

## AGRICULTURE

# 4



India is an agriculturally important country. Two-thirds of its population is engaged in agricultural activities. Agriculture is a primary activity, which produces most of the food that we consume. Besides food grains, it also produces raw material for various industries.

**Can you name some industries based on agricultural raw material?**

Moreover, some agricultural products like tea, coffee, spices, etc. are also exported.

### TYPES OF FARMING

Agriculture is an age-old economic activity in our country. Over these years, cultivation methods have changed significantly depending upon the characteristics of physical environment, technological know-how and socio-cultural practices. Farming varies from subsistence to commercial type. At present, in different parts of India, the following farming systems are practised.

#### Primitive Subsistence Farming

This type of farming is still practised in few pockets of India. Primitive subsistence agriculture is practised on small patches of land with the help of primitive tools like hoe, dao and digging sticks, and family/community labour. This type of farming depends upon monsoon, natural fertility of the soil and suitability of other environmental conditions to the crops grown.

It is a 'slash and burn' agriculture. Farmers clear a patch of land and produce cereals and other food crops to sustain their family. When the soil fertility decreases, the farmers shift and clear a fresh patch of land for cultivation. This type of shifting allows Nature to replenish the fertility of the soil

through natural processes; land productivity in this type of agriculture is low as the farmer does not use fertilisers or other modern inputs. It is known by different names in different parts of the country.

**Can you name some such types of farmings?**

It is *jhumming* in north-eastern states like Assam, Meghalaya, Mizoram and Nagaland; Pamlou in Manipur, Dipa in Bastar district of Chhattishgarh, and in Andaman and Nicobar Islands.

**Jhumming:** The 'slash and burn' agriculture is known as 'Milpa' in Mexico and Central America, 'Conuco' in Venezuela, 'Roca' in Brazil, 'Masole' in Central Africa, 'Ladang' in Indonesia, 'Ray' in Vietnam.

In India, this primitive form of cultivation is called 'Bewar' or 'Dahiya' in Madhya Pradesh, 'Podu' or 'Penda' in Andhra Pradesh, 'Pama Dabi' or 'Koman' or 'Bringa' in Odisha, 'Kumari' in Western Ghats, 'Valre' or 'Waltre' in South-eastern Rajasthan, 'Khil' in the Himalayan belt, 'Kuruwa' in Jharkhand, and 'Jhumming' in the North-eastern region.



Fig. 4.1

Rinjha lived with her family in a small village at the outskirts of Diphu in Assam. She enjoys watching her family members clearing, slashing and burning a patch of land for cultivation. She often helps them in irrigating the fields with water running through a bamboo canal from the nearby spring. She loves the surroundings and wants to stay here as long as she can, but this little girl has no idea about the declining fertility of the soil and her family's search for fresh a patch of land in the next season.

*Can you name the type of farming Rinjha's family is engaged in?*

*Can you enlist some crops which are grown in such farming?*

### **Intensive Subsistence Farming**

This type of farming is practised in areas of high population pressure on land. It is labour-intensive farming, where high doses of biochemical inputs and irrigation are used for obtaining higher production.

*Can you name some of the states of India where such farming is practised?*

Though the 'right of inheritance' leading to the division of land among successive generations has rendered land-holding size uneconomical, the farmers continue to take maximum output from the limited land in the absence of alternative source of livelihood. Thus, there is enormous pressure on agricultural land.

### **Commercial Farming**

The main characteristic of this type of farming is the use of higher doses of modern inputs, e.g. high yielding variety (HYV) seeds, chemical fertilisers, insecticides and pesticides in order to obtain higher productivity. The degree of commercialisation of agriculture varies from one region to another. For example, rice is a commercial crop in Haryana and Punjab, but in Odisha, it is a subsistence crop.

*Can you give some more examples of crops which may be commercial in one region and may provide subsistence in another region?*

Plantation is also a type of commercial farming. In this type of farming, a single crop is grown on a large area. The plantation has an interface of agriculture and industry. Plantations cover large tracts of land, using capital intensive inputs, with the help of migrant labourers. All the produce is used as raw material in respective industries.

In India, tea, coffee, rubber, sugarcane, banana, etc.. are important plantation crops. Tea in Assam and North Bengal coffee in



**Fig. 4.2:** Banana plantation in Southern part of India



**Fig. 4.3:** Bamboo plantation in North-east

Karnataka are some of the important plantation crops grown in these states. Since the production is mainly for market, a well-developed network of transport and communication connecting the plantation areas, processing industries and markets plays an important role in the development of plantations.



## CROPPING PATTERN

You have studied the physical diversities and plurality of cultures in India. These are also reflected in agricultural practices and cropping patterns in the country. Various types of food and fibre crops, vegetables and fruits, spices and condiments, etc. constitute some of the important crops grown in the country. India has three cropping seasons — **rabi**, **kharif** and **zaid**.

Rabi crops are sown in winter from October to December and harvested in summer from April to June. Some of the important rabi crops are wheat, barley, peas, gram and mustard. Though, these crops are grown in large parts of India, states from the north and north-western parts such as Punjab, Haryana, Himachal Pradesh, Jammu and Kashmir, Uttarakhand and Uttar Pradesh are important for the production of wheat and other rabi crops. Availability of precipitation during winter months due to the western temperate cyclones helps in the success of these crops. However, the success of the green revolution in Punjab, Haryana, western Uttar Pradesh and parts of Rajasthan has also been an important factor in the growth of the above-mentioned rabi crops.

Kharif crops are grown with the onset of monsoon in different parts of the country and these are harvested in September-October. Important crops grown during this season are paddy, maize, jowar, bajra, tur (arhar), moong, urad, cotton, jute, groundnut and soyabean. Some of the most important rice-growing regions are Assam, West Bengal, coastal regions of Odisha, Andhra Pradesh, Telangana, Tamil Nadu, Kerala and Maharashtra, particularly the (Konkan coast) along with Uttar Pradesh and Bihar. Recently, paddy has also become an important crop of Punjab and Haryana. In states like Assam, West Bengal and Odisha, three crops of paddy are grown in a year. These are *Aus*, *Aman* and *Boro*.

In between the rabi and the kharif seasons, there is a short season during the summer months known as the **Zaid** season. Some of the crops produced during 'zaid' are watermelon, muskmelon, cucumber,

vegetables and fodder crops. Sugarcane takes almost a year to grow.

## Major Crops

A variety of food and non food crops are grown in different parts of the country depending upon the variations in soil, climate and cultivation practices. Major crops grown in India are rice, wheat, millets, pulses, tea, coffee, sugarcane, oil seeds, cotton and jute, etc.

**Rice:** It is the staple food crop of a majority of the people in India. Our country is the second largest producer of rice in the world after China. It is a kharif crop which requires high temperature, (above 25°C) and high humidity with annual rainfall above 100 cm. In the areas of less rainfall, it grows with the help of irrigation.

Rice is grown in the plains of north and north-eastern India, coastal areas and the deltaic regions. Development of dense network



Fig. 4.4 (a): Rice Cultivation



Fig. 4.4 (b): Rice is ready to be harvested in the field





**India: Distribution of Rice**



of canal irrigation and tubewells have made it possible to grow rice in areas of less rainfall such as Punjab, Haryana and western Uttar Pradesh and parts of Rajasthan.

**Wheat:** This is the second most important cereal crop. It is the main food crop, in north and north-western part of the country. This rabi crop requires a cool growing season and a bright sunshine at the time of ripening. It requires 50 to 75 cm of annual rainfall evenly-distributed over the growing season. There are two important wheat-growing zones in the country – the Ganga-Satluj plains in the north-west and black soil region of the Deccan. The major wheat-producing states are Punjab, Haryana, Uttar Pradesh, Bihar, Rajasthan and parts of Madhya Pradesh.



*Fig. 4.5: Wheat Cultivation*

**Millets:** Jowar, bajra and ragi are the important millets grown in India. Though, these are known as coarse grains, they have very high nutritional value. For example, ragi is very rich in iron, calcium, other micro nutrients and roughage. Jowar is the third most important food crop with respect to area and production. It is a rain-fed crop mostly grown in the moist areas which hardly needs irrigation. Major Jowar producing States were Maharashtra, Karnataka, Andhra Pradesh and Madhya Pradesh in 2011-12.

Bajra grows well on sandy soils and shallow black soil. Major Bajra producing States were: Rajasthan, Uttar Pradesh, Maharashtra, Gujarat and Haryana in 2011-12. Ragi is a



*Fig. 4.6: Bajra Cultivation*

crop of dry regions and grows well on red, black, sandy, loamy and shallow black soils. Major ragi producing states are: Karnataka, Tamil Nadu, Himachal Pradesh, Uttarakhand, Sikkim, Jharkhand and Arunachal Pradesh.

**Maize:** It is a crop which is used both as food and fodder. It is a kharif crop which requires temperature between 21°C to 27°C and grows well in old alluvial soil. In some states like Bihar

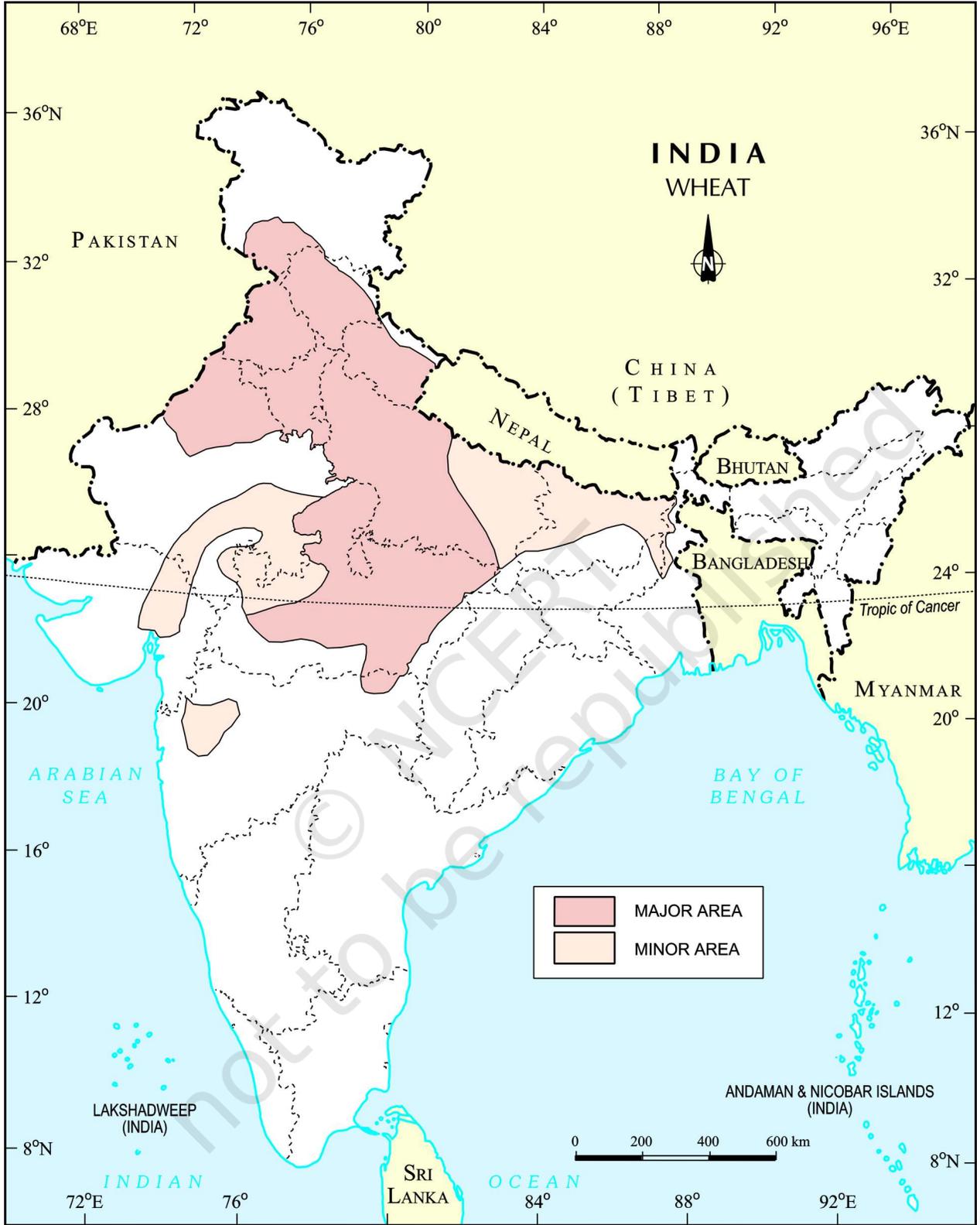


*Fig. 4.7: Maize Cultivation*

maize is grown in rabi season also. Use of modern inputs such as HYV seeds, fertilisers and irrigation have contributed to the increasing production of maize. Major maize-producing states are Karnataka, Uttar Pradesh, Bihar, Andhra Pradesh, Telangana and Madhya Pradesh.

**Pulses:** India is the largest producer as well as the consumer of pulses in the world. These are the major source of protein in a vegetarian diet. Major pulses that are grown in India are tur (arhar), urad, moong, masur, peas and





*India: Distribution of Wheat*



gram. Can you distinguish which of these pulses are grown in the kharif season and which are grown in the rabi season? Pulses need less moisture and survive even in dry conditions. Being leguminous crops, all these crops except arhar help in restoring soil fertility by fixing nitrogen from the air. Therefore, these are mostly grown in rotation with other crops. Major pulse producing states in India are Madhya Pradesh, Uttar Pradesh, Rajasthan, Maharashtra and Karnataka.

### Food Crops other than Grains

**Sugarcane:** It is a tropical as well as a subtropical crop. It grows well in hot and humid climate with a temperature of 21°C to 27°C and an annual rainfall between 75cm. and 100cm. Irrigation is required in the regions of low rainfall. It can be grown on a variety of



**Fig. 4.8:** Sugarcane Cultivation

soils and needs manual labour from sowing to harvesting. India is the second largest producer of sugarcane only after Brazil. It is the main source of sugar, gur (jaggary), khandsari and molasses. The major sugarcane-producing

states are Uttar Pradesh, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Telangana, Bihar, Punjab and Haryana.

**Oil Seeds:** In 2008 India was the second largest producer of groundnut in the world after china. In rape seed production India was third largest producer in the world after Canada and China in 2008. Different oil seeds are grown covering approximately 12 per cent of the total cropped area of the country. Main oil-seeds produced in India are groundnut, mustard, coconut, sesamum (til), soyabean, castor seeds, cotton seeds, linseed and sunflower. Most of these are edible and used as cooking mediums. However, some of these are also used as raw material in the production of soap, cosmetics and ointments.

Groundnut is a kharif crop and accounts for about half of the major oilseeds produced in the country. Gujarat was the largest producer of groundnut followed by Andhra Pradesh and Tamil Nadu in 2011-12. Linseed and mustard are rabi crops. Sesamum is a kharif crop in north and rabi crop in south India. Castor seed is grown both as rabi and kharif crop.

**Tea:** Tea cultivation is an example of plantation agriculture. It is also an important beverage crop introduced in India initially by the British. Today, most of the tea plantations are owned by Indians. The tea plant grows well in tropical and sub-tropical climates endowed with deep and fertile well-drained soil, rich in humus and organic matter. Tea bushes require warm and moist frost-free climate all through the year. Frequent showers evenly distributed over the year ensure continuous growth of tender leaves. Tea is a labour-intensive industry. It requires abundant,



**Fig. 4.9:** Groundnut, sunflower and mustard are ready to be harvested in the field



cheap and skilled labour. Tea is processed within the tea garden to restore its freshness. Major tea-producing states are Assam, hills of Darjeeling and Jalpaiguri districts, West Bengal, Tamil Nadu and Kerala. Apart from these, Himachal Pradesh, Uttarakhand, Meghalaya, Andhra Pradesh and Tripura are also tea-producing states in the country. In 2008 India was the third largest producer of tea after China and Turkey.

**Coffee:** In 2008 India produced 3.2 per cent of the world coffee production. Indian coffee is known in the world for its good quality. The Arabica variety initially brought from Yemen is produced in the country. This variety is in great demand all over the world. Initially its cultivation was introduced on the Baba Budan Hills and even today its cultivation is confined to the Nilgiri in Karnataka, Kerala and Tamil Nadu.



**Fig. 4.10:** Tea Cultivation



**Fig. 4.11:** Tea-leaves Harvesting

tropical as well as temperate fruits. Mangoes of Maharashtra, Andhra Pradesh, Telangana, Uttar Pradesh and West Bengal, oranges of Nagpur and Cherrapunjee (Meghalaya), bananas of Kerala, Mizoram, Maharashtra and Tamil Nadu, lichi and guava of Uttar Pradesh and Bihar, pineapples of Meghalaya, grapes of Andhra Pradesh, Telangana and Maharashtra, apples, pears, apricots and walnuts of Jammu and Kashmir and Himachal Pradesh are in great demand the world over.



**Fig. 4.12:** Apricots, apple and pomegranate

**Horticulture Crops:** In 2008 India was the second largest producer of fruits and vegetables in the world after China. India is a producer of

India produces about 13 per cent of the world's vegetables. It is an important producer of pea, cauliflower, onion, cabbage, tomato, brinjal and potato.



**Fig. 4.13:** Cultivation of vegetables – peas, cauliflower, tomato and brinjal



## Non-Food Crops

**Rubber:** It is an equatorial crop, but under special conditions, it is also grown in tropical and sub-tropical areas. It requires moist and humid climate with rainfall of more than 200 cm. and temperature above 25°C.

Rubber is an important industrial raw material. It is mainly grown in Kerala, Tamil Nadu, Karnataka and Andaman and Nicobar islands and Garo hills of Meghalaya. In 2010-11 India ranked fourth among the world's natural rubber producers.

### Activity

List the items which are made of rubber and are used by us.

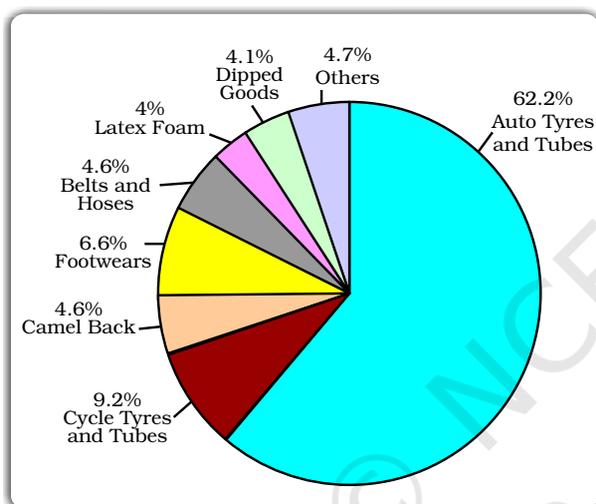


Fig. 4.14: Consumption of natural rubber - 2010-11

Source : Statistics and Planning Department Rubber Board, Kottayam, Kerala

**Fibre Crops:** Cotton, jute, hemp and natural silk are the four major fibre crops grown in India. The first three are derived from the crops grown in the soil, the latter is obtained from cocoons of the silkworms fed on green leaves specially mulberry. Rearing of silk worms for the production of silk fibre is known as **sericulture**.

**Cotton:** India is believed to be the original home of the cotton plant. Cotton is one of the main raw materials for cotton textile industry. In 2008 India was second largest producer of cotton after China. Cotton grows well in drier parts of the black cotton soil of the Deccan



Fig. 4.15: Cotton Cultivation

plateau. It requires high temperature, light rainfall or irrigation, 210 frost-free days and bright sun-shine for its growth. It is a kharif crop and requires 6 to 8 months to mature. Major cotton-producing states are—Maharashtra, Gujarat, Madhya Pradesh, Karnataka, Andhra Pradesh, Telangana, Tamil Nadu, Punjab, Haryana and Uttar Pradesh.

**Jute:** It is known as the golden fibre. Jute grows well on well-drained fertile soils in the flood plains where soils are renewed every year. High temperature is required during the time of growth. West Bengal, Bihar, Assam, Odisha and Meghalaya are the major jute producing states. It is used in making gunny bags, mats, ropes, yarn, carpets and other artefacts. Due to its high cost, it is losing market to synthetic fibres and packing materials, particularly the nylon.

### Technological and Institutional Reforms

It was mentioned in the previous pages that agriculture has been practised in India for thousands of years. Sustained uses of land without compatible techno-institutional changes have hindered the pace of agricultural development. In spite of development of sources of irrigation most of the farmers in large parts of the country still depend upon monsoon and natural fertility in order to carry on their agriculture. For a growing population, this poses a serious challenge. Agriculture which provides livelihood for more than 60 per cent of its population, needs some serious technical and





**Fig. 4.16:** Modern technological equipments used in agriculture

institutional reforms. Thus, collectivisation, consolidation of holdings, cooperation and abolition of zamindari, etc. were given priority to bring about institutional reforms in the country after Independence. 'Land reform' was the main focus of our First Five Year Plan. The right of inheritance had already led to fragmentation of land holdings necessitating consolidation of holdings.

The laws of land reforms were enacted but the laws of implementation was lacking or lukewarm. The Government of India embarked upon introducing agricultural reforms to improve Indian agriculture in the 1960s and 1970s. The Green Revolution based on the use of package technology and the White Revolution (Operation Flood) were some of the strategies initiated to improve the lot of Indian agriculture. But, this too led to the concentration of development in few selected areas. Therefore, in the 1980s and 1990s, a comprehensive land development programme was initiated, which included both institutional and technical reforms. Provision for crop insurance against drought, flood, cyclone, fire and disease, establishment of Grameen banks, cooperative societies and banks for providing loan facilities to the farmers at lower rates of interest were some important steps in this direction.

Kissan Credit Card (KCC), Personal Accident Insurance Scheme (PAIS) are some other schemes introduced by the Government of India for the benefit of the farmers. Moreover, special weather bulletins and agricultural

programmes for farmers were introduced on the radio and television. The government also announces minimum support price, remunerative and procurement prices for important crops to check the exploitation of farmers by speculators and middlemen.

### Bhoodan – Gramdan

Mahatma Gandhi declared Vinoba Bhave as his spiritual heir. He also participated in Satyagraha as one of the foremost satyagrahis. He was one of the votaries of Gandhi's concept of **gram swarajya**. After Gandhiji's martyrdom, Vinoba Bhave undertook **padyatra** to spread Gandhiji's message covered almost the entire country. Once, when he was delivering a lecture at Pochampalli in Andhra Pradesh, some poor landless villagers demanded some land for their economic well-being. Vinoba Bhave could not promise it to them immediately but assured them to talk to the Government of India regarding provision of land for them if they undertook cooperative farming. Suddenly, Shri Ram Chandra Reddy stood up and offered 80 acres of land to be distributed among 80 land-less villagers. This act was known as 'Bhoodan'. Later he travelled and introduced his ideas widely all over India. Some zamindars, owners of many villages offered to distribute some villages among the landless. It was known as **Gramdan**. However, many land-owners chose to provide some part of their land to



the poor farmers due to the fear of land ceiling act. This Bhoodan-Gramdan movement initiated by Vinoba Bhave is also known as the **Blood-less Revolution**.

### Contribution of agriculture to the national economy, employment and output

Agriculture has been the backbone of the Indian economy though its share in the Gross Domestic Product (GDP) has registered a declining trend from 1951 onwards; in 2010-11 about 52 per cent of the total work force was employed by the farm sector which makes more than half of the Indian Population dependent on agriculture for sustenance.

The declining share of agriculture in the GDP is a matter of serious concern because any decline and stagnation in agriculture will lead to a decline in other spheres of the economy having wider implications for society.

Considering the importance of agriculture in India, the Government of India made concerted efforts to modernise agriculture. Establishment of Indian Council of Agricultural Research (ICAR), agricultural universities, veterinary services and animal breeding centres, horticulture development, research and development in the field of meteorology and weather forecast, etc. were given priority for improving Indian agriculture. Apart from this, improving the rural infrastructure was also considered essential for the same.

#### Activity

Find out why an Indian farmer does not want his son to become a farmer.

From the Table 4.1, it is clear that though the GDP growth rate is increasing over the years, it is not generating sufficient employment opportunities in the country. The growth rate in agriculture is decelerating which is an alarming situation. Today, Indian farmers are facing a big challenge from international competition and our government is going ahead with reduction in the public investment in agriculture sector particularly in irrigation, power, rural roads, market and

**Table 4.1: India: Growth of GDP and major sectors (in %)**

Sector	Tenth Five	11 <sup>th</sup> Five	2012-17	
	Year Plan (2002-07)	Year Plan (2007-12)	Target I	Target II
Agriculture	1.7	3.2	4.0	4.2
Industries	8.3	7.4	9.6	10.9
Services	9.0	10.0	10.0	10.0
GDP	7.2	8.2	9.0	9.5

**Source:** *Faster, Sustainable and more Inclusive: An approach to the 12th Five Year Plan, Planning Commission, Government of India-2011.*

mechanisation. Subsidy on fertilisers is decreased leading to increase in the cost of production. Moreover, reduction in import duties on agricultural products have proved detrimental to agriculture in the country. Farmers are withdrawing their investment from agriculture causing a downfall in the employment in agriculture.

When farmers have been facing so many problems and land under agriculture is decreasing, can we think of alternative employment opportunities in the agriculture sector?

**Why are farmers committing suicides in several states of the country?**

### FOOD SECURITY

You know that food is a basic need and every citizen of the country should have access to food which provides minimum nutritional level. If any segment of our population does not have this access, that segment suffers from lack of food security. The number of people who do not have food security is disproportionately large in some regions of our country, particularly in economically less developed states with higher incidence of poverty. The remote areas of the country are more prone to natural disasters and uncertain food supply. In order to ensure availability of food to all sections of society our government carefully designed a national food security system. It consists of two components (a) buffer stock and (b) public distribution system (PDS).



As you know, PDS is a programme which provides food grains and other essential commodities at subsidised prices in rural and urban areas.

India's food security policy has a primary objective to ensure availability of foodgrains to the common people at an affordable price. It has enabled the poor to have access to food. The focus of the policy is on growth in agriculture production and on fixing the support price for procurement of wheat and rice, to maintain their stocks. Food Corporation of India (FCI) is responsible for procuring and stocking foodgrains, whereas distribution is ensured by public distribution system (PDS).

The FCI procures foodgrains from the farmers at the government announced minimum support price (MSP). The government used to provide subsidies on agriculture inputs such as fertilizers, power and water. These subsidies have now reached unsustainable levels and have also led to large scale inefficiencies in the use of these scarce inputs. Excessive and imprudent use of fertilizers and water has led to waterlogging, salinity and depletion of essential micronutrients in the soil. The high MSP, subsidies in input and committed FCI purchases have distorted the cropping pattern. Wheat and paddy crops are being grown more for the MSP they get. Punjab and Haryana are foremost examples. This has also created a serious imbalance in inter-crop parities.

You already know that the consumers are divided into two categories : below poverty line (BPL) and above poverty line (APL), with the issue price being different for each category. However, this categorisation is not perfect and a number of deserving poor have been excluded from the BPL category. Moreover, some of the so called APL slip back to BPL, because of the failure of even one crop and it is administratively difficult to accommodate such shifts.

Each district and block can be made self sufficient in foodgrain production if government provides proper agricultural infrastructure, credit linkages and also encourages the use of latest techniques. Instead of concentrating only on rice or wheat, the food crop with a better

growth potential in that particular area must be encouraged. Creation of necessary infrastructure like irrigation facilities, availability of electricity etc. may also attract private investments in agriculture.

The focus on increasing foodgrain production which should be on a sustainable basis and also free trade in grains will create massive employment and reduce poverty in rural areas.

There has been a gradual shift from cultivation of food crops to cultivation of fruits, vegetables, oil-seeds and industrial crops. This has led to the reduction in net sown area under cereals and pulses. With the growing population of India, the declining food production puts a big question mark over the country's future food security. The competition for land between non-agricultural uses such as housing etc. and agriculture has resulted in reduction in the net sown area. The productivity of land has started showing a declining trend. Fertilisers, pesticides and insecticides, which once showed dramatic results, are now being held responsible for degrading the soils. Periodic scarcity of water has led to reduction in area under irrigation. Inefficient water management has led to water logging and salinity.

#### Activity

Draw bar diagram showing the trend of food grain production in India during last five years. Find out the reason of this trend.

**Table 4.2: India: Foodgrains production**

(million tonnes)

Cereals	2006-07	2007-08	2008-09	2009-10	2010-11 (Provisional)
Rice	93.4	96.7	99.2	89.10	95.3
Wheat	75.8	78.6	80.7	80.80	85.9
Coarse grains (Jowar & Bajra)	18.0	17.4	16.3	16.6	16.5
Pulses	14.2	14.8	14.6	14.70	18.1
<b>Total</b>	<b>201.4</b>	<b>207.5</b>	<b>210.8</b>	<b>201.2</b>	<b>215.8</b>

**Source:** Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Economic Survey, 2011-12.





quality cotton from India. You have read about the Champaran movement which started in 1917 in Bihar. This was started because farmers of that region were forced to grow indigo on their land because it was necessary for the textile industries which were located in Britain. They were unable to grow foodgrains to sustain their families.

Under globalisation, particularly after 1990, the farmers in India have been exposed to new challenges. Despite being an important producer of rice, cotton, rubber, tea, coffee, jute and spices our agricultural products are not able to compete with the developed countries because of the highly subsidised agriculture in those countries.



**Fig. 4.17:** Tissue culture of teak clones

Today, Indian agriculture finds itself at the crossroads. To make agriculture successful and profitable, proper thrust should be given to the improvement of the condition of marginal and small farmers. The green revolution promised much. But today it's under controversies. It is being alleged that it has caused land degradation due to overuse of chemicals, drying aquifers and vanishing biodiversity. The keyword today is "gene revolution". Which includes genetic engineering.

● Genetic engineering is recognised as a powerful supplement in inventing new hybrid varieties of seeds.

Change in cropping pattern for example from cereals to high-value crops will mean that India will have to import food. During 1960's this would have been seen as a disaster. But if India imports cereals while exporting high-value commodities, it will be following successful economies like Italy, Israel and Chile. These countries exports farm products (fruits, olives, speciality seeds and wine) and import cereals. Are we ready to take this risk? Debate the issue.

**Can you name any gene modified seed used vastly in India?**



**Fig. 4.18:** Problems associated with heavy pesticide use are widely recognised in developed and developing countries

Infact organic farming is much in vogue today because it is practised without factory made chemicals such as fertilisers and pesticides. Hence, it does not affect environment in a negative manner.

A few economists think that Indian farmers have a bleak future if they continue growing foodgrains on the holdings that grow smaller and smaller as the population rises. India's rural population is about 600 million which depends upon 250 million (approximate) hectares of agricultural land, an average of less than half a hectare per person.

Indian farmers should diversify their cropping pattern from cereals to high-value crops. This will increase incomes and reduce environmental degradation simultaneously. Because fruits, medicinal herbs, flowers, vegetables, bio-diesel crops like jatropha and jojoba need much less irrigation than rice or sugarcane. India's diverse climate can be harnessed to grow a wide range of high-value crops.



## 1. Multiple choice questions.

- (i) Which one of the following describes a system of agriculture where a single crop is grown on a large area?
- (a) Shifting Agriculture  
(b) Plantation Agriculture  
(c) Horticulture  
(d) Intensive Agriculture
- (ii) Which one of the following is a rabi crop?
- (a) Rice (c) Millets  
(b) Gram (d) Cotton
- (iii) Which one of the following is a leguminous crop?
- (a) Pulses (c) Millets  
(b) Jawar (d) Sesamum
- (iv) Which one of the following is announced by the government in support of a crop?
- (a) Maximum support price  
(b) Minimum support price  
(c) Moderate support price  
(d) Influential support price

## 2. Answer the following questions in 30 words.

- (i) Name one important beverage crop and specify the geographical conditions required for its growth.
- (ii) Name one staple crop of India and the regions where it is produced.
- (iii) Enlist the various institutional reform programmes introduced by the government in the interest of farmers.
- (iv) The land under cultivation has got reduced day by day. Can you imagine its consequences?

## 3. Answer the following questions in about 120 words.

- (i) Suggest the initiative taken by the government to ensure the increase in agricultural production.
- (ii) Describe the impact of globalisation on Indian agriculture.
- (iii) Describe the geographical conditions required for the growth of rice.

**PROJECT WORK**

- Group discussion on the necessity of literacy among farmers.
- On an outline map of India show wheat producing areas.



## ACTIVITY

Solve the puzzle by following your search horizontally and vertically to find the hidden answers.

A	Z	M	X	N	C	B	V	N	X	A	H	D	Q
S	D	E	W	S	R	J	D	Q	J	Z	V	R	E
D	K	H	A	R	I	F	G	W	F	M	R	F	W
F	N	L	R	G	C	H	H	R	S	B	S	V	T
G	B	C	W	H	E	A	T	Y	A	C	H	B	R
H	R	T	K	A	S	S	E	P	H	X	A	N	W
J	I	E	S	J	O	W	A	R	J	Z	H	D	T
K	C	L	A	E	G	A	C	O	F	F	E	E	Y
L	T	E	F	Y	M	T	A	T	S	S	R	G	I
P	D	E	J	O	U	Y	V	E	J	G	F	A	U
O	U	M	H	Q	S	U	D	I	T	S	W	S	P
U	O	A	C	O	T	T	O	N	E	A	H	F	O
Y	O	L	F	L	U	S	R	Q	Q	D	T	W	I
T	M	U	A	H	R	G	Y	K	T	R	A	B	F
E	A	K	D	G	D	Q	H	S	U	O	I	W	H
W	Q	Z	C	X	V	B	N	M	K	J	A	S	L

1. The two staple food crops of India.
2. This is the summer cropping season of India.
3. Pulses like arhar, moong, gram, urad contain...
4. It is a coarse grain.
5. The two important beverages in India are...
6. One of the four major fibers grown on black soils.

