



CHARACTERISTICS OF INDIAN AGRICULTURE

India has a variety of soil, topography and climate. There are a very few countries in the world which have such a wide range of agro-climatic conditions, due to which different types of crops and livestock can be grown. Indian agriculture comprises production of crops, livestock- milk and meat, fisheries, poultry, and several other rural enterprises like honey production, wool production, etc. Therefore, agriculture in India is the largest private enterprise providing income and employment to millions of households directly or indirectly. But lack of awareness and access to modern technology, lack of market access, lack of assured irrigation, poor risk coverage, etc. make Indian agriculture highly vulnerable to the vagaries of nature as well as market forces. Still crop production remains the mainstay for the rural households.



LEARNING OUTCOMES

After studying this lesson, the learner:

- defines the concept of farm and farm size;
- identifies the land use pattern in India;
- recognizes the different agro-ecological zones of India;
- explains the various systems of farming practiced in India; and
- analyzes the importance of allied sectors in agriculture.

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3.1 FARM AND FARM SIZE

Usually, a **farm** is a piece of land, where crops and livestock production are taken up by a household or a farmer. Thus, it is an area of land that is primarily devoted to agricultural purposes with the main objective of producing food and other crops.

A **farmer** is a person who owns the land and/or operates an agricultural enterprise, either commercially or to sustain his family. While **agricultural labour** is basically a semi-skilled or unskilled person employed to a farm in connection with cultivating the soil or performing any farm operations, including raising, feeding, caring for, and managing livestock, bees, poultry, and fur-bearing animals.

The size of a farm is determined by the operational holding of a household. An **operational holding** is defined as all land which is used wholly or partly for agricultural production by one household, regardless of the legal ownership or location.

Table 3.1: Classification of farmer according to farm size/ operational holding

Type of farmer	Area of farm
1. Marginal	Below 1 ha
2. Small	Between 1 to 2 ha
3. Semi-medium	Between 2 to 4 ha
4. Medium	Between 4 to 10 ha
5. Large	10 ha and above

Note: 1 hectare (ha) = 2.47 acres or 10,000 m²

In India, smallholders refer to marginal and small farmers. They constitute 86.1% of total farms of our country. The all India average land holding size is 1.08 hectares (ha). Many farmers in India are landless as well, who don't have their own land, but operate on land taken on lease from landholders. Such farmers are also known as **tenant farmers**.

Table 3.2: Number of holdings, operated area and average size of holdings of different size holdings

Sr. No.	Size Group	Agriculture census 2015-16		Percentage of holdings to total holdings	Percentage of area operated to total area	Average operated area per Holding (ha.)
		Number of Holdings (in '000)	Area Operated (in '000 ha.)			
1	Marginal	1,00,251	37,923	68.45	24.03	0.38
2	Small	25,809	36,151	17.62	22.91	1.40
3	Semi-Medium	13,993	37,619	9.55	23.84	2.69
4	Medium	5,561	31,810	3.80	20.16	5.72
5	Large	838	14,314	0.57	9.07	17.07
	All Sizes	1,46,454	1,57,817	100.00	100.00	1.08

Source: Agricultural Census (2015-16)

3.2 LAND USE PATTERN IN INDIA

The country has large area of land under crop cultivation. Currently, about 60 per cent of cultivated lands are rainfed, where farmers mainly depend upon seasonal rainfall for crop cultivation. Further, majority of rural households still depend on agriculture for their livelihood. Among them, most of farmers are small and marginal (85%). These small farmers have very small land area for cultivation. Therefore, they are producing small quantities of food mainly for their household consumption and very little are left for selling in market. The country has total geographical area of 328.73 million hectares (Mha). But only 93% of total geographical area is available officially as reports from some of the difficult regions are not completed yet (Land use statistics 2018-19).

Land resources are used for the following purposes:



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1. Forests

It is a large area mostly covered with trees and vegetation. It is the source of clean air and water. Therefore, maintaining a forest area is highly essential for survival of human. Ideally, a country should maintain 33% of its geographical area under forest for maintenance of the ecological balance while India has only 24.6% area occupied by forest. It is observed that the forest area has increased over the years, although it is far lower than the desired proportion.

2. Land not available for Cultivation

- a. **Barren and waste land:** It includes desert, snow covered area or steep mountainous area.
- b. **Land put to non-agricultural uses** e.g. roads, buildings, factories, etc.

3. Other Uncultivated Land (excluding fallow land)

- a. Permanent pastures and grazing land
- b. Land under miscellaneous tree crops and mangroves

4. Fallow Lands

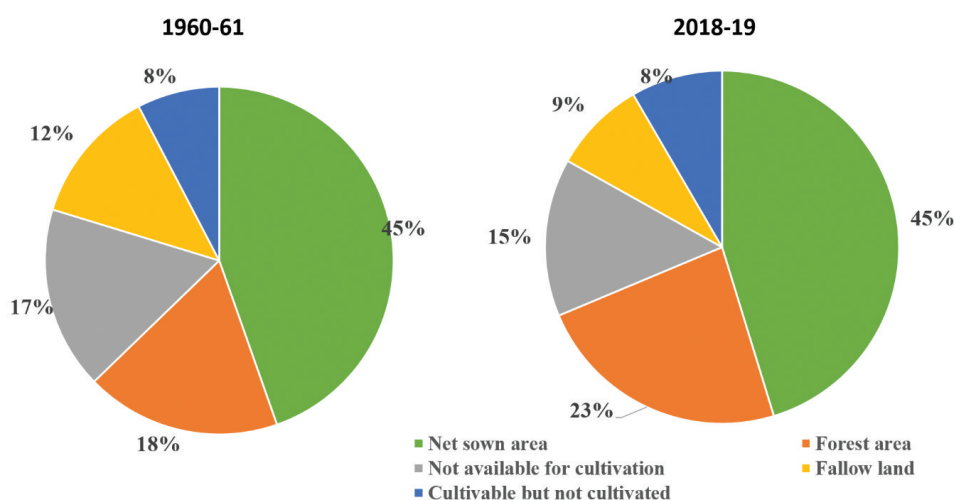
- a. **Current fallow** (left uncultivated for one or less than one year)
- b. **Other than current fallow** (left uncultivated for the past 1 to 5 agricultural years)

5. Net Sown Area

It is the total land area on which crops are sown. If an area is cultivated multiple times in year, it is still counted once only. For example, suppose a farmer has 2 ha land where he grows rice in *kharif* season and wheat in *rabi* season. Therefore, his net sown area is 2 ha, while gross cropped area will be $(2+2) = 4$ ha.

In India, 139.35 million hectares (Mha) is estimated as net sown area (NSA). In about 58 Mha areas, crops are grown more than once in a year, which makes gross cropped area (GCA) to 197.3 Mha.

The area of cultivated land where irrigation is provided to grow crops is called net irrigated area. If more than one crop is cultivated in a year, counting all the irrigated areas for all season and all crops will be gross irrigated area. India has 71.55 Mha as net irrigated area and 102.67 Mha as gross irrigated area during



2018-19. Out of total irrigated area, 35 per cent is irrigated by tube-wells, while 16 per cent by canal. The land use pattern varies from one state to another.

Fig 3.1: Land use pattern of India in 1960-61 and 2018-19

Source: Ministry of Agriculture & Farmers' Welfare, Govt. of India, 2021

Measurement Table

1 hectare	=	10,000 m ²
1 hectare	=	2.471 acres
1 acre	=	4046.86 m ²
1 acre	=	4840 sq. yard
1 tonne	=	1,000 kg
1 million	=	10 lakhs
1 billion	=	1000 million



INTEXT QUESTIONS 3.1

1. Total net sown area of India is
2. Which category of farmers has maximum operational land holding in India?

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3. Land size of marginal farmer
 - a. 1 to 2 ha
 - b. 2 to 4 ha
 - c. <1 ha
 - d. > 10 ha
4. India has a geographical area of
 - a. 329.7 M ha
 - b. 328.7 M ha
 - c. 325.7 M ha
 - d. 324.7 M ha

3.3 CHALLENGES OF INDIAN AGRICULTURE

Indian agriculture faces several challenges that impact its productivity, sustainability, and overall growth. Some of the key challenges include:

- 1) **Lack of Crop Diversification:** The agriculture sector is susceptible to price swings and market uncertainty due to its reliance on a small number of primary crops (e.g. rice, wheat, maize, sugarcane, etc). Promoting crop diversification can help in sustainable agricultural practices and risk reduction.
- 2) **Outdated Agricultural Practices:** Traditional agricultural methods are still used by a large number of Indian farmers, which results in low yields and inefficient farms. Sustainable agriculture depends on the use of contemporary equipment, technology, and scientific agricultural practices.
- 3) **Small and Fragmented Landholdings:** As a result of population increase and the dissolution of the joint family structure, agricultural land has been continuously divided into fewer and smaller parcels. Such tiny landholdings restrict farmer's capacity to use modern farming methods and technology. A fragmented land base frequently prevents large scale adoption of agricultural machinery and lowers total production.
- 4) **Dependency on Rainfall:** India's agriculture is mostly dependent on the monsoon. Distribution of rainfall is not the same throughout the country. Thus food grain output varies from place to place. Generally, after a year of abundant crop production there follows typically a year of severe deficit.
- 5) **Lack of Access to Credit and Market:** It is often difficult for small and marginal farmers to get insurance and loans. This restricts their capacity to invest in cutting-edge farming equipment, technology, and inputs. Farmers frequently encounter difficulties reaching markets as a result of poor infrastructure, problems

with transportation, and intermediaries. Furthermore, changes in the price of food might have an effect on farmers' earnings.

- 6) **Degradation of Soil Health:** Excessive use of chemical fertilizers and pesticides, coupled with poor soil management practices, contribute to soil health deterioration, affecting long-term agricultural sustainability.

However, recent developments addressing some of these issues like diversification of agriculture towards fruits and vegetables, collectivization of farming activities, market reforms, credit and insurance policies, digital agriculture, various government schemes, etc. are helping the farmers in getting better income from agriculture.



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3.3 AGRO CLIMATIC ZONES OF INDIA

Different crops need different types of climate for their growth. Even soil conditions like structure, depth, topography or moisture holding capacity can also significantly affect crop germination and growth. Hence season of planting; production and distribution of crops generally vary from region to region. Thus suitability of crops in different areas is controlled to a large extent by climate and soil. Classification of country into several agro-climatic zones was done with the primary objective of helping the farmers in selection of suitable crops according to the region. It will increase the farmer's income and reduce the regional inequalities in agricultural development by optimizing the agricultural production through judicious use of the available irrigation water. The Planning Commission of India divided total geographical area of country into 15 agro-climatic regions based on topography, annual rainfall, and temperature. These are:

1. **Zone 1 - Western Himalayan Region:** Jammu and Kashmir, Uttar Pradesh
2. **Zone 2 - Eastern Himalayan Region:** Assam, Sikkim, West Bengal and all North-Eastern states
3. **Zone 3 - Lower Gangetic Plain Region:** West Bengal
4. **Zone 4 - Middle Gangetic Plain Region:** Uttar Pradesh, Bihar
5. **Zone 5 - Upper Gangetic Plain Region:** Uttar Pradesh
6. **Zone 6 - Trans-Gangetic Plain Region:** Punjab, Haryana, Delhi and Rajasthan
7. **Zone 7 - Eastern Plateau and Hill Region:** Maharashtra, Uttar Pradesh, Orissa and West Bengal

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8. **Zone 8 - Central Plateau and Hill Region:** MP, Rajasthan, Uttar Pradesh
9. **Zone 9 - Western Plateau and Hill Region:** Maharashtra, Madhya Pradesh and Rajasthan
10. **Zone 10 - Southern Plateau and Hill Region:** Andhra Pradesh, Karnataka, Tamil Nadu
11. **Zone 11 - East Coast Plain and Hill Region:** Orissa, Andhra Pradesh, Tamil Nadu and Pondicherry
12. **Zone 12 - West Coast Plain and Ghat Region:** Tamil Nadu, Kerala, Goa, Karnataka, Maharashtra
13. **Zone 13 - Gujarat Plain and Hill Region:** Gujarat
14. **Zone 14 - Western Dry Region:** Rajasthan
15. **Zone 15 - The Islands Region:** Andaman and Nicobar, Lakshadweep

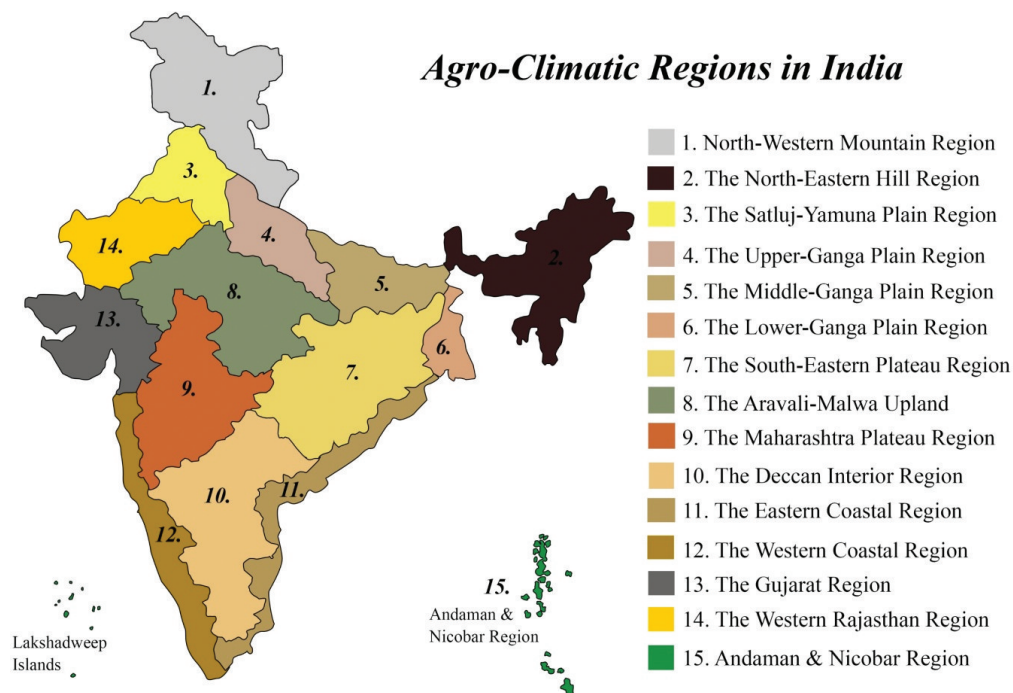


Fig. 3.2: Agro-climatic zones of India

3.4 DIFFERENT SOIL TYPES OF INDIA

India has a variety of soils due to its diverse geographical and climatic conditions. This diversity considerably affects agriculture, land use planning, and environmental

management. In India, the Indian Council of Agricultural Research (ICAR) has classified soils into 8 categories based on **colour and composition of the soils**. Figure 3.3 shows the distribution of various types of soil all over India.

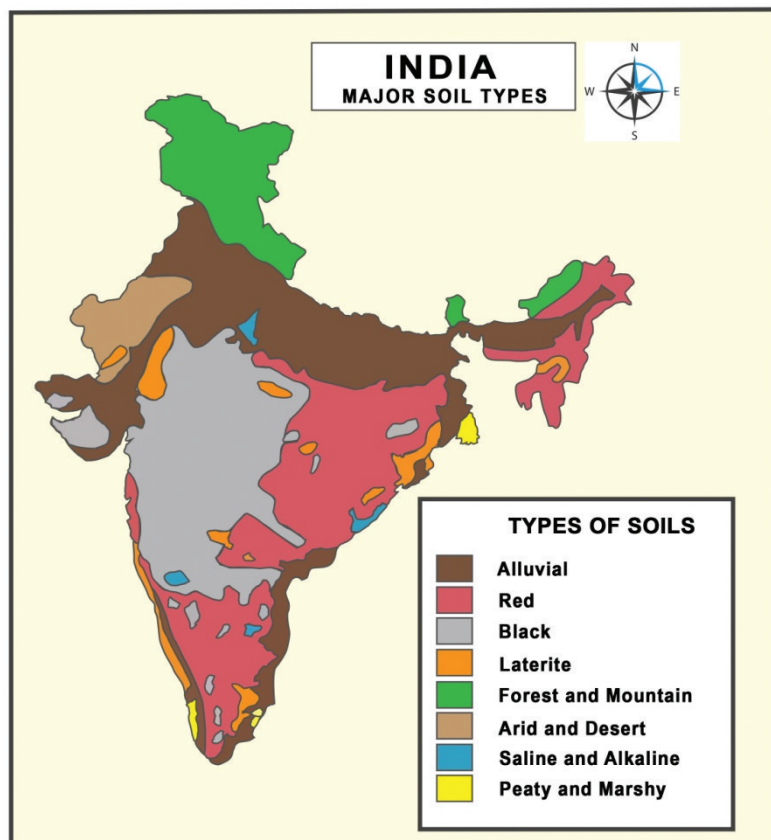


Fig 3.3: Distribution of major soils of India

- A. **Alluvial Soil:** This soil type covers the largest area in the country and occupies 113 Mha in the Indo-Gangetic Plain, Brahmaputra Valley and Coastal area. The most recent young alluvial soils are called “*Khadar*” and old alluvial soils are called “*Bhangar*”. Alluvial soils are considered to be the most fertile soils in India. The alluvial soil consists of various proportions of sand, silt and clay. Alluvial soils contain adequate proportion of potash, phosphorus and calcium, which are ideal for crop growth.
- B. **Red Soil:** Red soils are occupying about 85.7 Mha in the states of Telangana, Tamil Nadu, Karnataka, *etc.* These are well drained soils found in semi-arid to warm humid tropical climates. These soils are generally developed from granite and metamorphic rocks like gneisses and schists. This type of soil is found in low rainfall regions.



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- C. Black soil:** These are very dark, clay dominated soils. Black soils are also known as Black Cotton Soil or “*regur* soil” (in Central India) and “*bhal*” (in Gujarat). These soils occupy about 55 Mha, mostly found in Maharashtra, Madhya Pradesh and Gujarat states. Black colour of soil is due to presence of clay humus complexes. They are well known for their excellent water holding capacity. In addition, they are rich in calcium, magnesium, potash and lime, but generally poor in phosphate content. These soils develop deep cracks during hot weather, while becomes sticky when wet.
- D. Laterite or lateritic soil:** These soils are formed by laterization (alkaline hydrolysis) process, in tropical and subtropical climate with alternate wet and dry season. This soil is the result of intense leaching due to heavy rain. It is acidic ($\text{pH} < 6.0$) in nature, generally deficient in plant nutrients. It is found mostly in southern states, Western Ghats region of Maharashtra, Odisha, some parts of West Bengal and north-east regions. These soils are red in colour, have high clay content, deeply weathered and very deep. This soil is useful for tea and coffee cultivation. In Andhra Pradesh, Odisha and Kerala, cashew nut is cultivated in this soil.
- E. Arid soil:** Arid soil is red and brown in colour and sandy in texture. It is alkaline in nature. This soil type is found mainly in parts of Western Rajasthan, Haryana, Punjab and extends up to the Rann of Kutch in Gujarat. Due to high calcium content, the bottom horizon of the soil is full of ‘*Kankar*’ (pebbles), which restricts the infiltration of water through the soil. Due to dry climate and high temperature, it contains a very low percentage of organic matter.
- F. Forest and mountain soil:** These soils are found in the hilly mountainous areas where sufficient forests are available. These are loamy and silty in valley sides and coarse grained on the upper slopes.



Fig. 3.4: Major soil types found in India



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Table 3.3: The details of potential and problems of major soils of India

Sl. No.	Soil	Potential	Problems
1.	Alluvial soils	One of the best soil and used for growing most agricultural crops and spread in Indo-Gangetic plains (IGP), Brahmaputra valley and coastal area	Rich in plant nutrient but deficient in organic carbon, nitrogen (N) & phosphorus (P). Prone to salinization due to faulty irrigation and bad drainage.
2.	Black soils	Inherently fertile and used for growing cotton, citrus, millets, sorghum, soybean, pigeonpea, wheat and sugarcane. Spread in Maharashtra, Madhya Pradesh, Gujarat, Rajasthan, Chhattisgarh and some parts of Karnataka and Tamil Nadu.	Narrow workable moisture, poor drainage, low infiltration, calcareousness induces micronutrient deficiency. Inherently fertile but problem in workability and development of subsoil sodicity in some pockets.
3.	Red soils	Produces good yield under proper management of agricultural, horticultural & plantation crops. Spread in Tamil Nadu, Karnataka, Goa, Maharashtra, Madhya Pradesh, eastern and north-eastern regions of Bihar, Jharkhand, West Bengal, Assam and Uttar Pradesh.	Prone to surface crusting and hardening, poor natural fertility, low CEC (cation exchange capacity), P-fixation Poor in organic carbon, nitrogen (N) & phosphorus (P) content. Respond well to potassium management

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Sl. No.	Soil	Potential	Problems
4.	Laterite and lateritic soils	Formed by laterization process found in Malabar hills of Kerala. Spread in Maharashtra, Orissa, some parts of West Bengal and north-east regions.	Deficient in almost all nutrients but can be managed well if suitable management practices are adopted. Liming is essential for better crop production.
5.	Salt-affected soils	These soil contain excess of neutral soluble salt (especially chloride and sulphate salt of sodium, calcium and magnesium). Mostly found near coastal areas. Fertile soils developed salinity and sodicity due to faulty irrigation. Cultivated for salt-tolerant crops like, rice, wheat, sugarcane, barley, oats, cotton, etc. and a variety of grasses like Karnal grass, Bermuda grass.	Leaching of salts with good quality irrigation water along with adequate drainage network is essential for of removal of leached water. Sodic soils are reclaimed by gypsum application. In case of calcareous sodic soil, pyrites used for reclamation.
6.	Desert soil	These soils occupy the western part of Rajasthan, Gujarat, Haryana and Punjab. Cold arid soil found in in Leh, Ladakh. These are light soils with less than 10% clay.	Light soil, poor in nutrient and water holding capacity
7.	Forest and hill soils	These soils are developed under forest canopy. Spread in Himachal Pradesh, Jammu and Kashmir, Uttarakhand, Sikkim, Madhya Pradesh, Kerala, NE regions and Andaman & Nicobar	Bench terracing and soil conservation practices are required for cultivation



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Sl. No.	Soil	Potential	Problems
		Islands. Soils of cool climates, under coniferous forests of Himalaya are strongly acidic, high in organic carbon, moderately high in clay.	
8.	Peat and Marshy Soils	Developed under humid climate and in localized pockets of Kerala and eastern region of tidal swamps. High amount of organic matter with presence of pyrites (FeS_2). Generally, submerged (reduced) but sulphuric acid is formed when oxidized. Rich in organic matter. Rice cultivation is generally practiced.	Soil becomes extremely acidic after drainage.

INTEXT QUESTIONS 3.2

- India has been divided into how many Agro-Climatic Zones?
 - 17
 - 15
 - 18
 - 16
- Alluvial soil also known as
 - Regur
 - Khaddar
 - Bhangar
 - Both b and c
- Which type of soil is more suitable for cotton crop?
- 'Kankar' is found in soil.

3.5 DIFFERENT FARMING SYSTEMS IN INDIA

A farming system is a mix of farm enterprises such as crops, livestock, aquaculture, agro-forestry and fruit crops to which farm family allocates its resources in order to

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efficiently manage the existing environment for the attainment of the family goal. However, Food and Agriculture Organization (FAO) defined farming system as a population of individual farm systems that have broadly similar resource bases, enterprise patterns, household livelihoods and constraints, and for which similar development strategies and interventions would be appropriate.

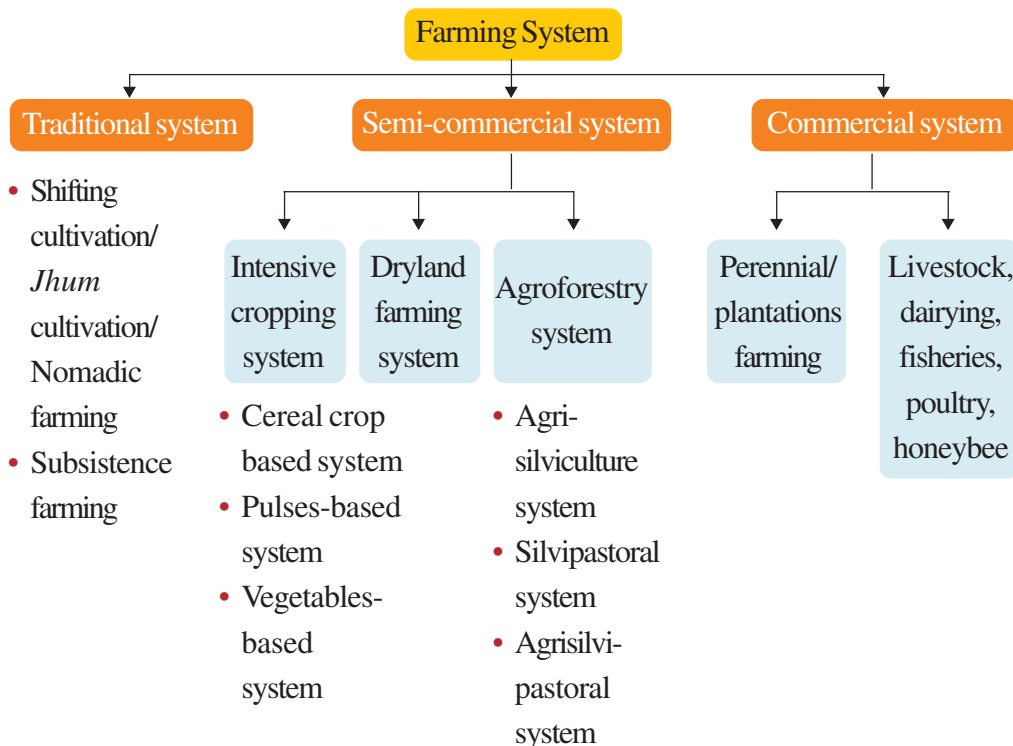


Fig. 3.5: Different farming systems of India

Shifting/Nomadic Farming

In this type of farming system, forest land is cleared by felling trees and burning the bushes. Once the land is cleared, crops are grown for two to three years and then the land is abandoned as the fertility of the soil decreases. The farmers then move to new areas and the process is repeated. Paddy, maize, millets and vegetables are the crops commonly grown in this type of farming. This is practiced mostly in North East Region of India.

Subsistence Farming

Under this, farmer household produces cereals mainly for household consumption and only residuals are sold in the local market. It is characterized by small and scattered land holdings. They use sub-optimal quantity of fertilizers and local variety of seeds. Cereals like wheat, rice, millets, pulses, vegetables, etc. are mainly grown. Some farmers also rear small number of livestock like cow, buffalo, bullocks, sheep or goat.



Intensive Cropping System

Intensive farming is currently practiced in most parts of the country. Farmers try to grow 2-3 crops in a year from the same piece of land to maximize the production and income by intensive use of improved varieties of seeds, chemical fertilizers, irrigation, and farm mechanization. This is also known as Industrial agriculture. This farming system is possible only in those areas where irrigation facility is available. India could achieve food security with the intensive farming of rice and wheat in large parts of Indo-Gangetic plain region.

Dryland Farming System

Dryland farming is a practice of growing crops without irrigation in areas where average annual rainfall is less than 1150 mm. In this region, crops are grown on available moisture only, as very limited irrigation water may be available. In some areas where rainfall is little high (> 1150 mm), rainfed farming is also prevalent. In these areas, mostly single crop or intercrops are grown in a year. Dryland farming is also subject to high variability in areas sown and crop yield.

Agro-forestry Farming System

Agroforestry is the integration of woody perennials, such as trees and shrubs, with crops, livestock, or fish production. It may be of different types. In case of agro-silviculture, trees and agriculture crops are grown together in same lands at the same time. In a silvipastoral system, trees and shrubs are grown with the field crops, so as to produce fodder for livestock. This system is needed in dry area to meet the fodder demand throughout the year. Similarly, in case of agri-silvi-pastoral system, tree crops + grain crops + animals are raised together. Forest tree crops for fodder like Subabul, Babool, Khejri etc. are taken with intercropping of grasses like stylo, berssem, etc. for fodder purpose as well as the food grain crops like maize, rice, *jowar*, etc. in between the strips of forest tree species.

Plantation Agriculture

It is mainly perennial crops oriented farming system, which are grown on large areas, like fruit orchard, tea, coffee, rubber, arecanut, coconut, palm oil, etc. It requires good managerial ability, technical knowledge, and capital investment. Most of the crops grown in plantation agriculture have a life cycle of 3 to 30 years. It is practiced in Kerala, Karnataka, Assam, Andhra Pradesh, and Maharashtra.

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Allied Farming System

There are several other non-crop farming systems, under which farming of livestock for meat, milk, wool or poultry, fisheries, honeybee keeping, etc. are done at commercial scale. The produce from such farming are mainly sold in the market on continuous basis.

**INTEXT QUESTIONS 3.3**

1. Enlist the traditional farming systems followed in India.
2. Shifting cultivation is followed mostly in states.
3. Dryland farming is practiced where rainfall is more than 1150 mm (True/False).
4. Give examples of two forest trees which are used as fodder.

3.6 CLASSIFICATION OF CROPS

A crop refers to group of plants sown and harvested for some definite economic purpose. In India, varieties of crops are cultivated by the farmers depending upon the soil type, agro-climatic conditions, market conditions, etc. These crops may be food crops as well as non-food crops. Major crops under different categories are given below in the box.

Field Crops

It is any of the herbaceous plants grown on a large scale in cultivated fields for agriculture purpose, primarily, grains, forage, sugar, oil and fibre. This includes other than fruits and vegetables. Field crops provide the food, feed, grain, oil and fibre for domestic consumption and are major component of a nation in progress.

Examples of field crops are cereals (rice, wheat, maize, sorghum, *etc.*) pulses (greengram, blackgram, redgram, bengalgram, *etc.*), oilseeds (sunflower, safflower, groundnut, sesame, *etc.*), fibre crops (cotton, jute, hemp, *etc.*).

FOOD CROPS: This includes cereals, pulses, fruits, vegetables, spices and condiments and other food crops.

Cereals: include paddy (rice), *jowar*, *bajra*, maize, *ragi*, wheat, small millets, barley and other cereals.

Pulses: include gram (chickpea), tur (redgram), urad (blackgram), moong (greengram), masur (lentil) and other pulses.

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Fruits: include mangoes, bananas, citrus fruits (oranges, kinnow, etc.), apples, guavas, grapes, pomegranate, papayas, litchi, pine apple, and other fruits. Dried fruits include cashew nuts, almonds, pistachio, walnut and others.

Vegetables: include potato, tomato, onion, brinjal, cauliflower, spinach, carrot, ladies finger (bhindi), bottle gourd, bitter gourd, snake gourd, broccoli, mushroom, chillies, *Capsicum*, sweet potato, etc.

Spices & condiments: include black pepper, ginger, turmeric, cardamom, betel nuts (arecanuts), garlic, coriander, fennel, cinnamon, etc.

Other food crops: Sugar cane, water melons, musk melons, etc.

NON-FOOD CROPS: This crop group include those crops which are either not for human consumption purposes or consumed after certain processing. Such as:

Oilseeds: groundnut, rapeseed & mustard, sesamum, soybean, linseed, sunflower, safflower, coconut, nigerseed, cotton seed, castor seed, and other oilseeds.

Flowers and landscaping plants: Roses, *Chrysanthemum*, marigold, jasmine, and many other crops grown for gardens and fencing

Fibres: Cotton (*kapas*), jute, mesta, sunhemp, and other fibres

Plantation crops: Tea, coffee, rubber, cocoa, and others.

Drugs & narcotics: Tobacco and opium

Fodder crops: Berseem, napier, guar, fodder maize, and other fodder crops

Timber & agroforestry: Bamboo, teak, subabul, and other trees

Horticultural Crops

Horticultural crops include fruits (mango, grapes, guava, banana, *etc.*), vegetables (spinach, cabbage, cauliflower, tomato, brinjal, *etc.*), flowers (rose, lotus, jasmine *etc.*), medicinal (*tulsi*, aloe vera, garlic, *etc.*), aromatic (lemon grass, mint, fennel, *etc.*) and ornamental plants (marigold, rose, desert rose, lavender, *etc.*).

Commercial Crops

Cash crops or commercial crops are the ones that are cultivated to be sold in the market to earn profits from their sale. In other words, any crop grown to generate cash / profit rather than for subsistence is called cash crop. Example: Sugarcane, coffee, jute, cotton, *etc.*

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Plantation Crops

Plantation crops are defined as a group of commercial crops perennial in nature, cultivated extensively in tropical and subtropical situations in large and contiguous areas. Example: Coconut, cashew nut, tea, coffee, oil palm, cocoa, *etc.*

**INTEXT QUESTIONS 3.4**

1. Commercial crops also known as crops.
2. Cereal, pulse, fruits, vegetables, spice and condiments come undercrops.
3. Plantation crops are in nature.
4. Soybean and niger are classified as
 - a. Pulse crop
 - b. Oilseed crop
 - c. Cereal crop
 - d. Fibre crop

3.7 IMPORTANCE OF ALLIED SECTORS OF AGRICULTURE

The allied sectors of agriculture play a crucial role in supporting and enhancing the overall agricultural system. These sectors contribute to the agricultural value chain by providing essential inputs, services, and processing activities. These sectors may benefit farmer through

- a. Employment generation
- b. Diversification of income sources
- c. Supply of inputs
- d. Nutritional security
- e. Efficient resource utilization and waste management
- f. Export of agricultural products
- g. Conservation of biodiversity
- h. Tackling harmful effects of climate change

The allied sectors of agriculture comprise livestock production - cattle & buffaloes, goats & sheep, poultry farming, fisheries, forestry and horticulture. In following section, we will discuss about some of these major sectors.



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Livestock Farming

Livestock farming is an integral part of crop farming and contributes substantially to household nutritional security and poverty alleviation through increased household income. The returns from livestock especially dairying and mixed farming in small and medium holdings are larger and highly sustainable. The progress in this sector results in more balanced development of the rural economy and improvement in economic status of poor people associated with livestock. Indian agriculture is an economic symbiosis of crop and livestock production with cattle as the foundation. Dairy animals produce milk by converting the crop residues and byproducts from crops which otherwise would be wasted. Dairy sector contributes by way of cash income, draught power and manure.

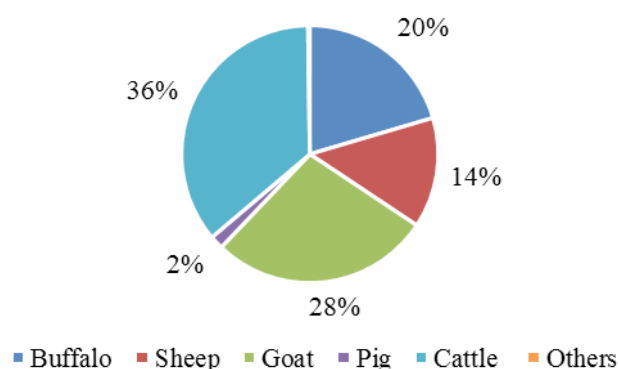


Fig. 3.6: Share of different livestock species in total population (2019)

Poultry

The number of poultry birds has increased to 851.81 million in the year 2019. It shows over 45.8% increase in backyard poultry and 4.5% in commercial poultry.

Table 3.4: Poultry population during 2012 and 2019

	Population (in millions)		% growth
	2012	2019	
Total poultry	729.21	851.81	16.81
Backyard poultry	217.49	317.07	45.78
Commercial poultry	511.72	534.74	4.50

Source: 20th Livestock Census Report, 2022

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Fisheries

With about 7.7 per cent of the global fish production, India is the third largest fish producing country in the world. Fisheries and aquaculture witnessed manifold rise in its production during past decades, from 5 lakh tonnes in 1950-51 to 142 lakh tonnes in 2019-20. The sector provides livelihood to about 16 million fishers and fish farmers at the primary level and almost twice the number along the value chain, and has enough potential to generate income, employment, growth in subsidiary industries, and earn foreign exchange for the nation. Export earnings from the fisheries sector has been Rs. 46,662.85 crores during 2019-20. Fisheries sector has been recognized as a 'Sunrise Sector' and has demonstrated an outstanding double-digit average annual growth of 10.87 per cent since 2014-15.

Table 3.5: Fish production in India (2019-20)

Sl. No	Type of fish	Production (000 tonnes)
1.	Inland fish	14164.00
2.	Marine fish	3727.00

Source: India Stat, 2022

3.8 SOURCES OF IRRIGATION IN INDIA

Irrigation is the artificial application of water to the soil or agricultural field. It is essential for sustaining crop productivity in many regions of the country mainly because the rainfall is inadequate and unevenly distributed to meet crop-water demands. Irrigation helps grow and cultivate crops. Major sources of irrigation water in India are rivers, rainwater, groundwater, open well, tube well, tanks, canals, etc.

The competing demands of water for other uses, viz. urbanization and industrialization, are also restricting the availability of water for crop production. Therefore, it is essential to optimize the use of water according to availability on a sustainable basis. In most part of the country, due to overuse of groundwater, the water table is declining. In India, various irrigation systems are used, like surface irrigation (check basin, border strip, furrow), sub surface irrigation (drip irrigation) and pressurised irrigation (drip and sprinkler irrigation). Drip irrigation, a green revolution technology, has been introduced to reduce the tillage requirement and increase the water-use efficiency by 40-80 per cent.



INTEXT QUESTIONS 3.5

1. Which allied agricultural sector is considered as 'Sunrise sector of India'?
2. By using drip irrigation method, water use efficiency can be increased by
 - a. 40 to 80%
 - b. 10 to 40%
 - c. 40 to 78%
 - d. 20 to 40%
3. Name few major sources of irrigation used in India.



Notes



WHAT YOU HAVE LEARNT

- A farm is a piece of land, where crops and livestock production are taken up by the household or farmer. Agricultural labour is basically a semi-skilled or unskilled person employed to a farm in connection with cultivating the soil or performing any farm operations.
- In India, lands are utilized for various purposes like agriculture, forest, pasture, grazing or non-agricultural use (road, railways, buildings or factories).
- Based on size of landholding, farmers are categorized into various classes. Small and marginal farmers form the majority of farming community
- A farming system is a combination of several farming activities, such as crops, livestock, aquaculture, agro-forestry and fruit crops by farmer to maximize productivity and farm income.
- There are eight major types of soils in India viz. alluvial soil, red soil, black soil, laterite soil, arid soil, forest soil, saline-alkaline soil and peaty-marshy soil.
- India has been divided into 15 agro-climatic zones based on temperature, annual rainfall and topography.
- Different sources of irrigation in India include surface irrigation (check basin irrigation), sub surface irrigation (drip irrigation) and pressurised irrigation (drip and sprinkler irrigation).

Scope and Importance
of Agriculture

Notes**TERMINAL QUESTIONS**

1. Explain the main characteristics of Indian agriculture.
2. Give a brief overview of different farming systems.
3. Define a crop? Can you provide examples for the different classifications of crops?
4. Could you list the types of soils found in India and discuss the features of alluvial soil in detail?
5. Can you provide a detailed description of the 15 agro-climatic zones in India?
6. What are the various sources of irrigation used in India?
7. Could you write down the importance of drip irrigation?

**ANSWERS TO INTEXT QUESTIONS****3.1**

1. 139.35 million hectare
2. Small and marginal farmers
3. < 1 ha (option c)
4. 328.7 Mha (option b)

3.2

1. 15 (option b)
2. Both b & C (option d)
3. Black soil
4. Arid soil

3.3

1. Shifting cultivation and subsistence farming
2. North eastern states
3. False
4. Subabul and Khejri



3.4

1. Cash crops
2. Food crops
3. Perennial
4. Oilseed crop (option b)

3.5

1. Fisheries sector
2. 40-80% (option c)
3. Rivers, rainwater, groundwater, open well, tube well, tanks, canals

GLOSSARY

Agroforestry: Agroforestry is the integration of woody perennials, such as trees and shrubs, with crops, livestock, or fish production.

Cropping intensity: Ratio of gross cropped area and net sown area in percentage term is called cropping intensity.

Current fallow: The areas which are usually cropped but due to some reason or the other were not cultivated during the reference year are classified as current fallow.

Farming system: A farming system is a mix of farm enterprises such as crops, livestock, aquaculture, agro-forestry and fruit crops to which farm family allocates its resources in order to efficiently manage the existing environment for the attainment of the family goal.

Gross cropped area: Area sown more than once in an agricultural year plus net sown area is known as gross cropped area.

Net sown area: The Net Area Sown represents the total cultivated area during the reference year without considering the number of times it has been cultivated in a year.

SUGGESTED READINGS

1. *Handbook of Agriculture*, 6th edition, Indian Council of Agricultural Research, New Delhi.
2. Chadha, K. L. (2019). *Handbook of Horticulture* (Vol. I & II), ICAR Publication, New Delhi.

WHAT YOU HAVE LEARNT

