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Distance Learning Programme (DLP)

INDIAN ECONOMY - II

(UPSC MAINS)

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Agriculture

Chapter 1

Agriculture is one of the oldest and prime activities of the human being. It includes growing crops, horticulture, pisciculture, sericulture, silviculture, floriculture, etc. The development of agriculture depends on fertile soil, rainfall, water resources, suitable climatic conditions, leveled topography, water vapour or humidity in the atmosphere, fertilizers and chemicals, improved seeds, and modern forms of technology, etc. In developing countries, the agriculture sector has been a major source of employment and it has contributed to the national economy.

Role of Agriculture in Indian Economy

- Agriculture, with its allied sectors, is the largest source of livelihoods in India. An estimated 70% of its rural households still depend primarily on agriculture for their livelihood, with 82% of farmers being small and marginal.
- In 2017-18, total food grain production was estimated at 275 million tonnes (MT). India is the largest producer (25% of global production), consumer (27% of world consumption) and importer (14%) of pulses in the world.
- India's annual milk production was 165 MT (2017-18), making India the largest producer of milk, jute and pulses, and with the world's second-largest cattle population 190 million in 2012.
- India is the second-largest producer of rice, wheat, sugarcane, cotton and groundnuts, as well as the second-largest fruit and vegetable producer, accounting for 10.9% and 8.6% of the world's fruit and vegetable production, respectively.
- Indian agricultural and allied sector accounts for about 17.5 % of India's GVA, and it ensures the food security for the 1.3 billion population of India.
- Many agro-based industries such as textile, leather, sugar, tea, etc., are dependent on the agricultural sector. Agribusiness is contributing greatly to the national income of India. Therefore, it is said that agriculture is the backbone of the Indian economy. Agricultural exports constitute around a fifth of the total exports of the country.

Cropping Patterns in India

- The cropping pattern indicates the proportion of area under different crops at a point of time. Variation in cropping systems has been one of the main characteristics of Indian agriculture, and it is credited to rain fed agriculture and existing socio-economic conditions of farmers.
- The crop statistics published by the governments are used to signify the cropping patterns. It is, however, a dynamic notion as it changes over space and time. The cropping patterns of a region are directly influenced by the geo-climatic, socio-cultural, economic, historical and political factors.

- Cropping systems of an area are decided by several soil and climatic parameters which determine overall agro-ecological setting for the nourishment and appropriateness of a crop or set of crops for cultivation. However, at farmers' level, potential productivity and financial benefits act as guiding principles while opting for a particular crop/ cropping system.
- These decisions with respect to choice of crops and cropping systems are further narrowed down under the influence of several other forces related to infrastructure facilities, socio-economic factors and technological developments, all operating interactively at the micro-level.
- There are two different ways of growing crops one is 'mixed cropping' which is blending two two or more crops together on the same piece of land without row arrangements and another way is 'intercropping', which is growing two or more crops simultaneously on the same field in a definite pattern.
- It is apparent that there are countless micro dissimilarity in the cropping patterns. In most parts of India, agriculture is still mainly subsistent in character. As a result, the food grain crops occupy over 71 % of the gross cropped area. But the country may be divided broadly into five agricultural regions:
- The rice region extending from the eastern part to include a very large part of the northeastern and the south-eastern India, with another strip along the western coast.
- The wheat region, occupying most of the northern, western and central India.
- The millet-sorghum region, comprising Rajasthan, Madhya Pradesh and the Deccan Plateau in the centre of the Indian Peninsula.
- The temperate Himalayan region of Kashmir, Himachal Pradesh and Uttar Pradesh and some adjoining areas. Here potatoes are as important as cereal crops (which are mainly maize and rice), and the tree-fruits form a large part of agricultural production.
- The plantation crop region of Assam and the hills of southern India, where good quality tea is produced. There is an important production of high-quality coffee in the hills of the western peninsular India. Rubber is mostly grown in Kerala and parts of Karnataka and Tamil Nadu. There are some large estates, but most of the growers would come under the category of small holders. Sugarcane, which in many countries is a plantation crop, is almost entirely grown by small holders in India.

Crop Rotation
It is the practice of growing different crops in succession on the same land, chiefly to preserve the productive capacity of the soil.

Types of Crops

- **Rabi:** Rabi crops are sown in winter from October to December, and harvested in summer from April to June. Some of the important Rabi crops are wheat, barley, peas, gram and mustard. Though, these crops are grown in large parts of India, states from the north and north-western parts such as Punjab, Haryana, Himachal Pradesh, Jammu and Kashmir, Uttarakhand and Uttar Pradesh are important for the production of wheat and other rabi crops.
- **Kharif:** Kharif crops are grown with the onset of monsoon in different parts of the country and these are harvested in September-October. Important crops grown during this season are paddy, maize, jowar, bajra, tur (arhar), moong, urad, cotton, jute, groundnut and soybean. Some of the most important rice-growing regions are Assam,

West Bengal, coastal regions of Odisha, Andhra Pradesh, Telangana, Tamil Nadu, Kerala and Maharashtra, particularly the Konkan coast along with Uttar Pradesh and Bihar. Recently, paddy has also become an important crop of Punjab and Haryana.

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

Types of Farming

Dry Farming

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

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 crop is grown in a year because enough amount of moisture in the soil is available.
- Rice and jute are the main crops of this type of farming. West Bengal, Assam, Nagaland, Meghalaya, Tripura, Manipur, Mizoram and Malabar Coast fall under this category.

Irrigated Farming

- This type of farming is practiced in areas where average rainfall is 80 to 200 cm, which is insufficient for certain crops.
- This system of farming can be practised only in those areas where the 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 leveled agricultural land.
- The main areas where such 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 type of farming.

Subsistence Farming

- 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 and the 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.

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 the fertility of land declines, farmers move to new areas, clear the forests and grow crops there for the next few years.
- This farming is practised in some pockets of the hilly areas of Northeast and in some tribal belts of Odisha, Chhattisgarh and Andhra Pradesh.
- In the northeast, such type of cultivation is known as "Jhuming".

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.

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 in 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 the Nilgiri hills.

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 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.

Eco-Farming or Organic Farming

- This farming avoids the use of synthetic fertilizers, pesticides, growth regulators and livestock feed additives. This type of farming relies on crop rotation, crop residues, animal manure, off-farm organic wastes and biological pest control to maintain soil productivity.
- Organic farming is being promoted through the scheme Mission Organic Value Chain Development for North Eastern Region (MOVCDNER) under the National Mission for Sustainable Agriculture (NMSA).
- Schemes such as Paramparagat Krishi Vikas Yojana (PKVY) and Rashtriya Krishi Vikas Yojana (RKVY) also promote organic farming in the country.
- Various organic farming models include Natural Farming, Vedic Farming, Cow Farming, Homa Farming, Zero Budget Natural Farming (ZBNF) etc.

- **Zero Budget Natural Farming (ZBNF):** Its main aim is:
  - Elimination of chemical pesticides, and promotion of good agronomic practices
  - It restores soil fertility and soil organic matter
  - It requires less water and is climate friendly

Dry Zone Agriculture

It is practised in the areas of low rainfall or drought prone areas. As almost 65% of areas fall under rain-fed region, it really becomes important for Indian agriculture.

Following are the Characteristics:

- **Low Rainfall**: Dry-land areas are those sub-humid parts of the country which receive 75 cm to 100 cm rainfall and those semi-arid parts which receive 30-75 cm rainfall. Such areas are found in parts of Punjab, Haryana, south western Uttar Pradesh, western Madhya Pradesh, eastern Rajasthan, eastern Gujarat (Saurashtra region), interior regions of Maharashtra (Vidarbha and Marathwada), Karnataka (the plateau region), Tamil Nadu and Andhra Pradesh (Rayalaseema and Telangana).
- **Lack of Assured Irrigation:** The crops grown and the cropping practices followed in dry-zone regions entirely depend upon rainfall, which is often unpredictable and erratic. Therefore, dry-zone agriculture is also referred to as rain-fed agriculture.

  Vidarbha and Marathwada region of Maharashtra and Saurashtra region of Gujarat are known for the failures of crops due to drought leading to farmer suicides. Besides low rainfall, these regions face uncertainty in terms of failure of rainfall, late onset, early withdrawal or long dry spells between two wet spells.
- **Practice of Subsistence Farming:** Farmers in the rain-fed area, especially the small and marginal farmers who form the bulk of the cultivator population in these areas, practise subsistence farming, as different from surplus oriented farming.

  Subsistence farming is characterised by low productivity, uncertain yields, low incomes and low capital formation. These regions coincide with the drought-prone belt of the country and the population here is faced with unemployment and under-employment during monsoon failure and during the lean season.

Significance of Dry Zone Agriculture

- The crops grown under dry zone or rain-fed conditions include nutritionally vital crops like pulses (a source of proteins, nearly 80% of pulses is grown in rain-fed areas), oilseeds (a source of fats, grown under rain-fed conditions); groundnut, jute and mesta (nearly the whole of it is grown under rain-fed agriculture); staple food like jowar, bajra (about 90% of it grown in the dry zones), maize and other millets.
- Even if the full irrigation potential available in the country is realised, nearly half the cultivated area in the country will remain under dry-zone agriculture. This underlines the importance of dry-zone agriculture in the country's economy.
- Dry-zone agriculture contributes more than one-third of the total food-grains.
- Lower growth in production and productivity of the rain-fed crops has led to a decline in per capita availability of pulses and oilseeds. Thus, it is important to give special attention to the rain-fed areas. This becomes even clearer if we consider that 90% of the rise in food-grains production in recent times has been contributed by rice and wheat alone.

- Considering the emerging trends of diminishing returns from agriculture, it becomes imperative to formulate a coherent strategy for dry zone areas, which will meet three objectives:
  - Food security
  - Removal of inter-regional, inter-personal and inter-sectoral disparities and nutritional deficiencies
  - Rural employment

Major Crops in India

- **Paddy:** About 23 % of the total cropped area in the country is under this crop. Paddy is ideally grown in areas having high annual rainfall and moderate temperature. However, it is also grown in areas of less than 125 cm rainfall with the help of irrigation. Presently, 51 % of the rice producing area is under irrigation. Deep fertile loamy or clayey soils are considered ideal for this crop. The leading paddy producing states are West Bengal, Uttar Pradesh, Andhra Pradesh, Punjab, Tamil Nadu, Bihar, Orissa and Assam.
- **Wheat:** Wheat ranks second after paddy crop, having about 13 % of total cropped area under it. Wheat requires cool weather with moderate rainfall. It grows well in the northern plains of India during the winter season when the mean temperature is between 10 and 15°C. Well-drained loamy soil is ideal for wheat cultivation. Uttar Pradesh, Punjab and Haryana are major wheat producing states in India. These account for 60% of the total area under wheat and 73 % of total wheat production in the country. The wheat production in the country showed a maximum increase after Green Revolution was introduced in 1966.
- **Jowar:** It is the third most important food crop with respect to area and production. It is a rain-fed crop mostly grown in the moist areas, which hardly need irrigation. Major Jowar producing States are Maharashtra, Karnataka, Andhra Pradesh and Madhya Pradesh.
- **Bajra:** Bajra grows well on sandy soils, and shallow black soil. Major Bajra producing States are Rajasthan, Uttar Pradesh, Maharashtra, Gujarat and Haryana.
- **Ragi:** Ragi is a crop of dry regions and grows well on red, black, sandy, loamy and shallow black soils. Major ragi producing states are Karnataka, Tamil Nadu, Himachal Pradesh, Uttarakhand, Sikkim, Jharkhand and Arunachal Pradesh.
- **Maize:** It is a crop, which is used as both food and fodder. It is a kharif crop, which requires temperature between 21°C to 27°C and grows well in old alluvial soil. Use of modern inputs such as High Yield Variety (HYV) seeds, fertilisers and irrigation have contributed to the increasing production of maize. Major maize-producing states are Karnataka, Uttar Pradesh, Bihar, Andhra Pradesh, Telangana and Madhya Pradesh.
- **Pulses:** India is the largest producer as well as the consumer of pulses in the world. Major pulses that are grown in India are tur (arhar), urad, moong, masur, peas and gram. Pulses need less moisture and survive even in dry conditions. Being leguminous crops, all these crops except arhar help in restoring soil fertility by fixing nitrogen from the air. Therefore, these are mostly grown in rotation with other crops. Major pulses producing states in India are Madhya Pradesh, Uttar Pradesh, Rajasthan, Maharashtra and Karnataka.

- **Oil Seeds:** Oil-seeds produced in India are groundnut, mustard, coconut, sesame (til), soyabean, castor seeds, cotton seeds, linseed and sunflower. Most of these are edible and used for cooking. Different oil seeds are grown covering approximately 12% of the total cropped area of the country. Groundnut is a kharif crop and accounts for about half of the major oilseeds produced in the country. Gujarat is the largest producer of groundnut followed by Andhra Pradesh and Tamil Nadu. Linseed and mustard are rabi crops. Sesamum is a kharif crop in north and rabi crop in south India. Castor seed is grown both as rabi and kharif crop.
- **Tea:** India is one of the leading producer and consumer of tea in the world. The country earns a sizable amount of foreign exchange through the export of tea. Tea grows best on the mountain slopes receiving large amount of rains (above 150 cm). Well drained deep loamy soils, rich in humus are ideal for tea plantation. The tea industry is highly labour intensive and it requires abundant, cheap and unskilled labour. Most of the tea producing areas are on the hilly slopes of Surma and Brahamputra 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 hills in Uttarakhand and in the Kangra valley of Himachal Pradesh.
- **Coffee:** India produces around 3.2 % of the world's coffee. The Arabica variety of coffee, initially brought from Yemen is produced in the country. This variety is in great demand all over the world. Initially its cultivation was introduced on the Baba Budan Hills, and even today, its cultivation is confined to the Nilgiri in Karnataka, Kerala and Tamil Nadu.
- **Sugarcane:** Sugarcane is the native plant of India. The country has the largest area under this 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: in the Northern Plains from Punjab to Bihar, and in the Peninsular India from Gujarat to Tamil Nadu, Maharashtra, Karnataka and Andhra Pradesh. More than 60 % of the total area under sugarcane is found in the Northern Plains. The yield per unit area of sugarcane in South India is higher than in the North India.
- **Rubber:** It is an equatorial crop and requires moist and humid climate with rainfall of more than 200 cm, and temperature above 25°C. It is mainly grown in Kerala, Tamil Nadu, Karnataka and Andaman and Nicobar Islands, and Garo hills of Meghalaya.
- **Fruits:** Mangoes of Maharashtra, Andhra Pradesh, Telangana, Uttar Pradesh and West Bengal; oranges of Nagpur and Cherrapunjee (Meghalaya); bananas of Kerala, Mizoram, Maharashtra and Tamil Nadu; litchi and guava of Uttar Pradesh and Bihar; pineapples of Meghalaya; grapes of Andhra Pradesh, Telangana and Maharashtra; and apples, pears, apricots and walnuts of Jammu and Kashmir and Himachal Pradesh are in great demand the world over.
- **Floriculture:** Flower such as rose, jasmine, marigold, chrysanthemum, tuberose, and aster are grown over a large area in Karnataka, Tamil Nadu, Andhra Pradesh, Rajasthan, West Bengal, Maharashtra, Delhi, Uttarakhand, Assam and Manipur.
- **Cotton:** Cotton requires a moderate rainfall of about 75 cm 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 are considered ideal for its cultivation, though it is also grown in the alluvial soils of the northern plains. India produces about 8 % of the world's cotton, but the quality of cotton is poor. Therefore, the long staple cotton is imported