



Importance of Agriculture in National Economy and Basic Principles of Crop Production

(*Rajneesh Thakur)

Department of Plant Pathology, College of Horticulture, Dr Yashwant Singh Parmar University of Horticulture and Forestry, Nauni, Solan, H.P. 173230

*Corresponding Author's email: rjthakur579@gmail.com

In India, agriculture provides a living for almost 70% of the population. It keeps giving our country's inhabitants a support system. It provides for both humans and animals' fundamental needs. It is a significant raw material source for numerous agro-based industries. India's geography is exceptional for agriculture since it offers a variety of beneficial conditions. There are plain areas, fertile soil, a lengthy growth season, and significant weather variety, among other things. In addition to its exceptional geographic features, India has continually used science and technology to boost production.

Types of farming in India

India has diversified topography. The country has Himalayan mountain ranges extending from Jammu and Kashmir in the west to Arunachal Pradesh in the North-East. They have hill ranges in the form of Eastern Ghats and Western Ghats. Besides India has one of the largest plain areas of the world in the form of Indo-Ganga plain & Central part of India is dominated by plateau area. Apart from variation in landform, the country has varieties of climatic conditions, and soil types. These physical variations along with other factors like availability of irrigation, use of machinery, modern agricultural inputs like High Yielding Varieties (HYV) of seeds, insecticides and pesticides have played their respective roles in the evolution of different farming practices in India.

Some of the major types of farming are discussed as follows

- **Subsistence and commercial farming:** Majority of farmers in India practices subsistence farming. This means farming for own consumption. In other words, the entire production is largely consumed by the farmers and their family and they do not have any surplus to sell in the market. In this type of farming, landholdings are small and fragmented. Cultivation techniques are primitive and simple. In other words there is a total absence of modern equipments like tractors and farm inputs like chemical fertilizers, insecticides and pesticides. In this farming, farmers mostly cultivate cereals along with oil seeds, pulses, vegetables and sugarcane. Commercial farming is just the opposite to subsistence farming. In this case, most of the produce is sold in the market for earning money. In this system, farmers use inputs like irrigation, chemical fertilizers, insecticides, pesticides and High Yielding Varieties of seeds etc. Some of the major commercial crops grown in different parts of India are cotton, jute, sugarcane, groundnut etc. Rice farming in Harayana is mainly for commercial purpose as people of this area are predominantly wheat eaters. However in East and North-Eastern states of India, rice cultivation would be largely of subsistence type.

2. Intensive and Extensive Farming: The basic difference between these two types of farming is the amount of production per unit of land. In comparison with temperate areas of

USA, Canada, and former USSR, India does not practice extensive cultivation. When we use large patch of land for cultivation then we call it extensive farming. Here, total production may be high due to larger area but per unit production is low. In India extensive cultivation can be observed in Punjab, Haryana and Western Uttar Pradesh. Intensive Farming records high production per unit of land. Best example of intensive cultivation is in Japan where availability of land for cultivation is very limited. Similar kind of situation can be observed in the state of Kerala in India.

3. Plantation Farming: Plantation farming is an artificial and established form. It is an estate where a single cash crop is grown for sale.

This type of agriculture involves growing and processing of a single cash crop purely meant for sale. Tea, coffee, rubber, banana and spices are all examples of plantation crops. Most of these crops were introduced in India by the Britishers in the 19th Century.

4. Mixed Farming: It is a situation in which both raising crops and rearing animals are carried on simultaneously. Here farmers engaged in mixed farming are economically better off than others.

Salient Features of Indian Agriculture

(a) **Subsistence Agriculture:** As mentioned earlier, most parts of India have subsistence agriculture. This type of agriculture has been practiced in India for several hundreds of years and still prevails in a larger part of India in spite of the large scale change in agricultural practices after independence.

(b) **Pressure of population on Agriculture:** Despite increase in urbanization and industrialization, about 70% of population is still directly or indirectly dependent on agriculture.

(c) **Mechanization of farming:** Green Revolution took place in India in the late sixties and early seventies. After more than forty years of Green Revolution and revolution in agricultural machinery and equipments, complete mechanization is still a distant dream.

(d) **Dependence upon monsoon:** Since independence, there has been a rapid expansion of irrigation infrastructure. Despite the large scale expansion, only about one third of total cropped area is irrigated today. As a consequence, two third of cropped areas is still dependent upon monsoon. As you know, monsoon in India is uncertain and unreliable. This has become even more unreliable due to change in climate.

(e) **Variety of crops:** India has diversity of topography, climate and soil. Since India has both tropical and temperate climate, crops of both the climate are found in India. There are very few countries in the world that have variety comparable to that of India.

(f) **Predominance of food crops:** Since Indian agriculture has to feed a large population, production of food crops is the first priority of the farmers almost everywhere in the country. However, in recent years, there has been a decline in the share of land used for food crops due to various other commercially most advantageous uses of these land.

(g) **Seasonal patterns:** India has three distinct agricultural/cropping seasons. You might have heard about kharif, rabi and zaid. In India there are specific crops grown in these three seasons. For example rice is a kharif crop whereas wheat is a rabi crop.

Role of Agriculture in Indian Economy

Major crops of India

India grows almost each and every crop. If we consider the varieties of crop grown from Kashmir to Kanyakumari and western coast of Gujarat to extreme north eastern states of Arunachal Pradesh, then there would be hundreds of crops. We group all these crops into four broad types. Let us discuss the main crops under each type in detail:.

1) Food Crops

i) Rice: Rice is the most important food crop of India. It is predominantly a Kharif or summer crop. It covers about one third of total cultivated area of the country and provides food to more than half of the Indian population. Maximum population of India is of rice consumers.

(ii) Wheat: Wheat is the second most important food crop of India next to rice. It is a Rabi or winter crop. It is sown in the beginning of winter and harvested in the beginning of summer. Normally (in north India) the sowing of wheat begins in the month of October-November and harvesting is done in the month of March-April. This is the staple food of millions of people particularly in the northern and north-western regions of India. Unlike rice, wheat is grown mostly as a rabi or winter crop.

(iii) Millets: Millets are short duration warm weather crops. These are coarse grain crops and are used for both food and fodder. These are kharif crop. These are sown in May-August and harvested in October- November. Today millets are mostly consumed by poor people as their staple food. In India, lots of millet is grown and these are known by various local names. Some of these are Jawar, Bajra, Ragi, Korra, Kodon, Kutki, Hraka, Bauti, Rajgira. In India, Jawar, Bajra and Ragi are grown on large areas but unfortunately area under these crops has drastically reduced over the years.

(iv) Pulses: It includes a number of crops which are mostly leguminous and provide invaluable proteins to the vegetarian population of India. As they have fewer sources of proteins in comparison to those who consume meat and fish. They also serve as excellent forage and grain concentrates in the cattle feed. Apart from that these leguminous crops have the capacity to fix atmospheric nitrogen in the soil and are normally rotated with other crops to maintain and restore soil fertility. A large variety of pulses are found in India. These are gram, tur or arhar (Pigeon Pea or Red Gram), urd (black gram), mung (green gram), masur (lentil), kulthi (horse gram), matar (peas) etc. But among these above mentioned varieties only gram and tur or arhar are more important pulses.

i) Gram: It is the most important of all the pulses. It accounts for about 37% of the production and about 30% of the total area of pulses in India. It is a rabi crop which is sown between September and November and is harvested between February and April. It is either cultivated as a single crop or mixed with wheat, barley, linseed or mustard.

2. Cash Crops

As mentioned in the beginning cash crops are those crops which are grown for sale either in raw form or semi processed form.

(I) Sugarcane: Sugarcane belongs to bamboo family of plants. It is a Kharif crop. It is the main source of sugar, gur and khandsari. It also provides raw material for the manufacturing of alcohol. Bagasse, the crushed cane residue, has also multiple uses. It is used for manufacturing of paper. It is also an efficient substitute for petroleum products and a host of other chemical products. A part of it is also used as fodder.

(ii) Cotton: Cotton is the most important fibre crop not only of India but also of the entire world. It not only provides a raw material for cotton textile industry but also its seed is used in Vanaspati oil industry. The cotton seed is also used as part of fodder for milch cattle for better milk production. Cotton is basically a kharif crop and grown in tropical and sub-tropical areas.

(iii) Oilseeds: It is one of the important groups of commercial crops in India. In fact, India has the largest area and production of oilseeds in the world. Oil extracted from oilseeds not only forms an important item of our diet but also serves as raw material for the manufacturing of hydrogenated oils, paints, varnishes, soaps, lubricants etc. Oil-cake (the residue after the oil is extracted from the oilseeds) forms an important cattle feed and manure. Groundnut: It is the most important oilseed of India. Groundnut is grown both as kharif and rabi crop but 90-95% of the total area is devoted to kharif crop.

3. Plantation Crops

(i) **Tea:** India is famous for its tea gardens. You must have heard about tea gardens of Assam and Darjeeling in West Bengal. It is being said that tea plantation in India was started by the Britishers in 1923 when wild tea plants were discovered by them in the hilly and forest areas of Assam. Tea is made from tender sprouts of tea plants by drying them. At present, India is the leading tea producing country in the world. China and Sri Lanka are respectively second and third largest producers of tea.

(ii) **Coffee:** Do you know from where coffee was brought to India? It is the indigenous crop of Ethiopia (Abyssinia Plateau). From Ethiopia, it was taken to Arabia in 11th Century. From Arabia, the seeds were brought by Baba Budan in 17th Century and were raised in Baba Budan hills of Karnataka. But it was British planters who took keen interest and large coffee estates were established in the hills of Western Ghats.

Major Challenges faced by Indian Agriculture

1. Stagnation in Production of Major Crops: Production of some of the major staple food crops like rice and wheat has been stagnating for quite some time. This is a situation which is worrying our agricultural scientists, planners and policy makers. If this trend continues, there would be a huge gap between the demand of ever growing population and the production.

2. High cost of Farm Inputs: Over the years rates of farm inputs have increased manifold. Farm inputs include fertilizer, insecticide, pesticides, HYV seeds, farm labour cost etc. Such an increase puts low and medium land holding farmers at a disadvantage.

3. Soil Exhaustion: On one hand green revolution has played a positive role in reducing hunger from India. On the other hand it has also led to negative consequences. One of which is Soil exhaustion. Soil exhaustion means loss of nutrients in the soil from farming the same crop over and over again. This usually happens in the rain forest.

4. Depletion of Fresh Ground Water: The second major negative consequence of green revolution is depletion of fresh ground water. You would remember that areas where green revolution was successful, it was due to the use of chemical fertilizers and irrigation. Most of the irrigation in dry areas of Punjab, Haryana and Western Uttar Pradesh was carried out by excessive use of ground water. Today fresh ground water situation in these states is alarming. In the coming few years if this type of farming practice continues, these states are going to face water famine.

5. Adverse impact of Global Climatic Change: Among various challenges, global climatic change is the recent one. It has been predicted that its impact on agriculture would be immense. Since, 70% of Indian population is engaged in agricultural activities, you can imagine the consequences. It is predicted that due to climate change, temperature would increase from 2°C to 3°C, there would be increase in sea level, more intense cyclones, unpredictable rainfall etc These changes would adversely affect the production of rice and wheat. Specifically, rise in temperature in winter would affect production of wheat in north India. Production of rice would be affected in coastal areas of India due to ingress of saline water and increase of frequency of cyclones.

6. Impact of Globalization: You can see the effect of globalization on the farm sector in India. All developing countries have been affected by it. The most evident effect is the squeeze on farmer's income and the threat to the viability of cultivation in India. This is due to the rising input costs and falling output prices. This reflects the combination of reduced subsidy and protection to farmers. Trade liberalization exposes these farmers to competition from highly subsidized production in the developed world.

7. Providing Food Security: Before the introduction of green revolution in India, we were not self sufficient in terms of our food grain production. Due to partition of India in 1947 the network of canal irrigation system, cotton belt and wheat bowl meant to West Pakistan which

is now Pakistan. Similarly the jute belt and rice bowl was awarded to East Pakistan, which is now Bangladesh. With the introduction of green revolution, production of food grains increased substantially and India became self sufficient. However, during the last one decade the total production has become stagnant. On the other hand we have added another 16 to 18 million population over this period. Although India has become self sufficient in good it is yet to ensure food security which is dependent upon accessibility, affordability as well nutritional value of the food available. One of the biggest challenges facing India is Providing Food Security to its population.

8. Farmers Suicide: Every suicide has a multiple of causes. But when you have nearly 200,000 of them, it makes sense to seek broad common factors within that group. The suicides appear concentrated in regions of high commercialization of agriculture and very high peasant debt. Cash crop farmers seemed far more vulnerable to suicide than those growing food crops. Yet the basic underlying causes of the crisis remained untouched. Commercialization of the countryside along with massive decline in investment in agriculture was the beginning of the decline. Withdrawal of bank credit at a time of soaring input prices and the crash in farm incomes compounded the problems. Shifting of millions from food crop to cash crop cultivation had its own risks. Privatization of many resources has also compounded the problems. The devastation lies in the big 5 States of Maharashtra, Andhra Pradesh, Karnataka, Madhya Pradesh and Chhattisgarh. These states accounted for two-thirds of all farm suicides during 2003-08. Some of the major factors responsible are indebtedness, crop failure and deterioration in economic status. Decline in social position, exorbitant charges by local money lenders for the vulnerable farmers, chronic illness in the family, addiction etc. have made life of farmers difficult.

Principles of Agricultural/ Crop Production

Cultivation of crop involves several activities. These activities are referred as agricultural practices. These activities are

- 1) Preparation of soil
- 2) Sowing
- 3) Adding Manure and Fertilisers
- 4) Irrigation
- 5) Protecting from weeds
- 6) Harvesting
- 7) Storage

1)Preparation of Soil • The preparation of soil is the first step before growing a crop. One of the most important tasks in agricultural is to turn the soil and loosen it. This allow the roots to penetrate deep into the soil. The loose soil allows the roots to breath easily even when they go deep into the soil. The loosened soil helps in the growth of earthworm and microbes present in the soil. These organisms are friends of the farmer since they further turn and loose the soil and add humus to it. **Tilling** • The process of loosening and turning the soil is called tilling or ploughing. This is done by using a plough

2)Sowing • Selection of seeds: Sowing is the most important part of crop production. Before sowing, good quality seeds are selected. Good quality seeds are clear and healthy seeds of a good variety. Farmers prefer to use seeds which give a high yield.

Tools used for Sowing Seeds

Traditional Tool: The tool used traditionally for sowing seeds is shaped liked funnel. The seeds are filled in the funnel, passed down through two or three pipes having sharp ends. These ends pierce into the soil and place seeds there.

Traditional method of sowing:**Tools used for Sowing Seeds**

Seed Drill: Now a days the seed drill is used for sowing with the help of tractors. This tool sows the seeds uniformly at proper distances and depths. It also insures that seeds get covered with the soil.

3) Adding Manure and Fertilizers: The substances which are added to the soil in the form of nutrients for the healthy growth of plants are called manure and fertilizers. Soil supplies mineral nutrients to the crop. These nutrients are essential for the growth of plants. In certain areas, f in the same farmers grow crop field. The field is never uncultivated or fallow. Because of this continuous growing of crops makes the soil poorer in certain nutrients. Therefore, farmers have to add manure to the field to replenish the soil with nutrients. This process is called manuring. Improper or insufficient manuring results in weak plants.

Manure and Fertilizers

- **Manure** is an organic substance obtained from the decomposition of plant or animal wastes. It can be prepared in the Fields. It provides a lot of humus to the soil. It is relatively less rich in plant nutrients.

- **Fertilizer** is an inorganic salt. They are prepared in factories. It does not provide any humus to the soil. Fertilizers are very rich in plant nutrients like nitrogen, phosphorus and potassium.

- **For Example:** Urea, ammonium sulphate, super phosphate, potash, NPK(Nitrogen, phosphorus and potassium).

4) Sources of irrigation: The sources of irrigation are-wells, tubewells, ponds, lakes, rivers, dam and canals.

Types of Irrigation:

- 1) Traditional Method
- 2) Modern Method

5) Protection from Weeds: Weeds: In a field many other undesirable plants may grow naturally along with a crop. These undesirable plants are called weeds. Weeds can be controlled by using certain chemicals called weedicides.

For Example: 2, 4-D The manual removal includes physical removal of weeds by uprooting or cutting them close to the ground from time to time. This is done with the help of sickle or a seed drill.

6) Harvesting: Harvesting of a crop is an important task. Cutting of a crop after its maturation is called harvesting. It can be done manually with the help of sickle or by a machine called harvester or combine. In the harvested crop, the grain are separated from the chaff by the process of winnowing and threshing.

7) Storage: Farmers have to store grains in jute bags or metallic bin. However large scale storage of grains is done in silos and granaries to protect them from pests like rats and insects.