**22**

LAND USE AND AGRICULTURE

In the previous lessons, we studied climate, soils, various types of resources and human activities. In this chapter, we will study agriculture. For agriculture, land is a very important resource. For its large area size, and physical and socio-cultural diversities, India has different types of landuses. Agriculture is predominant economic activity in India, engaging nearly three-fifths of its working population. Though the share of agricultural sector in gross domestic product has considerably declined to about one-fourth yet the importance of agriculture as employment provider to workforce especially in the countryside is very high. Obviously, agriculture forms the hub of Indian economy as a large number of industries are also heavily dependent on agriculture for supply of raw materials. Agriculture involves not only crops raising but also animal ranching and fishing.

**OBJECTIVES**

After studying this lesson, you will be able to:

- know the availability of land in India and its different uses;
- appreciate the significance of studying land use and agriculture;
- examine various factors responsible for the development of agriculture in India;
- describe the different types of crops grown in various parts of India;
- locate and identify the areas under different crops on a map of India;
- infer changing pattern of crop cultivation;
- explain the concept and significance of Agro-climatic Regions;
- identify the different strategies adopted for the agricultural development in India, during five year plans and
- explain the impact of economic liberalisation on agriculture in India.



Notes

22.1 GENERAL LAND USE

Land is the most vital resource of a country. It is a fixed asset and cannot be expanded to meet the needs of an increasing population. Therefore, it must be used carefully and in the best possible manner. The total geographical area of India is 32.88 lakh sq. kms. The major landuses in India are:

Net Sown Area (NSA)

The total land area on which crops are grown in a region is called **net sown area**. The net sown area and the area sown more than once together are called **gross cultivated area**. In India, about 47 per cent of total **reporting area** is under the net sown area.

States namely Punjab, Haryana, West Bengal, Uttar Pradesh, have the high proportional share of NSA than the national average. Against this, the share of NSA is less than one half of the national average in states of Himachal Pradesh, Uttarakhand, Meghalaya, Manipur, Nagaland, Mizoram, Sikkim and Arunachal Pradesh. All these states suffer from physical disabilities such as undulating terrain due to hilly topography, limiting the availability of plain land and fertile soils, important for cultivation. This is evidently clear from state wise distribution of proportional share of NSA that physiographic factors play an important role in availability of net cropped area in a region.

Forest

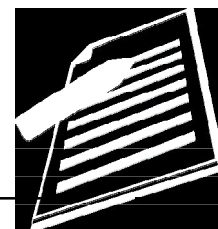
The area under forest cover is about 68 million hectares or 22 per cent of the total area in the country. This area has increased from 40 million hectares in 1951 to 68 million hectares in 2000. For the ecological balance the forest cover should be at least 33 per cent of the total geographical area of a country. The states of Arunachal Pradesh, Mizoram, Jammu & Kashmir and Tripura have relatively larger proportion of area under forest cover.

Land Not Available for Cultivation

The land under the settlements, roads, mines and quarries along with barren lands are included in this category. The sandy waste land of Rajasthan, marshy land of Kutchh (Gujarat) and rugged and eroded areas of northeast and northern mountains are few examples of barren lands. About 13 per cent of the total reported area is recorded under this category. Nagaland, Manipur and Assam registered a very high percentage of area not available for cultivations.

Fallow Lands

When lands are left unused to regain their lost fertility in a natural way is called fallow land. On the basis of usability criteria fallow lands can be divided into two groups current and old. Current fallow is the land in which no crop is raised during the current year. Old fallow land remain unused for a period of one or more years



but not exceeding 5 years. This is due to low investment capacity of numerous small and marginal farmers in advanced technology, lack of awareness, loss of fertility of soil, inadequacy of rainfall, lacking in irrigational facility etc. The fallow land occupy about 7.5 per cent of the total reported area. The states of Mizoram, Tamil Nadu, Meghalaya, Bihar, Andhra Pradesh and Rajasthan have a high percentage of area under fallow land. It is to be noted here that old fallow land may not be economically important but from ecological point of view fallow land is important category of land.

Cultivable Waste

It is the land in which crops were raised for some period of time but has not been cultivated for the last five years due to certain deficiencies such as alkalinity and salinity in the soils. Such cultivable waste are locally known as *reh*, *bhur*, *usar*, and *khola* in the some part of North India. Maghalaya, Himachal Pradesh and Rajasthan have a very high share of cultivable waste land in total land use in respective states.

Permanent Pastures and Grazing Lands

Not withstanding the highest live stock population in the world, India has only less than 4 per cent of the country under pastures and grazing lands. The states of Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Gujarat and Rajasthan have high above 5% of area under this category.

The area under different landuses are given below (Table 22.1)

Table 22.1: Land Utilization in India

| Landuses | Area (in lakhs hectare) | In percentage |
|--|-------------------------|---------------|
| 1. Area under non-agricultural uses | 212 | 6.95 |
| 2. Barren and uncultivable land | 197 | 6.46 |
| 3. Net area sown | 1442 | 46.64 |
| 4. Forest lands | 679 | 22.27 |
| 5. Miscellaneous tree crops and groves | 37 | 1.21 |
| 6. Cultivable waste lands | 150 | 4.92 |
| 7. Current fallows | 138 | 4.53 |
| 8. Old fallows | 96 | 3.15 |
| 9. Permanent pastures and grazing land | 118 | 3.87 |
| Total | 3049* | 100 |

* Total geographical area of which land utilization data is available.

**Notes****22.2 AGRICULTURAL LAND USE**

The net sown area, current fallows and land under tree crops and groves are included in agricultural land use. The agricultural land in India is little more than 50 per cent of the total geographical area in the country. This is the highest share of land in any country in the world. But due to large size of population in India, per capita arable land is available only 0.17 hectares, which is lower than the world average (0.24 hec). The per capita agricultural land in some select countries is much higher than India. In Australia it is 2.8 hec., in Canada 1.35 and in Brazil 0.33 hec. The lower per capita availability of land is an indicator of high pressure of population on land resources. Since there is little scope for increasing land under the plough, the way out to feed the growing population can be found in increasing land productivity. Over the period, area sown more than once has been increasing which is about 15 per cent. If the same piece of land is sown more than once in a year, it is called cropping intensity. Which stands for the ratio between gross cropped area and net sown area. The use of new technology, fertilizers, good quality of seeds and irrigation facilities are necessary for increasing intensity of cropping. The so called Green Revolution is also nothing but technological package, which include HYV seeds, chemical fertilizers and artificial irrigation. After the adoption of Green Revolution by India in 1966 onwards agricultural, land use has undergone a significant change.

22.3 TYPES OF FARMING

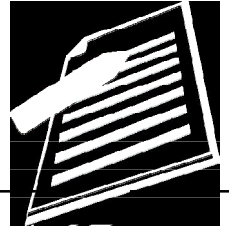
The basis for the classification of different types of agriculture in India are rainfall, irrigational facilities, purpose of production, ownership and size of holding and technology used. On the basis of these factors a number of farming can be identified. The main types of farming in India are:

A. Dry Farming

This type of farming is practised in the areas where the amount of annual rainfall is generally less than 80 cms. In such regions, the farmers are generally dependent upon rainfall. Here, moisture content in the soil is less. Hence, only one crop can be grown in a year. Millets like jawar, bajra, ragi, pulsees etc. are important crops grown under this type of farming. Rajasthan, Maharashtra, parts of Madhya Pradesh, Southern Haryana, part of Gujarat and Karnataka fall under this category of farming. In such areas, farmers adopt subsidy activities such as dairy, cattle farming to supplement their meagre farm incomes.

B. Wet Farming

This type of farming is practised in the areas of alluvial soils where annual average rainfall is more than 200cm. Here, more than one crops are grown in a year because enough amount of moisture in the soil is available. Rice and jute are the main crops of this types of farming. West Bengal, Assam, Nagaland, Meghalaya, Tripura, Manipur, Mizoram and Malabar coast fall under this category of farming.



C. Irrigated Farming

This type of farming is practiced in the areas where average rainfall is between 80 to 200 cms which is insufficient for certain crops,. This system of farming can be practised only in those areas where availability of water from underground or surface water bodies like rivers, tanks, and lakes is sufficient throughout the year. The other condition for this farming is the availability of levelled agricultural land. The main areas where much farming is practised are in Punjab, Haryana, Uttar Pradesh, north western Tamil Nadu and the deltas of peninsular rivers. The other important pockets of irrigated farming are found in the Deccan Plateau region particularly in Maharashtra, Karnataka and Andhra Pradesh. Wheat, Rice and Sugarcane are important crops of this farming.

D. Subsistence Farming

This types of farming is practised primarily to fulfill self requirements of the people of the area. The main objective of this farming is to provide subsistence to the largest number of people of a given area. Size of holdings is small, use of manual labour and simple farm implements are common features of this type of farming. Subsistence agriculture is practised in parts of Chhattisgarh, Uttarakhand, Jharkhand and the hilly areas of the country.

E. Shifting Cultivation

In this type of cultivation, land is cleared by cutting and burning of forests for raising crops. The crops are grown for a few years (2-3 years). As fertility of land declines, farmers move to new areas, clear the forests and grow crops there for next few years. This farming is practised in some pockets of the hilly areas of Northeast and in some tribal belts of Orissa, Chhattisgarh and Andhra Pradesh. In northeast, such type of cultivation is known as “Jhuming”.

F. Terrace Cultivation

It is practised in hilly areas. The farmers in these regions carve out terraces on the hill slopes, conserve soil and water to raise crops. In India, this type of cultivation is practised on the slopes of the Himalayas and the hills of the peninsular region. Due to pressure of population, terrace cultivation is being adopted in the North-Eastern states of India where shifting agriculture was practiced earlier.

G. Plantation Agriculture

Well organized and managed cultivation of crops particularly a single one on a large scale is called plantation agriculture. It requires large investment on the latest technology and proper management. Tea, coffee and rubber are examples of plantation agriculture. This agriculture is practised in Assam, West Bengal and the slopes of Nilgiri hills.

H. Commercial Farming

Under this farming, the farmers raise crops mainly for the market. Under this system, generally those crops are grown which are used as raw materials for



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industries. Cultivation of sugarcane in Uttar Pradesh and Maharashtra; cotton in Gujarat, Maharashtra and Punjab; and Jute in West Bengal are some of the examples of this farming.

I. Contract Farming

It is viewed as an important tool to increase private corporate involvement in agro-processing. In this system, companies engaged in processing/ marketing of agriculture products enter into contract with the farmers. They provide the farmers necessary facilities and buy back the products with a rate specified in advance. The Field Fresh Company, a multi national has 1000 acres land under horticulture in Punjab. Pepsi and McDonalds have started contact cultivation of citrus fruits and lettuce respectively. Ballapur and ITC provide farmers with fast growing cloned varieties of tree that mature in just four years and buy the out-put. Such type of farming is said to be getting popular among farmers especially in Punjab. However, some scholars fear that shift of lands from food crops under this contract farming on a scale is likely to result in food insecurity, especially for lower income groups.

J. Eco-Farming or Organic Farming

This farming avoids the use of synthetic fertilizers, pesticides, growth regulator and livestock feed additives. This types of farming rely on crop rotation, crop residues, animal manure, off-farm organic wastes and biological pest control to maintain soil productivity. A few farmers from Rajasthan, Andhra Pradesh, Madhya Pradesh, Pondichery and Punjab are adopting this types of agriculture.



INTEXT QUESTIONS 22.1

1. Match the following.

| <i>Types of farming</i> | <i>Chief characteristics</i> |
|----------------------------|--|
| (i) Subsistence Farming | (a) Factory like management |
| (ii) Wet Farming | (b) Large production for market |
| (iii) Shifting Cultivation | (c) Practised in the Area of low rainfall |
| (iv) Dry Farming | (d) Forests are cleared for raising crops |
| (v) Commercial Farming | (e) Practised in the Areas of high rainfall. |
| (vi) Plantation Farming | (f) Most of the production consumed locally. |

2. Which state of India has the highest percentage of net sown area?

22.4 CATTLE REARING

Cattle rearing is an important economic activity in India. Milk and milk products (Butter, Ghee etc) meat, eggs, leather, and silk are raw materials for industries. Animals provide a large proportion of energy required in the farm sector. The bullocks, buffaloes, horses, ponies, camel etc. are used as draught animals. They are used in agricultural activities like ploughing of fields, drawing of water from wells and for carrying loads. It is to be noted here that with rise in mechanized farming, the use of animal power for farm operations is on gradual decline. This is more true of Green Revolution areas. Hides and skins of animals are used as raw material for leather industries. Sheep, goats and camels provide wool. Their dung are used for biomass gas production and for making manure.

India is leading producer of milk in the world. It is due to initiative taken by government through 'Operation Flood'. Under this program good breeds of cows and buffaloes, which yield more milk, have been introduced. Co-operative societies in this field were encouraged. The modern dairy farms produced milk powder, butter, and cheese; condense milk, cream, and ghee along with milk.

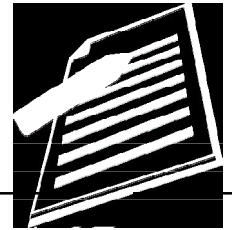
The largest number of livestock is found in Uttar Pradesh followed by the states of Rajasthan, Bihar and Madhya Pradesh. These four states account for 44% of total livestock of India. The density of animals in India is the highest in the world. It is about 130 heads of livestock per 100 hectare of land. The percentage of area under permanent pasture is very low in comparison to the density of animal population. Cattles, Buffaloes, sheep and goats are important livestock in India.

Distribution of Animal Resources in India

Cattle rearing in India is an important economic activity. The cattle population accounts for 43.5% of the total livestock in the country. The largest number of cattles in the country is found in Uttar Pradesh. Except Haryana, Punjab and Rajasthan, in other states of India the number of cattles are greater among livestock. The yield of milk from Indian cows is the lowest in the world. It is only 188 liters per animals per annum in India while in Netherland it is 4200 liters differing by about twenty three times. Buffaloes account for 18% of total livestock in India. They outnumber other animals in the states of Haryana and Punjab. For the milk point of view, buffaloes are important as they account for about 53% of total milk production in India.

Sheep are found mostly in the cold and dry regions of the country. They are very few in areas which are very hot and receive heavy rain during monsoon. They develop hoof diseases in hot and humid climate. Rajasthan, Tamil Nadu, Jammu & Kashmir, Himachal Pradesh, Andhra Pradesh and Uttar Pradesh are major states where sheep are in large numbers.

Among the other animals goats, camels, horses, yaks and mithuns are important. The goats reared mainly for meat and milk. In Rajasthan goats are greater in number than other animals. Camels are reared in western Rajasthan and adjoining areas

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of Gujarat, Haryana and Punjab. Camel is called the aeroplane of desert region implies to Thar Desert of India. Horse and ponies are distributed all over India specially in Jammu & Kashmir, Uttar Pradesh, Bihar, Madhya Pradesh and Punjab. Yaks are found in mountainous areas of Jammu & Kashmir, Haryana, Himachal Pradesh, Sikkim, and Arunachal Pradesh. Mithuns are found in Nagaland and Arunachal Pradesh.

The general condition of animals in India is very poor due to the lack of nutritious fodder, and harsh hot and humid weather conditions. Also, there is a lack of artificial insemination centers, and veterinary hospitals and doctors.

22.5 FISHING

Fishing has been an important occupation of the people in the coastal areas. However, in spite of having a long coastline and broad continental shelf, India's fishing industry is still largely in a developing stage. Modernization on limited scale has started recently. Fisheries are of two types (i) the inland and (ii) the open sea. The inland fishing is done in rivers, tanks, ponds and canals. The major rivers like Brahmaputra, Ganga, Satluj, Narmada, Mahanadi and Godavari; and numerous tanks and ponds are tapped for fishing. Inland fish production is accounted for two fifths or 40 percent of total fish production in India during 1995-96.

Open sea fishing or marine fishing, done in sea water, is caught in shallow water in our country. More than two-thirds of marine fish is landed on western coast of India. While remaining one third on the eastern coast. India caught 5.6 lakhs tonnes of fish during 2000-01.

Though, India has huge potential for fishing but the actual catch is very small. The main factors responsible for poor performance in fishing are traditional methods, wooden loge made boats, driven by human energy, and poor socio-economic conditions of the fishermen

In order to increase fish production and trade, the Government has taken a number of steps including (i) financial assistance to fishermen (ii) introduction of large vessels, (iii) better harbours and breathing facilities (iv) provision of refrigerated wagons and road transport facility (v) introduction of accident insurance scheme and (vi) marketing of fish on co-operative basis.

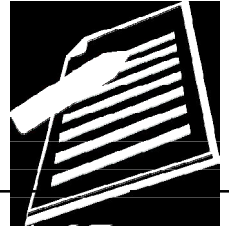
The rapid increase in the production of fish in the country is called **Blue Revolution**. This is synonymous with **shrimp farming** or **Aquaplosion**.



INTEXT QUESTIONS 22.2

Tick the most appropriate answer for the following questions from the options given in brackets.

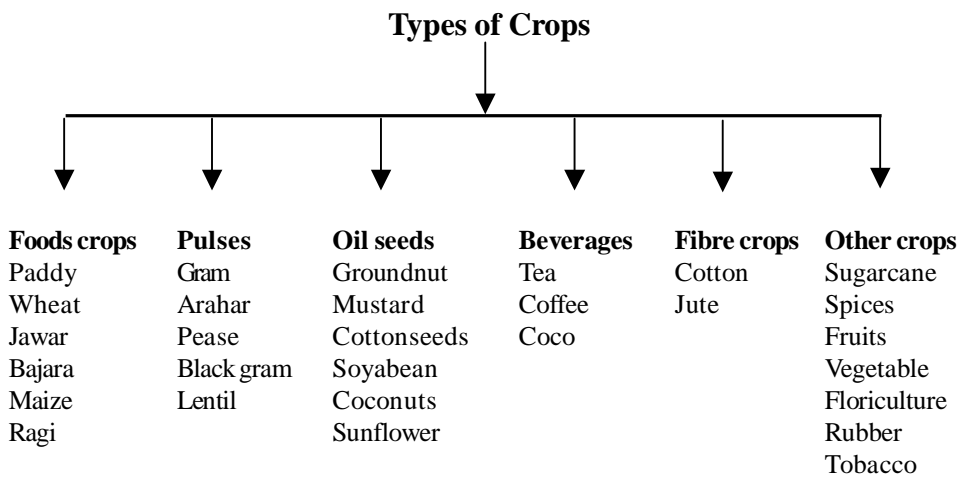
1. Of the total cattle population in the world, what percentage is found in India? (15/25/35/45)



2. Which state of India has the largest number of cattle population?
(West Bengal/Uttar Pradesh/Tamil Nadu/Kerala)
3. Which state of India has the highest number of goats?
(Uttar Pradesh/Rajasthan/Bihar/Assam)
4. What is the percentage share of land area under the forests in India.
(20/22/24/26)

22.6 MAJOR CROPS IN INDIA

Owing to cash physical diversity, a variety of crops are grown in our country. The crops grown in the country may be categorised as under:-



(i) Paddy

Paddy is basically a tropical crop. India is one of the major producers of rice in the world, accounting for one-fifth of the world production, ranking next only to China. About 23 per cent of the total cropped area in the country is under this crop. Paddy is grown in Kharif season.

Paddy is ideally grown in rainfed areas where annual rainfall is more than 125 cms. It requires high temperature (20⁰-25⁰C). However, it is also grown in areas of less than 125 cms rainfall with the help of irrigation. At present, 51 per cent of rice producing area is under irrigation.

Deep fertile loamy or clayey soils are considered ideal for this crop. It requires considerable manual labour for sowing and transplantation. Although paddy crop is grown in almost all states of India, the leading producing states are West Bengal, Uttar Pradesh, Andhra Pradesh, Punjab, Tamil Nadu, Bihar, Orissa and Assam. Andhra Pradesh is the largest producer of rice in India but consumption of

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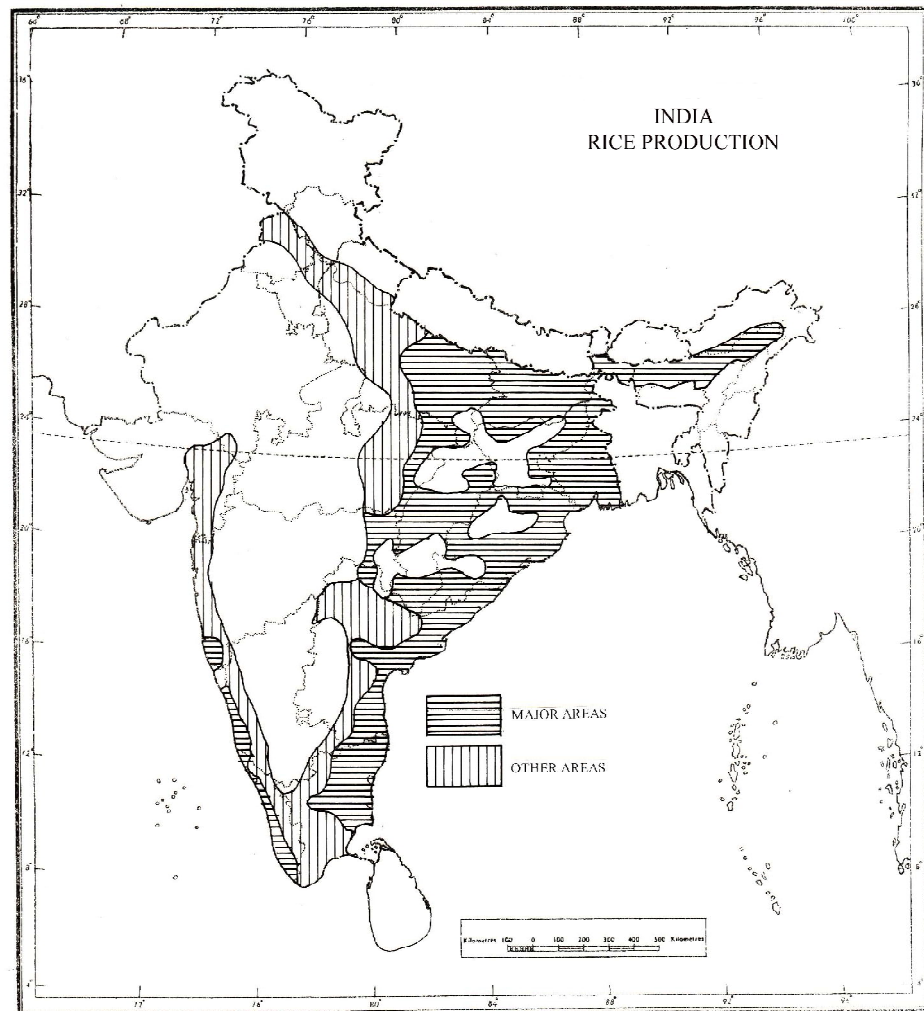
Economic activities
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rice being large, it has to import from other states. Against this, Punjab is the biggest contributor of rice to control public distribution system. In some states, three crops of paddy in a year are grown. For example, in West Bengal three crops are known as Aman, Boro and Aos.



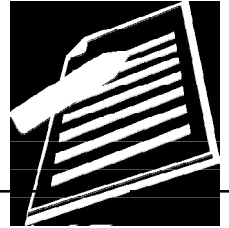
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Fig. 22.1 INDIA: Rice Producing Areas

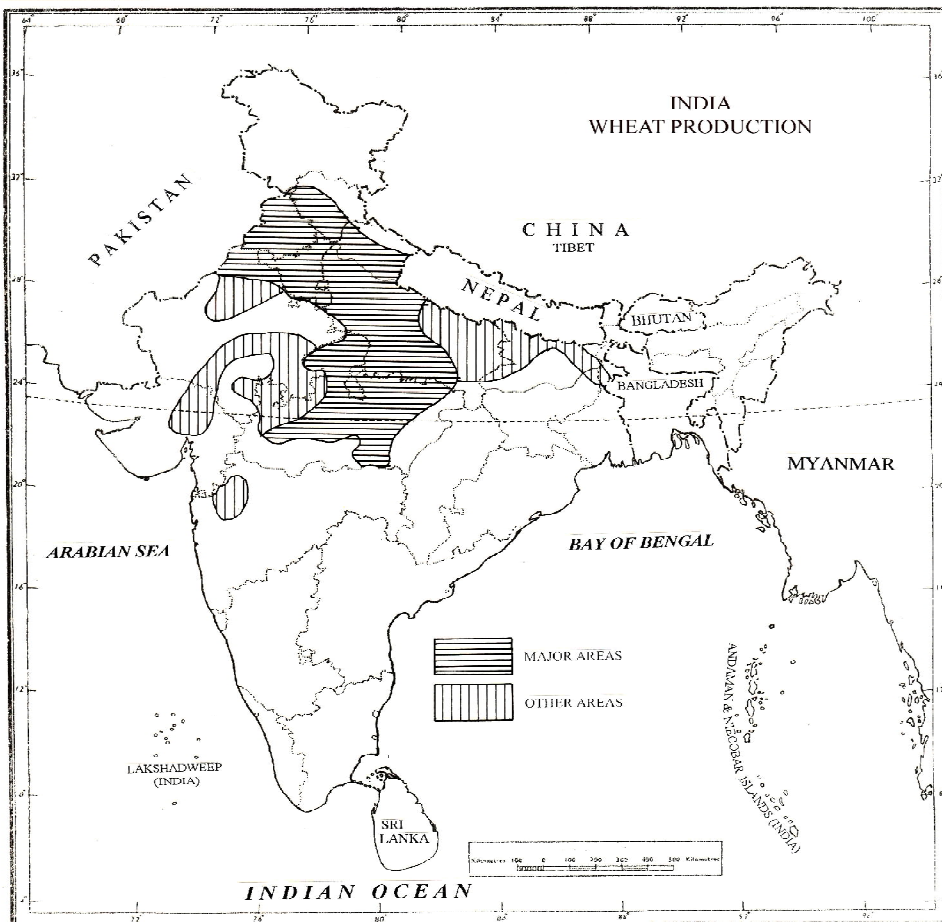
(ii) Wheat

Wheat is basically subtropical crop grown in the winter season in India. It is grown in rabi crop season, while paddy is sown in kharif season. Wheat ranks second after Paddy crop, having about 13 per cent of total cropped area under it. Wheat requires cool weather with moderate rainfall. It grows well in the northern plains of India during winter season when the mean temperature is between 10 and 15 °C. Well drained loamy soil is ideal for wheat cultivation.



Notes

Uttar Pradesh, Punjab and Haryana are major wheat producing states in India. They accounted for 60 per cent of total area under wheat and 73 per cent of total wheat production in the country in 2000-2001. Other important wheat growing states are Rajasthan, Bihar, Madhya Pradesh and Maharashtra. The wheat production in the country showed maximum increase after Green Revolution introduced in 1966. During 2000-01 the total production was 688 lakh tonnes. India is an important producer of wheat in the world. It is followed by China and USA. Although productivity per hectare has increased rapidly from 815 kg. in 1950-51 to 2743 kg. in 2000-01 per hectare the yield of wheat in India is lower in comparison with other major wheat producing countries.



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Fig. 22.2: INDIA: Wheat Producing Areas

(iii) Tea

India is the leading producer and consumer of tea in the world. The country earns a sizable amount of foreign exchange through export of tea. Tea grows best on the

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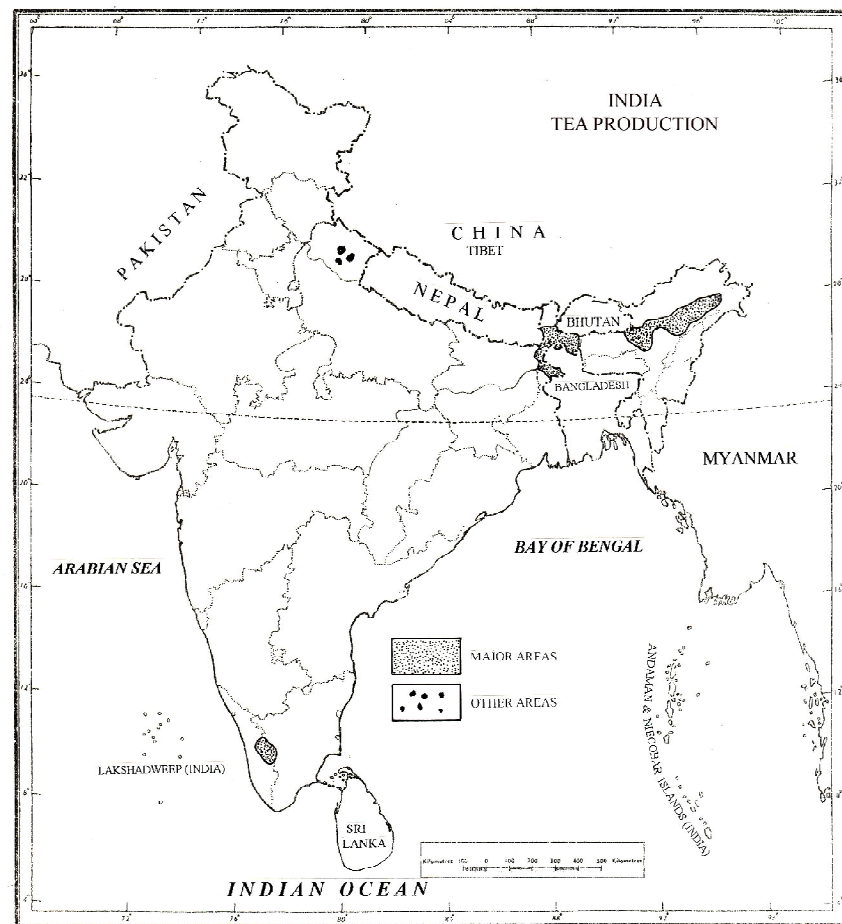
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mountain slopes receiving large amount of rains (above 150 cms.) Well drained deep loamy soils, rich in humus is ideal for tea plantation. Most of the tea producing areas are on the hilly slopes of Surma and Brahmaputra valleys in Assam, Darjeeling and Jalpaiguri districts of West Bengal. In south India, tea cultivation is confined mainly to the Annamalai and the Nilgiri hills. A small quantity of tea is also produced in the Kumaon hill in Uttarakhand and in the Kangra valley of Himanchal Pradesh. India produced 8.5 lakh tonnes in 1999. An amount of Rs. 2000 crores were earned in foreign exchange from the export of tea in 2000-01 despite huge demand in the domestic market.

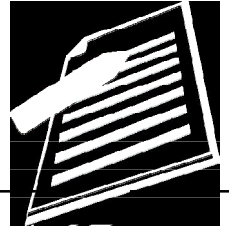


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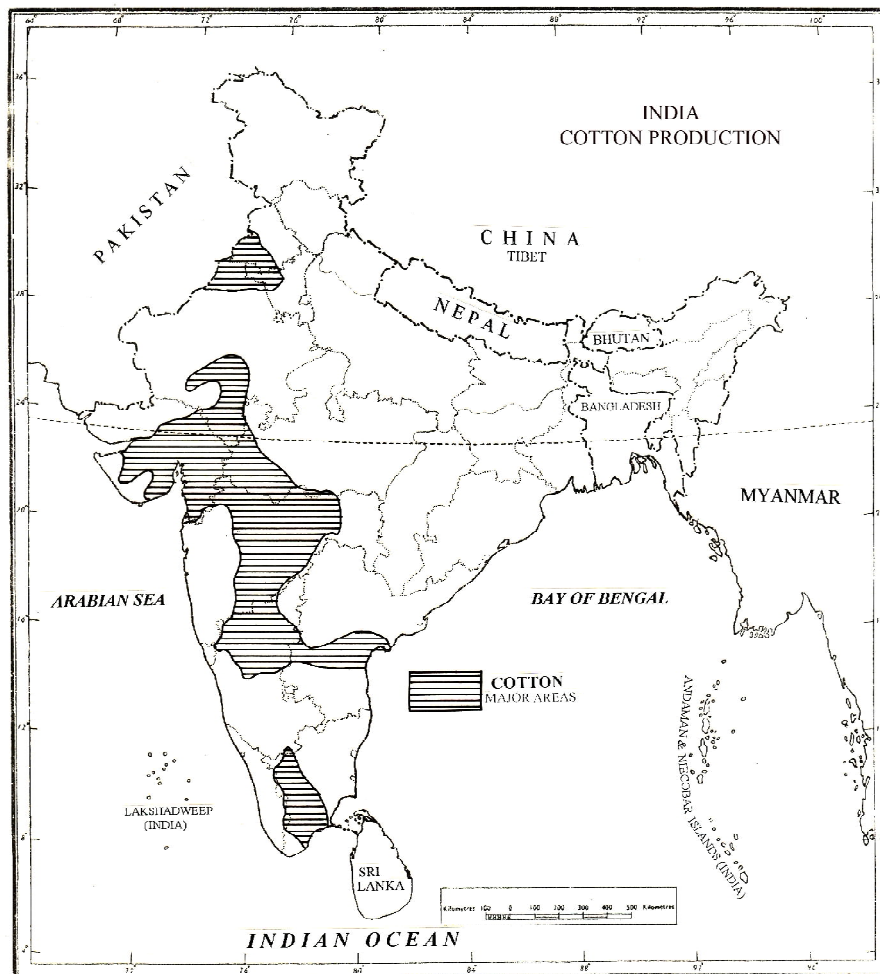
Fig.22 3: INDIA: Tea producing Areas

(iv) Cotton

India is one of the leading cotton producing countries in the world. The fibre of the cotton crop is used as raw material for the textile industries whereas oil extracted from its seeds is used in the vanaspati industry. Cotton seeds are also used as a cattle feed.



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Fig.22. 4: INDIA: Cotton Producing Areas

Cotton require a moderate rainfall of about 75 cms. and a cloud free weather for about 150 days at the time of flowering and ball opening. Well drained black soils of the Deccan Plateau is considered ideal for its cultivation, though it is also grown on alluvial soils of the northern plains.

India produces about 8 per cent of the world's cotton and is the fourth largest producing country after USA, China and Russia. However, the quality of cotton is rather poor. Therefore, the long staple cotton is imported to make good quality of fibre. The good quality of cotton is grown in Punjab and Haryana. Leading producers of cotton in India are Maharashtra, Gujarat, Andhra Pradesh, Haryana, Rajasthan, Punjab, Karnataka, Madhya Pradesh and Rajasthan.

(v) Sugarcane

Sugarcane is the native plant of India. The country has the largest area under this

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development in India

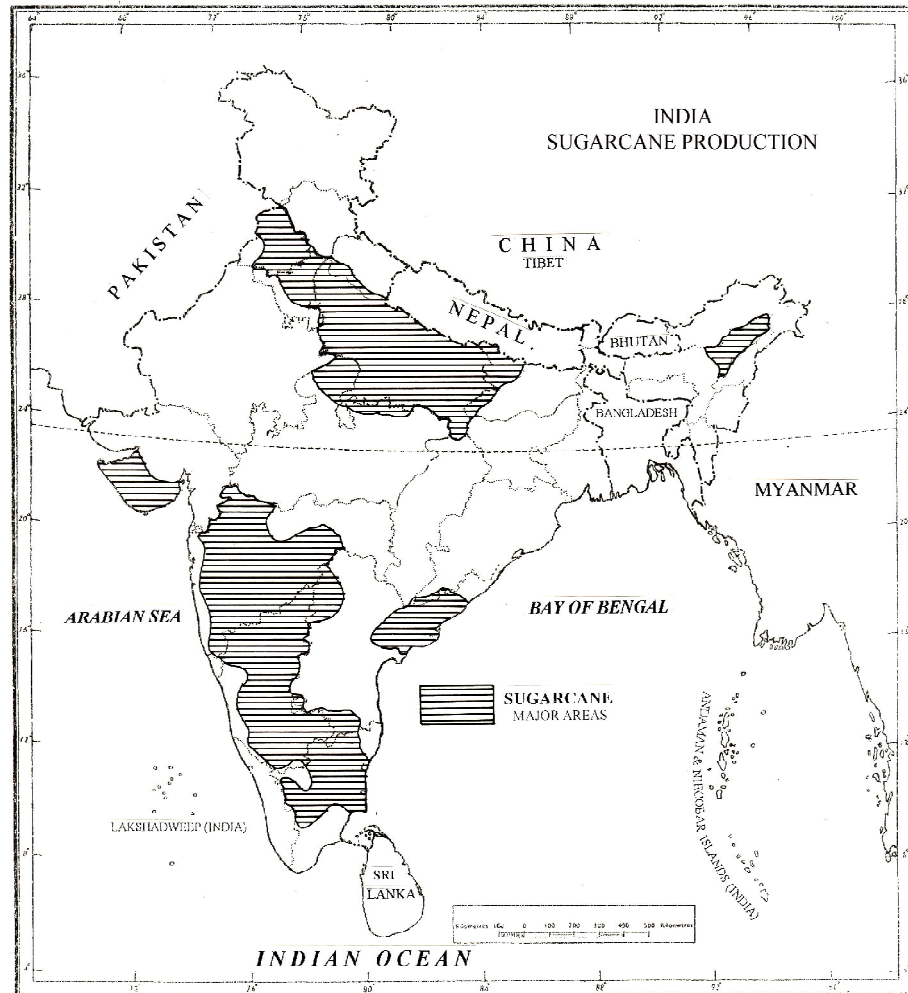


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crop in the world. It requires a hot and humid climate. Irrigation facility is required if rainfall is not enough. Fertile loamy and black soils are ideal for this crop.

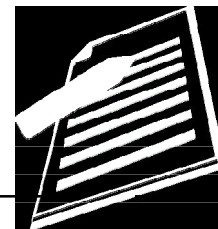
Sugarcane is cultivated in two belts (i) in Northern Plains from Punjab to Bihar, and (ii) in Peninsular India from Gujarat to Tamil Nadu, Maharashtra, Karnataka and Andhra Pradesh. More than 60 per cent of the total area under sugarcane is found in the North Plains. The yield per unit area of sugarcane in South India is higher than in the North India.



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Fig.22. 5: INDIA: Sugarcane Producing Areas

The leading producers of sugarcane are Uttar Pradesh, Maharashtra, Karnataka, Tamil Nadu and Andhra Pradesh. During 2000-2001, about 300 lakh tonnes of sugarcane was produced in India which is the highest in the world. Efforts are being made to increase production of sugarcane by developing hybrid varieties. The Sugarcane Research Institute at Coimbatore is engaged in its research.

**(vi) Spices**

India produces a wide variety of spices including black pepper, cardamom, chillies, turmeric, ginger, cloves etc. Indian spices are known for their quality and find a market all over the world.

Chilly is an important condiment crop which is widely grown in the country and shares more than one third or 34 per cent of total production of spices in India. Tamil Nadu, Andhra Pradesh, Maharashtra and Karnataka are the leading producers of chillies.

After chillies, turmeric is second important spice crop in India. Major producing states are Andhra Pradesh, Tamil Nadu, Maharashtra, Orissa and Bihar.

Among all the states, Kerala is one state where a large number of spices such as cloves, black pepper, ginger, cardamom are produced in the largest quantity. The other leading states in the production of spices are Karnataka, Tamil Nadu, Himachal Pradesh, Maharashtra, Orissa and Bihar.

Table 22.2 : Area, Production and Yield of selected crops in India, 1951-2001

| Crops | Area (in lakh hectares) | | Production (in lakh tonnes) | | Yield (kg./ hectare) | |
|-----------|----------------------------|---------|--------------------------------|---------|-------------------------|---------|
| | 1950-51 | 2000-01 | 1950-51 | 2000-01 | 1950-51 | 2000-01 |
| Tea | 3.1 | 4.4 | 2.8 | 8.7 | 87.6 | 1996 |
| Cotton | 59.0 | 86.0 | 31.0* | 97.0* | 98.3 | 191 |
| Rice | 388.0 | 444.0 | 206.0 | 849.0 | 668.0 | 1913 |
| Wheat | 98.0 | 251.0 | 65.0 | 688.0 | 815.0 | 2743 |
| Sugarcane | 29.0** | 43.0 | 1100.0** | 2996.0 | 33422.0 | 69636 |

* bales of 170 kg.

** 1960-61

(vii) Fruits

India accounts for about 10 per cent of the production of fruits in the world. It leads the world in the production of mango, banana, sapota and lemons.

A large variety of fruits are grown in India. Mango, bananas, citrus fruits pineapple, papaya, guava, sapota, jack fruit, lichi and grapes are tropical and subtropical fruits. The fruit of temperate areas are apple, pear, peach, plum, apricot, almond and walnut which are grown mostly in the mountainous areas of the country. The important fruits of arid zone of India are aonla, ber, pomegranate and figs.

Mango is the most important among fruit crops covering about 39 per cent of the area and account for 23 per cent of the total fruit production in the country. More than one-half or about 54 per cent of the world's mango is produced in



Notes

India. The mango tree grows throughout the country especially in Uttar Pradesh, Andhra Pradesh, Maharashtra, Tamil Nadu and Kerala. **Dussahari and Alphonso** varieties of mango are in great demand in foreign countries. The country exports such varieties to earn foreign exchange.

In terms of area Citrus fruits rank next only to mango. Oranges and lemons are grown in Assam, Maharashtra, Punjab, and Tamil Nadu. Undulating sloppy terrain is most suitable for the growth of citrus fruits.

India is ranking first in the world in the **Banana** production. Banana ranks third in areal coverage and are grown mainly in Maharashtra, Tamil Nadu and Kerala. It is also grown in West Bengal, Orissa and Assam.

Apple is the fourth major fruit crop, mainly grown in the Himalayan region of the country. **Guava** is largely produced in Uttar Pradesh and Bihar, whereas **pine-apple** is produced in Assam, Meghalaya, West Bengal, Tripura, Andhra Pradesh, Kerala and Karnataka.

(viii) Vegetables

India is the second largest producer of vegetables in the world next only to China. It contributes about 13 per cent to the world vegetable production. It occupies first position in the production of cauliflowers, second in onion, and third in cabbage in the world. Other major vegetable crops are potato, peas, tomato and bringal. More than fifty varieties of vegetables are grown in India.

(ix) Floriculture

With breaking of trade barriers in post-globalisation phase, international trade in vegetables, fruits and flowers has become lucrative. India can earn a sizable amount of foreign exchange by exporting flowers. Flower such as rose, jasmine, marigold, chrysanthemum, tuberose, and aster are grown over large area in Karnataka, Tamil Nadu, Andhra Pradesh, Rajasthan, West Bengal, Maharashtra, Delhi, Uttarakhand, Assam and Manipur.



INTEXT QUESTIONS 22.3

1. (a) Name two important fiber crops of India
 (i) _____ (ii) _____
- (b) Name two important sugarcane producing belts in the country.
 (i) _____ (ii) _____
- (c) Name the city where Sugarcane Research Institute is located

(d) What is the ranking of India in the production of Banana in the world?

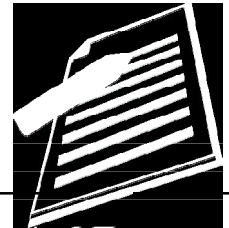
(e) Which state is the largest producer of Rice in India.

22.7 AGRO-CLIMATIC REGIONS OF INDIA

India has diverse agro-climatic conditions. It has almost all types of climatic conditions, capable of producing almost all kinds of agricultural produce in one or the other region. Several attempts have been made to classify India into various agricultural regions based on climatic and natural vegetation.

In 1989, the Planning Commission divided India into following 15 Agro-climatic regions. (Figure No. 22.6)

- I The North-Western Himalaya
- II The North-East Himalaya
- III The Lower Ganga Plain
- IV The Middle Ganga Plain
- V The Upper Ganga Plain
- VI The Trans Ganga plain (Punjab plains)
- VII The Eastern Plateau and hills
- VIII The Central Plateau and hills
- IX The Western Plateau and hills
- X The Southern Plateau and hills
- XI The East Coast Plains and hills
- XII The West Coast Plains and Ghats
- XIII The Gujarat Plains and hills
- XIV The Western Dry Region
- XV The Islands



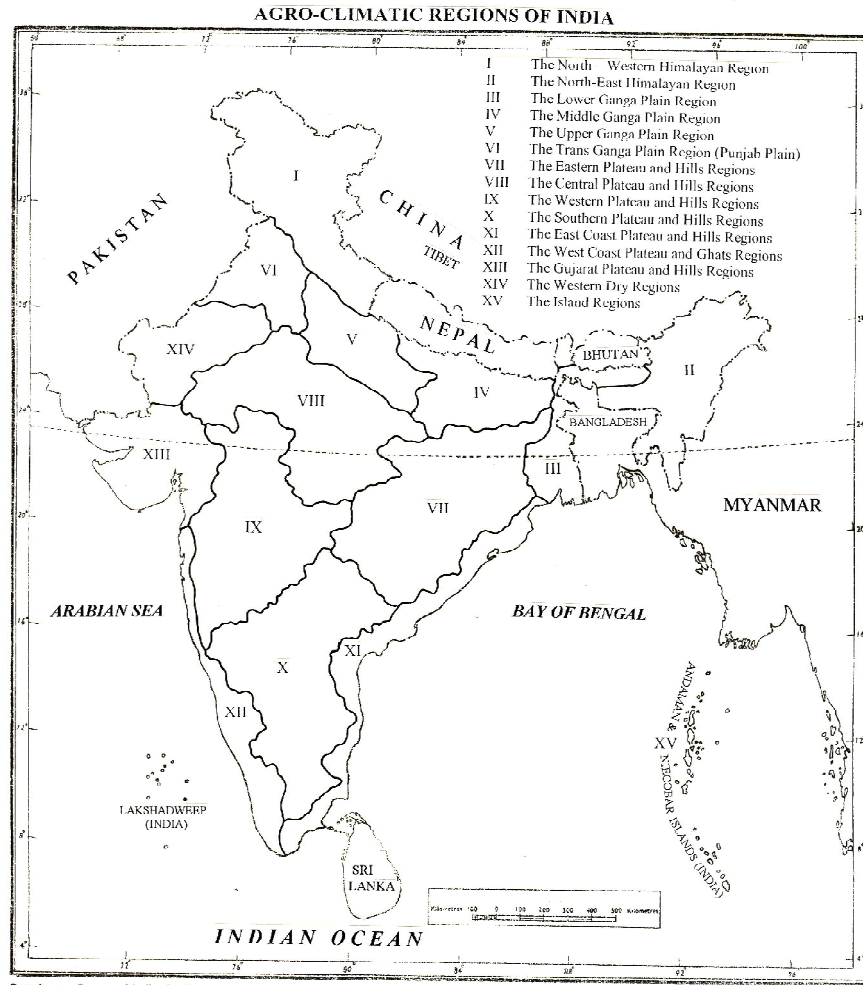
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Based upon Survey of India Outline Map printed in 1996.

The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
Responsibility for correctness of internal details shown on the map rests with the publisher.

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Fig. 22. 6: Agro-climatic Regions of India

22.8 CROPPING PATTERNS

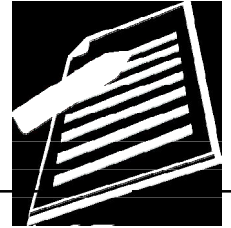
The agricultural land devoted to different crops in a region or state or country at a particular point of time is called the cropping pattern. The cropping pattern of a region is an outcome of a long term agricultural practices, social customs and traditions, physical conditions and historical factors.

Features of changing crop-pattern

Changing crop pattern in India is as under:-

A. Dominance of food crops over non-food crops

- At the time of Independence, more than 75 per cent of the total area sown in the country was devoted to the production of food crops. Gradually with commercialisation of agriculture, farmers in India have started shifting area to non-food crops. Now, relative share of area under food crops has declined from 76.7% during 1950-51 to 65.8% during 1999-2000. This trend shows commercialisation of agriculture in India.



Notes

B. Variety of crops grown

Almost every kind of crops are grown in India as it is endowed with a variety of soils. These crops can be grouped into (a) Food crops (b) Fibre crops (c) Oilseeds (d) Medicinal plants and spices. Food crops are of two types-cereal and non-cereal. Among the cereals rice, wheat and millet are important. Pulses come next and then oilseeds. Similarly a number of spices and medicinal plants are also cultivated throughout the country. Emphasis is placed now on production of oilseeds, because a large amount of foreign exchange is spent on import of edible oils. Special attention is also given to production of medicinal plants, fruits, flowers and vegetables.

C. Dominance of cereals among food crops:

Within broad group of food crops cereals like wheat and rice dominate. About 82 per cent of the area under food crops has been put to cultivation of cereals. This is due to better prices, less risk in production and the availability of better seeds.

D. Decline in coarse cereals

Jwar, Bajra, Maize, Millets, Barley etc. are called coarse or inferior cereals. The area under these crops to the total area under cereal crops has declined significantly from 48 per cent in 1950-51 to about 29 per cent in 2001. This is due to spread of irrigation facilities, improved inputs and a shift in consumption patterns of the people.

E. Declining importance of Kharif crops

There are mainly three cropping seasons in India (i) Kharif (ii) Rabi (iii) Zaid. The Kharif season corresponds to the rainy season, while Rabi season with the winter. The short period in between the harvest of the Rabi crops and the sowing of the Kharif crops is called the Zaid season. Till recently, Kharif crops have been contributing the large share in the crop production in India. But this dominance is on the decline. The share of Kharif has declined from 71 per cent in the 1970's to 49 percent in 2003-2004. This makes a significant change in Indian agricultural practices after Green Revolution. This change is important because it would lessen uncertainty in crops production, as Rabi crops are more reliable than Kharif ones. The Kharif crops are not reliable because they are mostly dependent on rainfall. The most parts of India get rainfall from monsoon which is unreliable. Contrary to this, mostly Rabi crops in India are raised on irrigation which is comparatively reliable.

Climate-rainfall, temperature, humidity; soils, size of farms, availability of fertilizer, good quality of seeds, irrigational facilities and price incentives are the factors which effect cropping patterns.

**Notes****22.9 ISSUES IN AGRICULTURAL DEVELOPMENT**

Agriculture contributes a significant share to the national income (26%) but more importantly it is a major source of livelihood for majority of work force in the countryside. However, the per hectare production of different principal crops in the country is relatively low. In some cases it is as low as 1/4th to 1/5th as compared to other countries due to traditional methods of cultivation, small farms size, low investment, low input, poor health and lack of education among the farmers, lack of linkages between agriculture and industry, and poor condition of infrastructure. Limited availability of cultivable land and ever increasing population has left no alternative but to increase productivity of crops.

It is this sector that continues to have great potential for reducing poverty and hunger in rural areas. Following issues are important for the development of agriculture in India:-

A. The Use of Farm Inputs

For high growth rate, farm inputs like seeds, fertilizers, and irrigational facilities play an important role. The use of high yielding varieties of seeds, chemical fertilizers have increased particularly in Green Revolution areas of Punjab, Haryana, western Uttar Pradesh, coastal Andhra Pradesh and Tamil Nadu. However, in several other parts of the country the use of chemical fertilizers is much below the national average. In regard to irrigation, the irrigated land in the country is less than 50 per cent of the potential. Hence, there is a need for equitable and efficient use of inputs in the country so that regional disparities in its use can be minimized. Another important factor associated with use of chemical fertilizers is their imbalanced use. Nitrogen, phosphorous and calcium required by the plants for balanced growth and good health of the soils are not used by most of the Indian farmers. There is over emphasis on the use of nitrogen, resulting in damage to fertility of soils and adverse effect on crop productivity.

B. Small Size of Land holdings

About 89 per cent of operational farm holdings in the country are below two hectares in size. Over 70 per cent of agricultural production comes from the subsistence agriculture. Unless small farmers are helped to improve the productivity and profitability of their farms, the agriculture in India will not develop in its true sense. This can be possible by optimum use of available land, water, credit facilities and labour resources.

C. Farm Mechanization

The use of improved agricultural implements and machines such as the plough, tractor, trolley, harvester, thrasher, water pump, sprinkler etc. are important to modernize Indian agriculture. These machines are being used in some parts of the country. Diffusion of modern farm technology and techniques is both necessary as well as a big challenge. To increase productivity, some agricultural implements

are being made available to the farmers through Development Blocks and Co-operative Societies.

D. Consolidation of Holdings

Small and scattered holdings of land are one of the reasons of low agricultural productivity in India. This is an obstacle in the way of modern agriculture in which machines, improved equipments and techniques are used. These problems are being minimized through consolidation of land holdings. However, in many parts of the country it is still a big problem. For example, apart from hill states, Rajasthan and Bihar are two states in the northern plain where land consolidation is yet to be implemented. This problem needs to be addressed on priority basis by the respective governments.

E. Diversification of Agriculture

Diversification of agriculture means a shift of resources from farm to allied activities, e.g. shift to dairy farming. Also, there is a need to give more importance to higher value crops in comparison to lower value. The diversification will improve income, generate employment, alleviate poverty, increase productivity, food security, and will also promote exports. Although, impressive gains have been made in agricultural production by diversifying agriculture in some parts of the country like in Punjab, Haryana and western Uttar Pradesh, remaining parts of the country, still needs much attention.

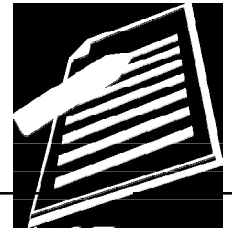
F. Agriculture and Industry Interface

For the better development of agriculture, it must be linked with the industry. It will increase investment in agriculture and boost agricultural productivity. It will also increase industrialisation and employment opportunities. Although, the interdependence of agriculture and industry has increased over the years, yet much is required to be done in time to come.

The agriculture and agriculture based industries need helping hand for over all development of rural areas.

Green Revolution

The eight years between the commencements of the Third-Five Year and fourth-Five Year Plans 1961-69 were the year of great significance for Indian agriculture. During this period a new strategy of agricultural production was introduced first in 1960-61 as a pilot project, in some districts of Punjab and was subsequently extended to other districts of the country. The core of this strategy was the use of High Yielding Variety (HYV) of seeds, application of chemical fertilizers and extension of adequate and assured irrigation. It also made it imperative to use pesticides and insecticides and improved agricultural implements to enhance agricultural productivity. It also became essential to make provision of cheap credit, storage and marketing facilities, crops preservation



Notes

**Notes**

measures, and support price for agricultural products. Due to these measures, food grains production surged in India and country became self sufficient in food grains. This achievement of Indian farmers is called 'Green Revolution'. The term Green Revolution was used first in 1968 by Dr. William Gadd of the U.S.A.

The Green revolution in India has been successful mainly in Punjab, Haryana, and western Uttar Pradesh because these regions had advantage of assured irrigation, adequate supply of fertilizers, HYV seeds, and modern agricultural implements at subsidised rate. The majority of farmers and the areas in the country have not been benefited by it, resulting in ever increasing inequalities in agricultural and rural development in the country. Due to increased application of chemical fertilizer and over irrigation, soils in the areas of the Green Revolution have been degraded in the form of salinity and water logging. The Green Revolution package has led to serious environmental disruption in areas of its success. Excessive concentrations of chemical fertilizers and pesticides contaminate the streams and the ground water with serious health hazards for the people. Fish are not found in the paddy fields any more and the water table has decreased drastically in these areas.

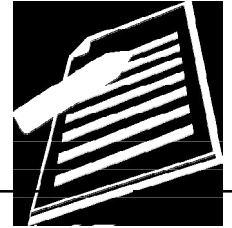
Green Revolution means rapid increase in farm production per unit area through the application of (i) high yielding seeds (ii) chemical fertilizers and (iii) assured and adequate irrigation.

G. Infrastructural Development

The Government has tried to develop various infrastructural facilities in rural areas- e.g. electrification, provision of irrigation facilities, construction of metalled roads to connect villages to the markets. The scheme of crops insurance has also been introduced. Awareness programs for farmers through radio and television are being relayed. A number of magazines are being published to provide the latest information about new techniques in agriculture. Recently call centers have been established to solve problems of farmers on telephone. But existing infrastructural facilities are not adequate in the country. There is a need of spreading these facilities to small farms, in general, and to the farmers of remote areas, in particular.

H. Agricultural Credit

Commercial banks, Regional Rural (*Grameen*) Banks and Cooperative banks, provide credit support and services for agricultural and rural development. Commercial Banks account for 50 per cent, Cooperative Banks 43 per cent and regional Rural Banks 7 per cent share in the credit flow for agriculture. *Kissan* Credit Card scheme was introduced in 1998-99 to facilitate access of credit to farmers from commercial banks and Regional Rural Banks. There is need for expanding this scheme to other geographical areas.



I. Globalization and Indian Agriculture

Globalization, in simple term means integration of the economy of a country with worlds economy. In Indian context, this refers to the opening up the economy to foreign direct investment in different field of economic activities, removal of obstacles to the entry of Multi National Companies (MNC's) in India, allowing Indian companies to enter into foreign collaborations, to encourage setting of joint ventures abroad, bringing down the level of import duties and opening the Indian market for the world.

Impact of Globalization on Agriculture: The experts are divided on the impacts of globalization on agriculture. They say that India will get benefited through improved prospects for agricultural export as a result of increase in the world prices of agricultural commodities with reduction in heavy farm subsidies provided in the developed countries and breaking of barriers to trade. The prices of agricultural products in India are not likely to increase as all major programmes such as subsidies on P.D.S. (Public Distribution System) and on agriculture are exempted from the control of W. T. O. Agreement on agriculture. It is mainly because of the fact that subsidy given on agriculture in India is below the limit of 10 per cent of value of agricultural products. Furthermore, India has the skills and the low cost labours which make it one of the lowest-cost producer of agricultural products in the world. Hence, there will be a large market world wide for these products. Moreover, it is also said that an improvement in terms of trade in favour of agriculture will promote faster agricultural growth in India.

However, these claims are questionable on the following grounds:

- (i) Due to globalization, the Indian farmers might have to face much unstable prices of agricultural products as world prices for these products fluctuate largely on year-to-year basis.
- (ii) The impact of trade liberalizations on the prices of agricultural products at international level and domestic level depends on what policies other countries follow. For example, developed countries are not willing to reduce subsidies on their agricultural products, to keep these still cheaper to benefit their farmers.
- (iii) Due to liberalization, MNC's engaged in agro-business would operate freely in India. For their strong financial background, they could produce hybrid varieties of seeds and the specialised agro-chemicals, using advance biotechnology. These hybrid seeds cannot be regrown or reproduced by the farmers as they are genetically modified to terminate after first use. Therefore, these seeds will have to be purchased every year from the MNCs for the monopoly they have over it under IPR (Intellectual Property Rights) regime.
- (iv) There would be uneven distribution of income across social classes and geographical region due to effect of globalization on agricultural practices and trade. Rich regions or social groups will be richer in the country.

**Notes****Intellectual Property Rights (IPRs)**

It is an important feature of the WTO agreements among the member countries related to intellectual property rights (IPRs). It covers copyright, trademarks, geographical indications including appellations of origin, industrial, patents on production of new varieties of plants and seeds, etc. Under this agreement on the above subject all member countries have to (i) provide minimum standards of protection (ii) facilitate domestic producers and remedies for the information of IPRs and (iii) settle dispute between the WTO members.

The traditional knowledge of farmers and indigenous people in respect of uses of different variety of plants are being used by MNCs for their business profits patenting them under IPRs. The famous examples are patent of neem and turmeric product by American MNCs.

22.10 AGRICULTURAL DEVELOPMENT POLICIES DURING FIVE YEAR PLANS

The agriculture in India during five-year plans has registered a phenomenal growth.

At the time of Independence, partition of Indian sub-continent on communal lines, resulted among others in acute shortage of food and raw material for her industries. Therefore, during first five-year plan (1951-56) the highest priority was accorded to increase of agricultural production. Nearly one third or 31 per cent of total plan funds were allocated to agriculture sector. River valley projects were taken up. Irrigational facilities and fertilizer plants were established. Consequently, production of food-grains increased by 36 per cent in a short span of five years.

The second five-year plan (1956-61) was focused on industrial growth and only 20 per cent of plan allocation was devoted to agriculture. Still food-grains production exceeded the target due to extension of irrigation facilities and use of chemical fertilizers.

During the third Five Years Plan (1961-66), the priorities were on self-sufficiency in food grains, meeting the raw material needs of industries and increase in exports. During this period, Green Revolution programme was started on a small scale. But this plan failed to meet the target due to Chinese aggression (1962), Indo-Pak war (1965) and severe and prolonged drought during 1965-66. There were a great crisis of food that forced the Prime Minister L. B. Shatri to appeal to people to observe fast once a week.

During next three annual plans (1966-69) agriculture recorded 6-9 per cent annual growth under the impact of Green Revolution. The production of food grain touched 94 million tonnes.

The Fourth Plan (1969-74) aimed at 5 per cent annual growth in food grains. High Yielding Variety (HYV) of seeds, fertilizer use, new agriculture techniques and irrigation facilities provided to expand area of Green Revolution. The production of wheat increased sharply but growth in rice, oilseeds and coarse grains

were nominal resulting in only 3 per cent annual growth against the target of 5 per cent.

During Fifth Plan Period (1974-79) emphasis were given to self-sufficiency in food production and poverty eradication. Stress was laid on the extension of irrigation, expansion in cultivated area under HYV seeds and grant of loans and subsidies to farmers. Dry farming was propagated. This plan achieved its target successfully with 4.6 per cent growth. Almost all food grains except pulses witnessed increase in production.

The Sixth Plan (1980-85) emphasized on land reforms, use of HYV seeds, chemical fertilisers and groundwater resources and improving post harvest technology as well as marketing and storage facilities. The annual growth rate was 6 per cent, highest ever during plan periods. The food-grain production reached 152 million tonnes.

The highest growth in food-grain, pulses and coarse cereals was recorded during Seventh Plan (1985-90) showing over all annual growth rate of 4 per cent. The areas of Green Revolution were expanded during the period.

The Eighth Plan (1992-97) witnessed a tendency of stagnation in foodgrain production while oilseed registered a rapid growth.

The Ninth Plan (1997-02) witnessed a mixed success. There were fluctuations in the foodgrain production. During this plan period National Agricultural Policy, 2000, was framed and several measures were announced including, watershed management, development of horticulture, agricultural credits and insurance scheme for crops.

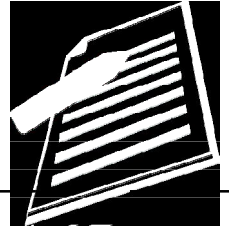
In the Tenth Plan (2002-2007) focus is placed on (i) sustainable management of water and land resources, (ii) development of rural infrastructure to support agriculture, (iii) dissemination of agriculture technology, (iv) credit flow to agriculture sector, and (v) agricultural marketing reforms.

The New Agricultural Policy

The Government of India has announced (28th July 2000) a new National Agricultural policy, 2000, in the light of changes arising out of economic liberalization and globalization. The main aims of the policy are (i) achieving more than 4 per cent per annum growth rate in agriculture sector, (ii) growth based on efficient use of resources and conservation of soil, water and biodiversity, (iii) growth with equity-in region and among the farmers, (iv) growth that caters to domestic market and maximizes benefits from exports of agricultural products and (v) technologically, environmentally and economically sustainable growth.

The main features of this policy are:-

- (1) privatisation of agriculture and price protection of produce,
- (2) land leasing and contract farming by private companies,



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- (3) raising the ceiling of land holdings,
- (4) involving national livestock breeding strategy to meet requirement of milk, meat, egg and livestock products.
- (5) protection of plant varieties and improvement of horticultural crops, live-stock species and agriculture.
- (6) liberalization of domestic market by dismantling of restriction on movement of commodities in the country.
- (7) improving the domestic and international marketing system.
- (8) facilitating the flow of credit to farmers against pledging of their products and providing them most other facilities available to manufacturing sector.
- (9) keeping agriculture outside the regulatory and tax collection system.
- (10) encouraging consolidation of land holdings and speeding up tenancy reforms to recognize the right of the tenants and sharecroppers

It may be noted that the policy are intentions of Government, thus, its success depends on the commitment of the Government to convert it into reality.



INTEXT QUESTIONS 22.4

1. What are the determinants of cropping pattern in India?

2. What do you understand by globalization?

3. Name three agricultural seasons found in India?
1. _____ 2. _____ 3. _____
4. During which five year plan period a special programme for the Green Revolution started?

5. Write four objectives of new National Agricultural policy 2000.



WHAT YOU HAVE LEARNT

India has different types of land uses. About 47 per cent of its total area is under cultivation leaving very little scope for brining further land under cultivation. The

food for rapidly growing population can be provided only by improving productivity per hectare of land as cultivable land in India is only 13 per cent. There is need of increasing forest land for ecological balance.

Animal rearing is important economic activity in India. It accounts for a quarter of the total agricultural output. India has the highest number of livestock but the quality of livestock is very poor. Efforts are being made to improve the quality of animals through operation flood. As a result, India is now leading in milk production in the world. Fisheries is also an important occupation in India.

Rice, wheat, sugarcane, cotton and tea are important crops grown in India. Efforts are being made to increase production of fruits, vegetables, spices and flowers. The importance of these crops have increased due to global opportunities in export of agricultural commodities. India can earn a sizable amount of foreign exchanges with export of these items.

The government of India has formulated a new agricultural policy in 2000 in the light of economic liberalization. In the new agricultural policy emphasis have been placed on privatization of agriculture, increasing animal products, aquaculture, floriculture, improving domestic and international market systems and facilitating credit flow to the farmers.



TERMINAL QUESTIONS

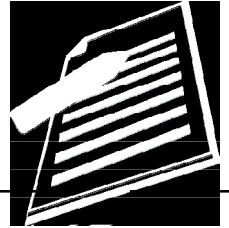
1. Discuss changing pattern of cropping in India.
2. What is meant by Green Revolution? Write its impact on agricultural production and environment.
3. What is the impact of globalization on agricultural sector in India?
4. Show the sugarcane and tea producing areas on an outline map of India.
5. Write short notes on following:-
 - (a) Eco-farming/organic farming
 - (b) White Revolution
 - (c) Blue Revolution
 - (d) Agricultural policy of India.



ANSWER TO INTEXT QUESTIONS

22.1

1. (i) (f)
(ii) (e)



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(iii) (d)

(iv) (c)

(v) (b)

(vi) (a)

2. Punjab (84%)

22.2

1. 25

2. Uttar Pradesh

3. Rajasthan

4. (ii) 22

22.3

1. (a) (i) Cotton (ii) Jute

(b) (i) from Punjab to Bihar in the Northern Plain.

(ii) from Gujarat to Tamil Nadu in South India.

(c) Coimbatore

(d) (i) First

(e) West Bengal

2. See Map on page No.

22.4

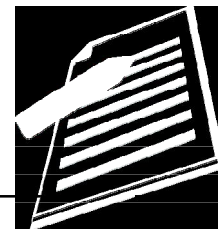
1. Climate (rainfall, temperature, humidity), soils, size of farms, availability of fertilizers, good quality of seeds, irrigational facilities and price incentives are the factors which effect cropping patterns

2. Globalization means to make global, worldwide or effecting whole world or all people. It integrates economy of a country with world economy.

3. There are three agricultural seasons in India - (i) Rabi (ii) Kharif (iii) Zaid.

4. During third plan (1961-66).

5. i) Achieving more than 4 per cent annum growth rate in agriculture sector
(ii) Growth based on efficient use of resources and conservation of our soil, water and biodiversity, (iii) Growth with equity-in region and among the farmers, (iv) growth that caters to domestic market and maximizes benefits from exports of agricultural products.



HINTS TO TERMINAL QUESTIONS

1. Refer to section 22.6 and 22.8
2. Refer to box information under section 22.9
3. Refer to section 22.9 (I)
4. Refer to Fig. No. 22.3 and 22.5
5.
 - (a) Refer to 22.3(J)
 - (b) Refer to 22.4
 - (c) Refer to 22.5
 - (d) Refer to 22.10

Notes