Thus there is a tendency for the villagers to accept passively a program they feel has been imposed from above. In an important change of policy in 1959 it was decided to delegate the responsibility, power, and resources for planning and execution of development programs to the people's institutions. By the middle of 1960 all States had assigned management of the local works program to the elected panchayats (village councils); and wherever elected assemblies at the block level had been formed, control of the community development program had been fully transferred to them, together with the resources and staff. All States have either passed or proposed to pass legislation introducing a three-tier system of "democratic decentralization"--the village, the block, and the district.

Cooperatives

Organization of cooperatives in the countryside has been a major aim of the Government since attaining independence in 1947. The movement, which had been gaining in the previous few decades, made further progress during the 1950's, particularly in the field of credit. But with some 10 million members in June 1958 (table 19), farm-credit societies were probably serving less than 20 percent of the rural households. Cooperative farming societies and marketing and processing cooperatives are considerably more limited in number than farm-credit societies.

In recent years, the Government has continued to emphasize farm credit but has focused attention on noncredit societies. In 1956 the Government established a National Cooperative Development and Warehousing Board. The Board's functions are to promote cooperative activities in general and to assist in processing, marketing, and warehousing.

Table 19.--India: Number and memberships of farm cooperatives, by type, June 30, 1958

Type	Number of societies	Memberships
Credit	166,543	10,221,249
Marketing:		
Local	1,899	541,289
District	2,685	602,900
State	16	2,109
Sugarcane supply:		
Local	7,469	377,875
District	186	1,761,423
Milk unions	73	9,243
Milk supply	1,941	168,342
Farming	1/3,637	189,752
Irrigation	1,557	45,167
Sugar factories	51	123,251
Cotton ginning	76	34,380
Other processing	544	28,335

1/ Includes 2,442 farming societies classed as such, 1,035 field labor and land colonization societies not so classed in Andhra Pradesh, and 160 other farming societies apparently not so classed in other States.

Source: Government of India (36).

The Second Five Year Plan provided funds to develop cooperative processing through sugar factories, oil mills, cotton gins, and jute-baling plants. It further provided for organizing State and local marketing societies. In India these societies not only market produce but often buy farm supplies for their members. The Second Plan also provided for the construction of depots for the marketing societies and the larger credit societies and for the construction of centrally located warehouses by the central and State warehousing cooperatives for the use of the marketing cooperatives.

The Government is accelerating its program for organizing cooperative marketing and processing societies. To increase interstate and foreign trade through cooperatives, a National Agricultural Cooperative Marketing Federation was established in 1958/59. By the end of the year (1958/59), the Central Warehousing Corporation had opened nine warehouses in strategic ports and at railway junctions, while State Warehousing Corporations had been established in all States except Kerala, and Jammu and Kashmir. Cooperatives are favored in the allocation of import and export quotas; they have participated in the export of such products as cotton, pulses, and jute, and the import of such products as seed potatoes.

Since 1958, plans have called for the organization of multiple-purpose village service societies as the primary unit within the community development program. Despite these measures, the cooperative market movement does not seem to have taken strong hold in rural India.

Credit

Although farm credit societies are the oldest cooperatives in India and have numbered over 100,000 for many years, they have never been an important source of farm credit. A comprehensive rural-credit survey completed in 1951/52 revealed that professional moneylenders, agricultural moneylenders, and relatives provided over 80 percent of the credit advanced Indian farmers. This survey shows the following sources of credit (in percentages of total money loaned).

	Percent
Professional moneylenders	44.8
Agricultural moneylenders	24.9
Relatives.....	14.2
Traders and commission agents ..	5.5
Government.....	3.3
Cooperatives	3.1
Commercial banks.....	0.9
Landlords.....	1.5
All other sources	1.8
	100.0

Interest rates on credit provided by moneylenders, traders, and other individuals generally exceed the legal maximum by a large margin, but this credit is convenient. It is usually not secured and requires no waiting period, no formal papers are involved, and there is frequently no fixed date for repayment or restriction on use of the funds.

The reverse is true of credit advanced by cooperative credit societies. The rates of interest charged on loans by small societies range from 4½ percent to 12½ percent, and that by the larger societies from 3¼ percent to 12 percent. This contrasts sharply with rates of 25 to 70 percent applied by private sources. The societies generally have not been an adequate and dependable source of credit to farmers for many reasons, including inadequate capitalization, slow service, collateral required, and low individual loan limits.

However, the last decade has seen an increase in the number and membership of credit societies and a marked rise in the credit advanced by them, especially in the past few years. These advances are estimated at the equivalent of about $250 million in 1958/59, compared to about $100 million in 1955/56. Even so, they probably amounted to only about 10 percent of the credit obtained by farmers.

The cooperative societies supply short- and medium-term credit. Cooperative land mortgage banks provide long-term loans. By the end of 1958 there were central land-mortgage banks in all States except Madhya Pradesh, and Jammu and Kashmir, while primary (local) land-mortgage banks numbered about 350 at the end of 1959. Advances made by these banks to individuals in 1958/59 amounted to about $12.5 million.

In addition to these sources, farmers in some States can obtain loans-in-kind from grain banks. The recently established Central and State Warehousing Corporations are also prepared to grant short-term credit to farmers on the basis of warehouse receipts.

Other Organizations

The two outstanding farmer-operator organizations in India are United Planters' Association of Southern India (UPASI) and the Farmers' Forum (Bharat Krishak Samaji). UPASI, founded in 1893 from 13 planter associations, acts as a channel of communications between the plantation community and the rest of the economy. Success of Indian plantation agriculture has been enhanced by the work of this organization. It is a small organization; in 1958 it had only 343 ordinary members with about 279,000 acres planted to various plantation crops.

The Farmers' Forum, patterned after U.S. general farm organizations, was formed in 1955 as an unofficial and nonpolitical organization, though Government sponsored and supported. The Forum itself sponsored the World Agricultural Fair held in New Delhi in 1959. A group of 20 farmers from the Forum are chosen each year to travel through the United States under the auspices of the U. S. Agency for International Development to study agricultural organizations.

In addition to these organizations, an unknown number of Young Farmer Clubs have been established in various States. These clubs are directed at the village level and have undertaken such projects as reclaiming and irrigating unused land.

MARKETING

Distribution

Over 22,000 periodic markets or bazaars (called hats or shandies) are held in rural areas on a semiweekly, weekly, or biweekly time schedule. Most markets for agricultural products are not equipped by modern standards to perform the necessary functions of a modern market.

The generally weak financial status of most farmers, poor transportation facilities, and inadequate storage space force the sale of crops immediately after harvest; thus markets are glutted and prices are low.

Until lately, various practices have prevailed in the markets that made prices received by farmers unreasonably low. Unlike in more developed countries, market prices are not generally known. The Government has taken action to remove malpractices in marketing processes and to ensure a more orderly and efficient marketing system. These include the establishment of regulated markets, enforced grading and standardization of important commodities, and provision of warehouse facilities. About 645 of India's 1,800 primary wholesale markets have been regulated and 1,000 more are scheduled for regulation.

Only a small part of total food production enters commercial channels. It is estimated that about one-third of the output of food grains is marketed; most of it is handled by private traders. The Government buys small quantities of locally grown rice and wheat in surplus areas and controls storage and distribution of all imported supplies of wheat and rice.

Except for a few metal silos, all publicly owned or operated grain storage facilities are godown (warehouse) sheds, widely dispersed throughout the country. Present storage facilities are inadequate for long-term storage of large volume reserve stocks. Grain storage capacity available to the Ministry of Food and Agriculture is estimated at 3 million tons. This will be expanded to 5 million tons bv 1965/66. Most new storage space will be the godown type that accommodates bagged grains. However, at port cities more bulk silo-type storage is being constructed.

Transportation

India has an extensive rail, highway, and waterway transportation system. The Indian rail network is the fourth largest in the world with 35,395 miles of routes. It is India's most important means of transportation. The country has a total of 144,000 miles of surfaced roads and 250,000 miles of unsurfaced road routes. The national highway system of about 15,000 miles connects major Indian cities. Internal waterway routes are over 5,000 miles in length. The major ones are the Ganges and Brahmaputra Rivers and their tributaries, the Godavari and the Krishna Rivers and their canals, the backwaters and canals of Kerala, the Buckingham Canal in Madras and Andhra Pradesh States, the west coast canals, and the Mahanadi canals in Orissa. (29)

Most agricultural produce is transported to urban markets by rail, although little provision is made for proper care of produce in transit. Railway freight is one of the largest costs in the marketing of farm produce, but until recently the interests of the farmer have been of little importance in the setting of freight rates.

There is a lack of highways connecting small villages with nearby railheads and the larger urban markets. Although main roads are usually hard surfaced, village roads are generally neglected and may become impassable in the rainy season. Some villages do not have suitable roads for the transport of agricultural produce. Produce is brought to rail stations on foot and by bicycle and oxcart. The latter is the dominant form of farm equipment for transporting goods. The inland water transportation system does not complement the railway and road systems. It is restricted to short distances in local areas, and only flat-bottom boats and barges find the rivers navigable.

FOOD CONSUMPTION

Caloric Availability (14)

The 1958 food balance shows the average per capita level of food available for consumption in terms of energy value was 2,050 calories per day. This average is lower than that for most other countries and is one of the lowest in Asia. This level of caloric availability, when compared with nutritional standards that represent the physiological needs for normal health and activity for the people living in South Asia, is deficient by 250 calories, 1 gram of animal protein, 2 grams of protein from pulses and other vegetable sources, and 4 grams of fat.

Diet Composition

Grains furnish two-thirds of the caloric value of the diet; rice alone supplies a third, and wheat, which is gaining in importance, over a tenth. Estimated per capita levels of food grain consumption, by kind, between 1947 and 1960 are provided in table 20. Because most Indians are not only poor but are vegetarians from religious conviction, average per capita consumption of animal protein foods--meat, fish, eggs, and milk--is quite low. In sharp contrast is the exceptionally large consumption of pulses, a rich source of vegetable protein. Sugar consumption has been increasing and now exceeds the average for the Far East, as does consumption of fats. Per capita supplies of fruits and vegetables, however, appear to be well below the Far East average.

Food Expenditures (3)

Food expenditures account for about three-fifths of per capita income in India, two-fifths in Japan, and one-fifth in the United States. The value of food consumed per person, per day, is $0.10 in India, $0.26 in Japan, and $1.07 in the United States. The pattern of food expenditures varies widely; the food group representing the largest share of food expenditures is grain products in India and Japan and meat in the United States.

Shifts in the level of consumption and in composition of the diet arise largely from changes in per capita income. Immediate changes in the Indian diet are expected to be small because a relatively low rate of economic growth combined with a high rate of population growth restricts gains in per capita income. Diets in the United States also appear to be changing rather slowly at present, but in Japan, where the economy is expanding at an unparalleled rate and the rate of population increase is quite low, impressive per capita income gains are producing a rapid rise in the intake of animal products and fruit, while the consumption of starchy foods appears to be declining.

Degree of Self-Sufficiency

Except for food grains, India is more or less self-sufficient in most foods. Net imports of wheat and rice for the years 1957 to 1959 provided a daily average of 80 calories per capita, or about 4 percent of the caloric value of the total food supply.

Table 20.--India: Estimated annual per capita consumption of food grains, 1947-60

Year 1/	Rice 2/	Wheat	Jowar	Bajra	Barley	Corn	Ragi	Small Millets	Gram	Tur	Other Pulses
	Pounds per capita										
1947 ...	144	40	36	13	16	16	9	12	22	3/	3/
1948 ...	139	39	41	17	17	16	9	14	25	3/	3/
1949 ...	137	42	34	15	14	14	9	11	25	10	18
1950 ...	137	49	39	18	14	14	9	11	21	10	20
1951 ...	116	43	34	15	14	10	8	10	21	9	17
1952 ...	122	56	36	14	13	12	7	14	18	10	17
1953 ...	127	52	40	16	15	15	7	12	22	9	17
1954 ...	149	48	42	22	15	16	9	13	25	10	19
1955 ...	136	48	47	17	15	15	8	13	29	9	18
1956 ...	139	46	34	17	14	13	9	10	27	9	19
1957 ...	144	56	36	14	14	15	8	10	31	10	16
1958 ...	126	56	39	17	11	15	8	8	23	7	16
1959 ...	144	62	41	18	12	16	9	10	32	8	20
1960 ...	134	61	36	17	12	17	9	9	25	7	19

1/ Indian agricultural year ending June.
2/ Milled basis.
3/ Data not available.

Source: National Council of Applied Economic Research (32).

The Third Five Year Plan calls for an increase in the energy value of the national diet to an average of 2,300 calories per person per day and at the same time calls for self-sufficiency in grain production (34). In view of the rapidly expanding population and difficulties associated with agricultural development, it is doubtful whether either of these goals can be realized by 1965/66.

NATIONAL AGRICULTURAL POLICY (10)

Since 1950, India's agricultural policy has been geared to national plans for rapid economic development, coupled with improvement in living levels and a greater degree of social justice. As these objectives do not always coincide, at least in the short-run, some balance among them has had to be struck. While attempting to reconcile the claims of economic and social justice with the requirements of production, the Government has thus far in the Five Year Plans given first priority to increasing output of food and fiber, as this has been considered essential for achieving the planned rate of growth of the economy as a whole.

With limited possibility for expanding the area used for agriculture, increases in farm output must come from increases in yields. The Government has attempted to promote production under programs of land reform, technological improvement, improved credit and marketing systems, and expanded agricultural research, education, and extension systems.

So far, only a limited price support program for agriculture has been adopted to stimulate farm output. The main reasons for the limited approach are administrative difficulties, financial outlays involved, and a lack of storage facilities. For the last several years, however, the Government has been applying its limited price support program in the following ways: (1) procuring food grains from producers at fixed prices, (2) setting floor and ceiling prices for important varieties of cotton, and (3) setting minimum prices for sugarcane purchased by mills. At the same time, the Government has also occasionally fixed maximum controlled prices for certain commodities to check undue price increases and facilitate procurement operations.

Direct production controls are confined to tea, coffee, and rubber. For these crops, commodity boards have the power to regulate acreage and production when necessary.

The Government does not use direct production subsidies. Now and then, however, the central and state governments take steps to insure an adequate supply of farm needs for the cultivator at reasonable prices. These needs have recently included low-interest production loans, supplies of chemical fertilizers and improved varieties of seeds at concessional prices, and other needed items. In the event crops fail due to natural calamities, collection of the production loans is suspended.

AGRICULTURAL TRADE POLICY (10)

As in the previous Five Year Plans, the Third Plan largely determines what merchandise and capital goods will be imported.

The principal problem confronting trade policy formulators is the protracted inability to balance the import-export trade. The persistent disparity between exports and imports is mainly responsible for India's adverse foreign exchange position. Therefore, efforts have been directed to stimulating exports when possible, although to restrict imports remains a key policy.

Over the decade 1950-60 the value of free world export trade about doubled but the Indian share in it declined from 2.0 percent in 1950 to 1.2 percent in 1960. Indian imports increased by 60 percent in 1960 over the 1950-54 average. For the same period, exports increased by only 5 percent (current prices).

Most imports and exports, except for those made on governmental account, are subject to licensing. Export control is exercised on most agricultural items. Quotas are established for imports and exports of certain items and for individual importers and exporters. Licenses are used, also to control the direction of trade.

Tariffs are a subsidiary control on imports and a source of revenue. The duty rate applied varies considerably from commodity to commodity. Nonessential items carry higher rates of duty. Rates on other items depend in large measure on the protective interests of specific industries or the economy in general.

Bilateral trade agreements are made to balance trade between India and the countries with which such contracts are negotiated. Generally, only essential commodities are imported under these agreements. Currently, bilateral trade agreements are in force between India and some 30 countries; several have rupee payment arrangements.

Since exports are being promoted in an effort to rectify the persistent trade deficit, export controls are progressively being relaxed. Under the Exports Control Order of October 10, 1962, most agricultural commodities were freed from export restrictions with the exception of some oilseeds, commercial crop seeds, and wheat and wheat products.

Export excise duties have been reduced or eliminated on several commodities in efforts to keep Indian prices competitive in world markets. Agricultural commodities currently subject to such duties are coffee, jute, rice, tea, cotton, and cotton waste. Export duties are an important source of revenue for the treasury.

The Government has formed export promotion councils for 13 commodities. These councils regularly conduct market research studies and publicity programs in foreign countries. The commodities of agricultural origin included in this program are cotton textiles, silk, cashews, tobacco, pepper, and other spices. In addition to these councils, the State Trading Corporation was established in 1956 to diversify and expand trade. The Export Risks Insurance Corporation was established in 1957 to provide coverage for risks not normally covered by established firms.

Recently the Government began subsidizing certain farm exports in order to maintain or increase foreign exchange earnings. Sugar exports have been subsidized to bridge the gap between higher Indian prices and world market prices.

In another export promotion program involving subsidies, licenses are issued for the import of raw material against exports of manufactured goods. Agricultural commodities included in this type of incentive arrangement are copra, cashew nuts, cotton, wool, and silk; they are linked with exports of vegetable oils, cashew kernels, cotton textiles, wool textiles, and silk textiles respectively.

India is a member of the General Agreement on Tariffs and Trade. As a member of the British Commonwealth, India grants and receives in return tariff preference from other member countries. Also, India is a member of international commodity agreements for tea, sugar, and coffee.

AGRICULTURAL TRADE

Agricultural Exports

In recent years two-fifths of total Indian exports have been agricultural. These exports do not include the large and important exports of manufactured products of agricultural origin (jute and cotton textiles).

Tea remains India's leading agricultural export commodity, accounting for nearly one-half of total agricultural exports by value (table 21). Shifts in the relative importance of some traditional agricultural exports from 1951 to 1961 reflect changes in domestic production and consumption. For example, Indian exports of cashew nuts, wool, feedstuffs, coffee, and sugar increased in value during the period. On the other hand, exports of cotton, vegetable oils, tobacco, spices, and hides and skins declined in value over the same period.

Agricultural Imports

In recent years over one-fifth of India's total imports have been agricultural. Wheat, cotton, and rice continue to be the major agricultural import commodities notwithstanding large domestic production of these crops. Burma has been the major supplier of rice while the United States has been the major supplier of wheat. Indian imports of cashew nuts, nonfat dry milk, and rubber have more or less steadily increased over the period (1951-61). Cashew nuts are imported in the shell and are shelled and reexported as cashew kernels. The rising trend in crude rubber imports reflects growing domestic demand for rubber above the quantity that can be produced domestically. Some tobacco has regularly been imported, mainly the superior varieties that are not available in sufficient quantity from local production. Nonfat dry milk imports have increased steadily over the period, mostly under the U.S. Food for Peace program. The value of these agricultural imports from 1951 to 1961 is provided in table 22.

Table 21.--India: Selected agricultural exports, by value, calendar years 1951-61

Commodity	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
	Million dollars										
Tea	201.4	169.5	216.4	274.5	238.1	299.5	259.1	286.7	265.4	252.1	262.0
Cashew nuts	20.5	25.5	25.0	21.5	24.5	31.7	30.9	32.6	31.9	38.6	39.0
Cotton	33.6	31.7	23.1	17.9	50.9	36.8	27.1	31.9	23.5	17.1	27.4
Vegetable oil 1/	54.8	48.1	17.8	14.9	70.0	37.3	19.7	13.3	28.2	21.4	8.8
Tobacco	31.8	28.8	23.6	20.7	25.8	25.0	24.3	30.9	27.1	30.7	31.1
Spices 2/	58.2	43.1	31.8	26.0	15.7	15.1	14.3	14.8	17.0	30 6	24.9
Wool	16.4	19.2	16.1	19.2	18.9	24.5	24.4	18.1	23.1	17.2	17.8
Feed stuffs	3/	3/	0.2	2.1	15.3	6.4	4.7	15.9	41.8	35.4	35.5
Hides and skins	20.9	12.3	12.4	14.3	14.1	15.9	13.9	14.7	22.0	21.2	16.2
Coffee	1.5	2.8	1.0	15.8	5.0	11.2	16.2	15.1	13.1	14.1	20.0
Sugar 4/	3/	8.3	1.6	0.1	1.9	2.0	26.6	7.1	4.8	3.2	32.9

1/ Peanut, sesame, mustard, castor, and linseed oil.
2/ Pepper, ginger, and cardamon.
3/ Less than $0.1 million.
4/ Excludes molasses.

Source: Richards, S. I. (38).

Table 22.--India: Selected agricultural imports by value, 1951-61

Commodity	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
	Million dollars										
Wheat	359.6	219.0	124.3	23.4	35.4	121.3	254.1	249.0	247.1	359.5	231.1
Cotton	238.0	245.5	104.7	120.7	112.4	112.5	101.9	62.3	72.9	167.3	145.4
Rice	97.0	114.5	35.4	87.8	34.6	43.8	91.8	39.9	27.4	82.5	48.3
Cashew nuts	4.1	9.1	12.4	6.5	6.6	12.0	15.5	15.7	12.7	17.0	19.6
Tobacco	4.5	4.0	1.6	1.9	3.1	1.8	2.7	2.9	2.9	.5	1.9
Nonfat dry milk	2.9	5.1	5.2	6.9	8.7	10.4	10.5	9.7	11.7	4.6	10.4
Rubber	9.6	2.9	.3	2.0	3.4	6.7	6.6	6.5	10.8	17.2	14.1

Source: Richards, S. I. (38).

Trade with the United States

The principal agricultural commodities the United States has supplied India in recent years have been wheat, cotton, tobacco, and nonfat dry milk (table 23). The major share of these exports has been under Public Law 480 programs. For example, of total agricultural exports to India in 1961, valued at $259.8 million, 83 percent or $215.8 million was under Public Law 480, including barter.

Between August 1956 and December 1962 the United States agreed to sell India over $2 billion worth of surplus agricultural commodities under Title I, Public Law 480 (12). The largest of these contracts was the 4-year agreement signed in May 1960 for approximately $1.3 billion worth of grains (about 17 million metric tons of wheat and rice).

Total U. S. agricultural exports to India for calendar year 1961 amounted to $260 million, of which wheat and cotton accounted for 80 percent. The level for 1961 is down 39 percent from 1960.

United States agricultural imports from India in 1961 were up 5 percent from 1960 for a total value of $84 million. Principal commodities imported in 1961 were cashew nuts and tea.

Total U. S. exports to India averaged $249 million annually for the 1958-60 period; three-fifths were agricultural commodities. U. S. imports from India for the same period averaged $208 million; one-third was agricultural. Total U.S. exports to India for 1961 were 12 percent above the 1958-60 average, and imports were one-fifth more.

Direction of Trade

Western Europe, the Western Hemisphere, and Asia accounted for over four-fifths of the Indian export trade in 1952, 1956, and 1960. However, exports to these regions declined from 89.4 percent of the total in 1952 to 80.6 percent in 1960. Most of this decline is accounted for by a rise in exports to Eastern Europe, mainly to Russia. The United Kingdom remained the principal Indian export market in Western Europe, and the United States was the leading market in the Western Hemisphere. Exports to Asia declined from 30.9 percent in 1952 to 20.2 percent in 1960, and for the same period there was a decline from 25.8 percent to 21.5 percent in exports to the Western Hemisphere. Indian exports to Africa rose while those to Oceania remained fairly constant.

Most Indian imports come from Western Europe, Asia, and the Western Hemisphere. These regions accounted for 92 percent in 1952 and 88.1 percent in 1960. Eastern Europe advanced from 0.4 percent to 3.7 percent of Indian imports for the same period. Imports from Africa, Asia, and Oceania remained more or less at about the same levels between 1952 and 1960. Imports from Western Europe rose from 31.1 percent in 1952 to 42.4 percent in 1960. Those from the Western Hemisphere declined from 39.0 percent to 26.0 percent for the same period (table 24).

Table 23.--United States: Agricultural trade with India, by commodities, 1957-61

Commodities	1957	1958	1959	1960	1961
	- - - - - - - - - - 1,000 dollars - - - - - - - - - -				
U.S. Exports to India:					
Wheat	177,271	142,550	171,559	270,262	148,298
Cotton, raw	36,878	11,366	15,121	88,274	60,151
Corn	8	3,376	6,061	5,130	6,479
Grain sorghum	0	3,343	470	3,160	0
Tobacco, unmfd.	2,731	2,923	1,937	488	1,912
Nonfat dry milk	3,834	2,333	3,832	1,060	2,393
Other dairy products	75	776	146	54	0
Wheat flour	103	41	89	130	0
Rice	20,361	0	0	46,524	25,756
Other agricultural	11,639	9,241	9,858	10,068	14,810
Total agricultural	252,900	175,949	209,073	425,250	259,799
Total P.L. 480 1/	(204,840)	(160,981)	(202,060)	(385,518)	(191,841)
Total exports	436,929	311,987	335,791	639,116	481,863
U.S. Imports from India:					
Cashew nuts	22,960	24,078	23,532	25,983	23,623
Tea	14,988	15,467	14,848	13,942	15,293
Hides and skins	4,112	4,843	6,614	5,884	5,211
Wool	6,140	4,511	7,165	3,638	2,878
Pepper	3,010	1,626	1,634	9,616	4,870
Opium	1,084	1,373	1,928	2,479	2,598
Bristles	1,860	1,362	1,401	2,233	1,711
Essential oils	1,895	919	1,396	2,409	2,215
Psyllium seed	1,182	704	743	765	928
Other spices	971	684	663	775	490
Walnuts	37	403	185	556	919
Crude bones	717	358	643	528	769
Castor oil	8,417	0	3,698	7,219	0
Other agricultural	3,593	3,671	4,344	3,749	22,899
Total agricultural	70,966	59,999	68,794	79,776	84,404
Total exports	204,588	184,505	209,213	229,971	254,814

1/ Excludes 3-way shipments under Title III of P.L. 480 barter, which totaled $24 million in 1961.

Source: Economic Research Service (9).

Table 24.--India: Direction of trade 1952, 1956, and 1960

Region and country	Exports			Imports		
	1952	1956	1960	1952	1956	1960
	- - - - - Percent - - - - -			- - - - - Percent - - - - -		
Western Europe ...	32.7	44.3	38.9	31.1	52.5	42.4
United Kingdom .	22.2	32.9	28.5	19.3	26.5	20.5
Asia	30.9	21.2	20.2	21.9	23.2	19.7
Japan	4.5	5.4	5.6	2.5	5.5	5.5
Pakistan	8.1	1.4	1.7	3.7	2.7	1.5
Western Hemisphere	25.8	20.8	21.5	39.0	13.0	26.0
United States ..	20.6	16.0	16.6	35.1	12.0	24.4
Africa	4.9	5.7	6.6	5.5	6.1	5.8
Egypt	1.1	2.0	2.3	2.6	2.0	1.7
Sudan	1.3	1.4	1.3	.4	1.6	1.0
Oceania	4.7	4.9	4.8	2.1	1.8	2.4
Australia	4.2	4.1	3.5	1.9	1.5	2.3
New Zealand	.5	.8	1.3	.2	.3	.1
Eastern Europe ...	1.0	3.1	8.0	.4	3.4	3.7
Soviet Bloc	.7	.9	3.1	.3	1.5	2.4
U.S S.R.	.3	2.2	4.9	.1	1.9	1.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Government of India (22).

Foreign Exchange Levels

During the First Five Year Plan period foreign exchange and gold balances exceeded $1.5 billion. Beginning with the Second Five Year Plan foreign exchange levels have steadily declined from the previous high levels (table 25).

Table 25.--India: Gold and foreign exchange balance, 1951-63 1/

Year or month	Amount 2/	Year or month	Amount 2/
	Million dollars		Million dollars
1951	1,945	1959	814
1952	1,796	1960	670
1953	1,862	1961	665
1954	1,867	1962	512
1955	1,866	1963:	
1956	1,435	March	620
1957	942	April	619
1958	722	May	643

1/ End of year and month shown.
2/ Includes a constant level of $247 million in gold as legal requirement for backing rupee currency.

Source: International Monetary Fund (19, 20).

The adverse foreign exchange situation that developed during the Second Plan was due partly to underestimation of the direct foreign exchange requirements of the Plan and partly to failure to take into account sufficiently the growing import needs of a developing economy. The sharp rise in the tempo of private investment in the early stages of the Plan also contributed to the difficulties, although this probably affected the timing of deficits rather than their total over the Plan period. However, since the emergence of the foreign exchange crisis a stringent import policy has been followed. A rigorous system of exchange allocations on a half-yearly basis has been adopted, and no significant new commitments have been made unless they are covered by external assistance.

Balance of Payments

In 1951/52, the first year of the First Plan, there was a balance-of-payments deficit of $491 million, but the situation improved substantially in subsequent years because of the increase in agricultural and industrial production. The deficit in the balance of payments over the First Plan period as a whole was $668 million; of this $412 million was financed by external assistance and $256 million by drawing on the foreign exchange reserves.

During the Second Five Year Plan period, 1956/57 through 1960/61, the net deficit on current account and net capital transactions was estimated at $4,325 million (table 26). This was financed by $2,952 million from external assistance, $117 million in net drawings from the International Monetary Fund, and $1,256 million from foreign exchange reserves.

The external accounts came under heavy pressure soon after the Second Plan began, and the foreign exchange resources declined by $1,010 million within 2 years. A reappraisal of the economic situation in 1958 led to the decision to scale down the plan and to concentrate on "core" projects. The total external assistance utilized for the Plan turned out to be more than 50 percent over the level that was originally envisaged. The drawing down of foreign exchange reserves amounted to $1,256 million; the Plan estimate was $420 million (34).

Table 26.--India: Balance of payments and financing, 1957/58 through 1960/61 1/

Item	1956/57	1957/58	1958/59	1959/60	1960/61 2/	Total 1956-61
	Million dollars					
Exports	1,333	1,247	1,210	1,308	1,312	6,410
Imports	2,308	2,589	2,163	1,938	2,257	11,255
Trade balance	-975	-1,342	-953	-630	-945	-4,845
Invisibles (net, excluding official donations)	233	214	170	149	115	881
Current account (net)	-742	-1,128	-783	-481	-829	-3,964
Capital transactions (net, excluding official donations)	-76	-48	-21	-122	-94	-361
Overall balance	-818	-1,176	-804	-603	-924	-4,325
Negative balance financed by:						
External assistance 3/	237	557	716	619	823	2,952
International Monetary Fund net drawings	117	73	...	-50	-23	117
Foreign exchange reserves	464	546	88	34	124	1,256
Total	818	1,176	804	603	924	4,325

1/ Fiscal years April-March.
2/ Preliminary subject to revision.
3/ Including P.L. 480 and 665 assistance from the United States.

Source: Third Five Year Plan (34).

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