UNIT 4 : INDIAN AGRICULTURE & GREEN REVOLUTION

UNIT STRUCTURE

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4.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- become familiar with the place of agriculture in the Indian economy,
- be acquainted with the nature of India's agriculture,
- be able to draw the major objectives of agriculture in the context of Indian Planning,
- describe the present status of agriculture in the Indian economy, and point out the factors that affect agricultural production and productivity, and
- discuss the new agricultural strategy, viz., Green Revolution and its impact on the agricultural sector of the country.

4.2 INTRODUCTION

Agriculture in India has a long history dating back to ten thousand years. Today, India ranks high in the world in terms of farm output. Agriculture and allied sectors like forestry and logging accounted for 16.6 percent of the GDP in 2007 employing 60 percent of the total workforce and despite a steady decline of its share in the GDP, it is still the largest economic sector that plays a significant role in the overall socio-economic development of India. Contribution of agriculture to GDP in some recent years has been shown in Unit 8 (section 8.4).

Agricultural growth has a direct impact on poverty eradication and is also an important factor in containing inflation, raising agricultural wages and for employment generation.

India is the largest producer of milk, cashew nuts, coconuts, tea, ginger, turmeric and black pepper in the world. It also has the world's largest cattle population (281 million). It is the second largest producer of wheat, rice, sugar, groundnut and inland fish. It is the third largest producer of tobacco. India accounts for 10 percent of the world's fruit production with first rank in the production of banana and sapota.

Thus, it is clear that agriculture is the backbone of the Indian economy particularly in the rural areas. The rural areas are the biggest markets for low priced and middle priced consumer durables. Besides, rural domestic savings are a ready and important source of resource mobilisation. This unit will be helpful to you in getting an overall idea about Indian agriculture and various issues of this sector.

4.3 ROLE OF AGRICULTURE IN INDIAN ECONOMY

The significance of agriculture in the Indian economy can be discussed under the following major heads:

- Share of agriculture in national income,
- Role of agriculture in employment generation,
- Impact of the agricultural sector on industrial development,
- Role of agriculture in the earning of foreign revenue, and

- Its role in the overall economic growth of the country.
- Other important roles of the agricultural sector
- Share of agriculture in national income: Since independence, the share of agriculture in national income has declined continuously. This can be viewed from the following table 4.1.

Table 4.1: Share of Agriculture in National Income (GDP)

Period	Share of agriculture in GDP
1950-51	55
1970-71	44
1990-91	31
2000-2001	26
2005-06	20
2022-23	17

Source: Economic –Survey 2006-07, Table 1.3, RBI Annual Report, 2006-07; www.statista.com

From Table 4.1, it can be seen that in 1950-51, the share of agriculture in the GDP was around 55 percent. As the process of industrialization and economic growth gathered momentum under the five year plans with manufacturing and service sectors growing rapidly, the percentage share of agriculture in the GDP declined and reached a level of only 20 percent in 2005-06 and 18 percent in 2006-07. In 2007-08, the share of agriculture in the GDP was 17.8 percent, which again came down to less than 17 percent in 2023.

Please refer to Unit 8 (section 8.4, Figure 8.1) for knowing the contribution of agriculture to GDP in some recent years.

- **Role of agriculture in employment generation:** Though the share of agriculture in national income has considerably declined, yet a very high proportion of the working population in India is still engaged in this sector. Data provided by the Census of India reveal that in absolute terms, agriculture provided employment to 98 million persons in 1951. The number of people working on land (cultivators and agricultural labourers) increased to 235 million in 2001. In terms of percentage, however, people working

on land came down from 70 percent to 59 percent during the five decades between 1951 and 2001. Contribution of agriculture in total employemt in the economy has gradually come down from 63 percent in 1991 to 43.9 in 2018. (Please refer to section 8.4, Figure 8.2 for a comparative scenario.)

Also please note that the Tenth five year plan (2002-2007) report estimated that the agricultural sector still provides employment to 57 percent of India's workforce and is the single largest private-sector occupation. It is disturbing that the proportion of agricultural labourers has increased from 20 per cent to 27 per cent between 1951 and 2001 but that of cultivators registered a decline from 50 percent to 32 percent. This shows clearly the growing pauperisation (pauperisation means making poorer than before) of the rural peasantry.

- **Impact of the agricultural sector on industrial development:** Indian agriculture has been the source of supply of raw materials to its leading industries. Cotton and jute textile industries, forest-based industries, sugar, flour mills, edible oils etc depend on agriculture directly. Other small-scale and cottage industries like handloom weaving, oil crushing, rice husking etc depend upon agriculture for their raw materials. Together they account for 50 percent of income generated in the manufacturing sector in India.

  However, in recent years, the significance of agriculture to industries is going down as many new industries have come up which are not dependent on agriculture. But the importance of food processing industries in recent years is being recognized both for generation of income and employment.

- **Role of agriculture in the earning of foreign revenue:** Agricultural products like tea, sugar, oilseeds, tobacco, spices etc constitute the main items of exports of India. Broadly speaking, the proportion of agricultural goods which are exported is about 50 percent of our exports. Again, certain manufactured products which use raw materials of this sector viz., jute, clothes and sugar contribute to another 20 percent to the aggregate export volume of the country. Thus, the agricultural sector contributes to 70 percent of India's export in terms of volume. The Tenth

plan estimated that agriculture contributed about 15 percent of the total export earnings in terms of revenue. This has a great significance for economic development. Increased export helps the country to pay for the increased import of machinery and raw materials.

- **Role of agriculture in the overall economic growth of the country:** Agriculture in India is one of the major factors for the growth of the Indian economy which is still primarily agrarian. Agriculture is the most important sector in India. As the Indian economy is mainly based on agriculture, the annual output of products from the agricultural sector is an important factor in the growth of the economy. Agriculture also has a crucial role to play in Indian exports, where it has a significant contribution. Many of the industries in India are dependent on agriculture for raw materials. So, without agriculture and agriculture-based products, the Indian economy cannot sustain or accelerate its growth rate.
- **Other important roles of the agricultural sector:** Apart from the above, the agricultural sector also plays the following roles:
  - India's transport system secures bulk of their business from the movement of agricultural goods. The internal trade of the country is mostly in agricultural products.
  - Prosperity of the farmers leads to prosperity of industries. Prosperous farmers have greater demand for manufactures. Likewise, bad crops lead to a depression in business. Generally, a failure in the agricultural sector leads to failure of economic planning.
  - The 11th plan emphasises that the agricultural sector should act as a bulwark (bulwark means protecting something against some evils) in maintaining food security and in the process, national security as well.
  - Allied sectors like horticulture, animal husbandry, dairy and fisheries have an important role in improving the overall economic condition and health and nutrition of the rural masses.
  - To maintain the ecological balance, there is a need for sustainable and balanced development for both agriculture and allied sectors. The 11th plan recognizes this fact and gives importance to the development of the agricultural sector.



CHECK YOUR PROGRESS

Q 1: State whether True (T) or False (F).

(a) In 1950-51, the share of agriculture in the GDP was around 55 percent. (T/F)

(b) The share of agriculture in GDP declined to 17.8 percent in 2007-08. (T/F)

Q 2: Do you agree that the condition of the rural cultivators in India has turned worse over the years? Justify your position. (Answer in about 50 words).

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4.4 TRENDS IN AGRICULTURAL PRODUCTION AND PRODUCTIVITY

4.4.1 Growth of Agriculture since 1951

A comparative picture of the growth rate of the agricultural and allied sectors and the GDP growth rate at the same period has been shown in the following table 4.2.

It can be seen from the table that the growth rate of agriculture has lagged behind that of GDP all the decades of planning shown here. Thus, during 1951-1961, the annual rate of growth in agriculture was 3.3 percent, while the rate of growth of GDP was 3.8 percent. During the subsequent decades of planning as well, the growth rate of agriculture was below the growth rate of GDP. Despite spectacular progress achieved under the new agricultural strategy based on IADP (Integrated Area Development Project) and HYVP, the overall progress in agriculture was very poor. During 2001-2007, the annual

average rate of growth of agriculture declined to 2.2 percent, mainly because of poor monsoon conditions, although the GDP growth rae rose to 7.2 percent.

Table 4.2: Growth of the Agricultural Sector since 1950-51

Period	Compound Annual Growth Rate of agriculture and allied sector	Growth rate of GDP
1951-1961	3.3	3.8
1961-1971	2.2	3.7
1971-1981	1.7	3.3
1981-1991	3.9	5.7
1991-2001	2.8	6.7
2002-2007	2.1	7.5
2007-2012	3.6	8.1

Source : Center for Monitoring Indian Economy; Basic statistics of the Indian Economy, Vol 1,August 1992, August 1994; Economic survey 2006-2007.

But it is gratifying to note that with the green revolution, India not only became self-sufficient in food grains but also accumulated a huge food surplus – about 58 million tonnes in January 2002. As a result of adoption of improved inputs and management practices, the total food grain production increased from a mere 50.8 million tonnes in 1950-51, to 212 million tonnes in 2006-07. Thereafter, the condition of agriculture improved during the fourth decade of planning (1981-1991). The growth rate in the 1980s rose to 3.9 percent. But again, the compound growth rate of agriculture for the period 1991-2001 declined to 2.8 percent. Since then, especially during 2002-2003, agricultural production continued to decline. Although there was some improvement in the agricultural growth; yet it was much lower than the targeted growth rate of four per cent per annum. During the 11th plan, the annual growth rate in agriculture was 3.6 percent while the annual growth rate of GDP was 8.1 percent.

According to a study conducted by CII (Confederation fo Indian Industry) and Bain & Company, two-thirds of India's population participated in the rural economy in 2019–20, with about 60 percent

concentrated in six states. Uttar Pradesh has the highest rural population (~18 crore), followed by Bihar (~11 crore). Maharashtra, West Bengal, Madhya Pradesh and Rajasthan also comprise a large share of the rural economy. Since 2017, the rural workforce has been increasing at a rate of 8 percent to 12 percent per annum in states like Rajasthan, Uttar Pradesh, and Bihar. Within the rural economy, agriculture holds the highest share of output (37 percent).Agriculture is among the fastest growing sectors in the rural economy, with a compound annual growth rate (CAGR) of 11 percent over the last five years. (Source: Business Line, March 4, 2022)

4.4.2 Present Status of Productivity of Indian Agriculture

Since the 1960s, India's agricultural development, more commonly called the green revolution, has been applauded the world over and many developing countries have started considering India as their role model. Initially, India remained a food deficit country for almost 2 decades since independence. But with the green revolution, India not only became self-sufficient in food grains but accumulated a huge food surplus – about 58 million tonnes in January 2002. As a result of adoption of improved inputs and management practices, the total food grain production increased from a mere 50.8 million tonnes in 1950-51, to 212 million tonnes in 2006-07 and productivity increased from 522 kg/ha to more than 1707 kg/ha. The productivity of wheat, rice and oilseeds increased to a greater extent than other crops. The increase in production of food grain was possible as a result of adoption of quality seeds, higher dose of fertilizer and plant protection chemicals, coupled with assured irrigation. As a result, not only has the country achieved self sufficiency in foods but also has adequate agro-produce for export.

Our agriculture is now at the crossroads. The use of certified/ quality seeds by the farmers has increased to 700,000 tonnes. The fertilizer consumption has increased to 21.65 million tonnes (more than 112.69 kg/ha) in 2006-07 from 0.29 million tonnes in 1960-61.

The use of technical grade plant protection chemicals has increased to 56.11 thousand tonnes (0.4 kg/ha) from a meagre 8.62 thousand tonnes in 1960-61 during the peirod. According to a recent report, the current use of agrochemicals in the Indian market is low, with only 0.27 kg per hectare, which is far less than in developed countries. (The Times of India, April 27, 2023)

Crop and site specific agricultural mechanization and agro-based small and medium enterprises in rural sector using a proper blend of conventional and renewable energy sources will facilitate in enhancing agricultural productivity and profitability resulting in higher income for farmers and better quality of life.

The major factors for such success of agriculture were: increase in the net areas sown, expansion of irrigation facilities, land reforms, specially consolidation of land holdings.

However, in spite of the spectacular achievements, various constraints and disturbing trends have continued to hamper the required growth of the agricultural sector. These are mainly because of the following factors:

- Agriculture in India continues to be a gamble in the monsoons.
- There is limited use of new agricultural technology. The new technologies succeeded only in wheat and to a small extent in rice. Other food crops and non-food crops did not show any perceptible improvement in production.
- Decline in investment in agriculture.
- Limited success of the land reform measures and growing exploitation of tenants.
- Failure to control growth of rural population.
- Unbalanced regional agricultural development.



CHECK YOUR PROGRESS

Q 3: Which factors in India have contributed to the success of its agricultural sector? (Answer in about 30 words) .....

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Q 4: State whether True (T) or False (F).

(a) Green revolution in India was a total failure. (T/F)

(b) Over the years in India, investments in the agricultural have recorded tremendous growth. (T/F)

4.5 FACTORS INFLUENCING AGRICULTURAL PRODUCTIVITY

India is striving to find ways and means to keep its burgeoning population adequately fed. On the one hand it is facing the problem of declining productivity and on the other, the challenges posed by liberalization. Due to the small size of farm holdings (average farm holding size 1.6 ha) and socio-economic disparities, Indian agriculture continues to be dependent upon human (agricultural workers population 234.10 million in 2000- 01) and the animal power (27 million pairs). However, agricultural workers population is showing an overall declining trend. The agriculture sector of India saw nearly 148 million employees in financial year 2023. Considering the recent period of 2017-2023, the number of employees in the agriculture sector was the highest in fiscal year 2022 at over 158 million (Source: www.statista.com). Hand tools and animal drawn implements are still extensively used which involve a great amount of drudgery.

The factors that affect agricultural productivity include inputs such as utilizing human, animal and mechanical power, use of fertilizers, irrigation, crop technology, power, Agricultural Research and infrastructure. These have been discussed in some detail as follows :

- **Fertilizers :** After independence the use of fertilizers in India in the last 50 years has grown nearly 170 times. In 1950 the use of fertilizer per hectare in India was 0.55 Kg but by 2001-02 this figure has increased to around 90.12 Kg per hectare which further increased to 125.4 kg in 2013-14. Fertiliser consumption in 2023 was 193 kg per hectare of arable land, whihc is slightly lower than the all-time high of 210.7 kg in 2020. (Source: World Bank). The Green revolution during 1960s and

subsequent increased intensification of agriculture were the major causes behind this growth.

Fertilizers and pesticides have become a major cost of production in India along with the cost of other inputs like seeds and labor cost.

- **Irrigation :** Water is an essential natural resource for the survival of life, a key input for plant growth and is instrumental in the upkeep of the environment. Although water is a renewable source, it is quite dynamic and scarce. The source of all water is affected by a number of factors. As a result, rainfall in India is highly variable, irregular and undependable in terms of distribution and amount. The highest and lowest annual average rainfall in India is 10,000 mm (Khasi-Jaintia Hill, Meghalaya) and 100 mm in Rajasthan, respectively. The distribution of water is highly skewed and to make the distribution more equitable it better the technical feasibility of inter basin transfer of water by linking the Himalayan and Peninsular rivers has been examined and the proposal is under consideration of the Government of India.
- **Farm mechanisation :** Farm mechanisation in the agricultural sector results in:
  - Timely field operations. This increases productivity, reduces crop losses and improves the quality of agro produce,
  - Increased land utilization and ensuring efficient use of the inputs, and
  - Increased labour productivity by the use of labour saving devices, which are also cost effective and eco-friendly.

    So far, the use of tractors has been on the increase. The sale of tractors during 2005-06 touched 2,92,000 units. In 2023, it has further increased to more than 9,45,300 units. It was a increase over 12.2 percent from the previous year (Source:www.statista.com). Thus, mechanisation indicator is one of the measures of modernisation of agriculture of a country.
- **Farm Power Availability :** India has made remarkable progress in agricultural mechanisation technology. The country has evolved a selective mechanisation model using a power mix based on animate

(i.e., use of animal power) and inanimate (use of machine power) power sources. The mix of power sources includes human beings, animals, power tillers, tractors, engines and electric motors. The increasing use of tractors and irrigation pumps operated by electric motors and diesel engines are the indicators of the fact that the use of mechanical power in India has increased many fold during the last two decades.

- **Agricultural Drainage :** Drainage has become a part of integrated water management. This involves removing or conserving water as required and also being much concerned about water quality and environmental values. Land drainage and irrigation are complementary to each other for maintaining sustainable agricultural productivity. Large areas have been degraded in the country due to the problem of water-logging and salinity, especially in the irrigated alluvial tracts in north-west India (Haryana, Punjab, Gujarat etc.).
- **Women Friendly Improved Tools and Equipment for Agriculture :** Women play a major role in rural India through their active participation in agriculture. At present, the women engaged as work force in agriculture and an allied sector are estimated at about 61 million which amounts to about 30 per cent of the total rural workers in the country. Studies have shown that the Indian women work for about 14-16 hours a day to carry out various activities on farm and at home. There are more than 50 improved hand tools and equipment developed by various research organizations in the country. Out of these, 30 hand tools/ equipment have been identified which can be made suitable for women workers.
- **Agricultural Research and Development :** The apex body for education, research and extension education in the field of agriculture is the Indian Council of Agricultural Research (ICAR), established in 1929. India's transformation from a food deficit to a food surplus country is largely due to ICAR's smooth and rapid transfer of farm technology from the laboratory to the land.

  The results of agricultural research include higher yielding crop varieties, better livestock breeding practices, more effective fertilizers and pesticides, and better farm management practices. Agricultural

research is required not only to increase agricultural productivity, but also to keep productivity from falling.

- **Agriculture Infrastructure:** There is a positive relationship between infrastructure and agricultural productivity. The most obvious example of how public investment in infrastructure might affect agricultural productivity is through investment in public transportation. An improved highway system can reduce the farmers' cost of acquiring production inputs and of transporting outputs to market.

  Agriculture Infrastructure like seeds, fertilizers, irrigation sources should be organized to achieve the maximum momentum of growth. Factors like high soil productivity, supply of balanced crop nutrients, efficient water management, improved crops, better plant protection, post-production management for value-addition and marketing, are responsible for higher yield in the Indian agriculture. To achieve this, the government has taken definite steps to improve agriculture infrastructure in India. In the present day agriculture, application of modern biotechnologies like DNA finger printing, tissue culture, terminator gene technology and genetic cloning will play a vital role in raising the productivity.

- **Impact of Climate and Weather on Agriculture:** Industrialization, deforestation, encroachment of wetlands, grasslands etc. have affected the annual rainfall and the availability of water. These are bound to affect the land use system as well. Redistribution of rainfall and surface water will also adversely affect the biodiversity, productivity of both the terrestrial and aquatic eco-systems. In order to minimize the impact or to manage climate changes, large scale investments into proactive or anticipatory research is necessary to meet the emerging challenges of livelihood gathering by the agrarian economies like of India.

- **Government Programs:** The role of the government in the agricultural sector is pervasive. Government programs affect productivity through the allocation of resources and outputs. Government farm programmes are the most common examples of government involvement in agriculture. But other examples are numerous: Tax policies are

implemented to encourage private firms to undertake agricultural extension programmes. Most of the state governments are encouraging NGOs to take up extension activities.



CHECK YOUR PROGRESS

Q 5: How have the changes in climate affected the agricultural sector? (Answer in about 40 words) .....

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Q 6: Which organisation is called the apex body of education and research of agricultural studies in India? What has been its role? (Answer in about 50 words) .....

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Q 7: State whether True (T) or False (F).

(a) Men and women in India can handle all the tools used in agriculture with equal efficiency. (T/F)

(b) There is a positive relationship between infrastructure and agricultural productivity. (T/F)

4.6 GREEN REVOLUTION IN INDIA

Between 1947 and 1967, efforts at achieving food self-sufficiency were not entirely successful. Efforts until 1967 were largely concentrated on expanding the farming areas. But starvation deaths were still being reported in the newspapers. In a perfect case of Malthusian economics, population in India was growing at a much faster rate than food production. In 1961 India was on the brink of mass famine. The government realized the need for a dramatic improvement in food grain production. This called for a

drastic action to increase yield. The action came in the form of the Green Revolution.

The term "Green Revolution" is a general one that is applied to successful agricultural experiments in many developing countries. It is to be noted that this concept is not specific to India. But it was most successful in India. The Green Revolution in India is referred to the period between 1967 to 1978. Punjab was selected by the Indian government to be the first site to try the new crops because of its reliable water supply and a history of agricultural success.

Strategies of Green Revolution in India : There were three basic elements in the method of the Green Revolution:

- Continued expansion of farming areas;
- Double-cropping in existing farmland; and
- Using seeds with improved genetics.

Let us now discuss a few points on each of these strategies.

- **Continued expansion of farming areas:** As mentioned above, the area of land under cultivation was being increased right from 1947. But this was not enough in meeting the rising demand. Other methods were also required. Yet, the expansion of cultivable land also had to continue. So, the Green Revolution continued with this quantitative expansion of the farmlands.
- **Double-cropping in existing farmland:** Double-cropping was a primary feature of the Green Revolution. Instead of one crop season per year, the decision was made to have two crop seasons per year. The one-season-per-year practice was based on the fact that there is only one natural monsoon per year. The artificial monsoon came in the form of huge irrigation facilities. Dams were built to arrest large volumes of natural monsoon water which were earlier being wasted. Simple irrigation techniques were also adopted.
- **Using seeds with superior genetics:** This was the scientific aspect of the Green Revolution. The Indian Council for Agricultural Research (which was established by the British in 1929) was reorganized in 1965 and then again in 1973. It developed new strains of high yield variety

(HYV) seeds, mainly wheat and rice and also millet and corn.

As we have already mentioned, the introduction of high-yielding varieties of seeds after 1965 and the increased use of fertilizers and irrigation are known collectively as the Green Revolution. This has helped India to become self-sufficient producer of food grain production, and thus to improve the agricultural scenario of the country. Famine in India, once accepted as inevitable, has not returned since the introduction of Green Revolution in the country.

During the 1980's in spite of three years of scanty rainfall and a drought during the middle of the decade, India managed without large scale food imports, because of the increase in food grain production and the existence of a large buffer stock insulating against any agricultural crisis. By the 1990's India had attained self sufficiency in food grain production, because the rate of increase in food grain production has kept pace with the increase in population. This is the direct result of Green Revolution, improved seeds and fertilizers, better irrigation and increased awareness among the farmers.

Thus, we have discussed in the above that the growth in food-grain production is a result of concentrated efforts to increase all the Green Revolution inputs needed for higher yields: better seed, more fertilizer, improved irrigation, and education of farmers. Although increased irrigation has helped to lessen the year-to-year fluctuations in farm production resulting from the uncertainities of the monsoons, it has not eliminated those fluctuations. In the following section we shall make a critical analysis on the impact of green revolution in the country.



CHECK YOUR PROGRESS

Q 8: Mention the three basic elements of green revolution in India. (Answer in about 30 words)

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Q 9: State whether True (T) or False (F).

(a) The concept of green revolution is confined to India only.(T/F)

(b) In spite of the introduction of the green revolution, India has not been able to attain self sufficiency in food production.(T/F)

4.7 IMPACT OF GREEN REVOLUTION

4.7.1 Achievements of the Green Revolution

The following achievements are important.

- **Boost to the production of cereals:** The major achievement of the new strategy is the increase in the production of major cereals like wheat and rice.
- **Increase in the production of commercial crops:** The green revolution was mainly directed to increase the production of foodgrains. It did not affect the production of commercial crops or cash crops such as sugarcane, cotton, Jute, oil seeds and potatoes. However, significant improvement in the output of sugarcane took place after 1973-74. Likewise, there was considerable improvement in the production of other cash crops such as oil seeds, potatoes etc.
- **Significant changes in the crop pattern:** As a result of the green revolution, the crop pattern in India has undergone significant changes. The output of cereals has risen at the rate of 3 percent to 4 percent per annum but the output of pulses has remained stagnant or even declined .This has resulted in a decline in the importance of pulses as foodgrains and its output has fallen from 16 percent in 1960-61 to 6 percent 2006-07.
- **Boost to agricultural production and employment:** The successful adoption of the new agricultural technology has led to a continuous expansion in the area under crops, increase in total production and rising agricultural productivity. Impressive results have been achieved in wheat, rice, maize, potatoes etc.

The adoption of new technology has given a boost to agricultural employment because of diverse job opportunities created by multiple cropping.

- **Forward and backward linkages strengthened:** The new technology and modernisation of agriculture has strengthened the linkages between industry and agriculture. Various agro food processing units have been set up in many areas of the country.

4.7.2 Limitations of the Green Revolution

- Even today, India's agricultural output sometimes falls short of the demand. The Green Revolution, howsoever impressive, has thus not succeeded in making India totally and permanently self-sufficient in food. In 1979 and 1987, India faced severe drought conditions due to poor monsoon; this raised questions whether the Green Revolution was really a long-term achievement. In 1998, India had to import onions. Again, in recent years, it had to import sugar as well.
- Nothing like the ***Bengal Famine*** can happen in India again. But it is disturbing to note that even today, there are places like Kalahandi (in India's eastern state of Orissa) where famine-like conditions have been existing for many years and where some starvation deaths have also been reported.
- Farmers with 20 acres or more land have made the greatest gains partly by mechanising farm operations and partly by diversifying their cropping pattern. Again, the impact of mechanisation of farming has led to the problem of displacement of Labour.
- About 75 percent to 90 percent of the farmers in the rice belt have experienced a relative decline in their economic position.
- The term 'high yielding varieties' is a wrong name or word, because it implies that the new seeds are high yielding of themselves but actually they are highly responsive to certain key

inputs such as fertilizers and water. The new seeds performed worse than the indigenous varieties. Increasing the nitrogen uptake of plants by using artifical fertilizers upsets their carbon/ nitrogen balance causing matabolic problems to which the plant reacts by taking up extra water.

- Because of their narrow genetic base, HYVs are inherently vulnerable to major pests and disease. The Central Rice Research Institute of Cuttack has found out that the 'high yielding varieties' are susceptible to major pests with a crop loss of 30 percent to 100 percent. The Green Revolution in India cannot therefore be considered to be a 100 percent success story.



CHECK YOUR PROGRESS

Q 10: Do you think that high yielding varieties are very suitable for India? Justify your point. (Answer in about 50 words)

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Q 11: State whether True (T) or False (F).

(a) Green revolution in India is a case of 100 percent success. (T/F)

(b) In spite of the introduction of the green revolution, India has not been able to attain self sufficiency in food production. (T/F)



4.8 LET US SUM UP

- Agriculture is the backbone of the Indian economy. Agriculture in India has a long history dating back to ten thousand years. Today, India ranks second in the world in farm output.

- Agriculture and allied sectors like forestry and logging accounted for 16.6 percent of the GDP in 2007 in India.
- Agriculture employed 60 percent of the total workforce in 2007.
- India is the largest producer in the world of milk, cashew nuts, coconuts, tea, ginger, turmeric and black pepper.
- The importance of food processing industries is being recognized for the generation of income and employment.
- Agriculture Planning in India is a very important tool to enhance and maximize the total agriculture based produce.
- Growth in the Indian Agriculture is based on resources being used efficiently and conservation of natural resources.
- From the third plan onwards, the greatest emphasis was laid on irrigation, fertilisers and seed technology which led to the green revolution.
- The planning commission has fixed the target of 4 percent rate of growth to be achieved in agriculture during the eleventh plan.
- Since 1966, the use of modern agricultural inputs has increased at a compound rate of 10 percent per annum.
- The new technology and modernisation of agriculture has strengthened the linkages between industry and agriculture. The new agricultural technology has made the farmer market oriented.
- The term "Green Revolution" is a general one that is applied to successful agricultural experiments in many Third World countries.
- In today's globalised economic scenario, 100 percent self-sufficiency is not considered as vital a target as it was when the world political climate was more dangerous due to the Cold War.



4.9 FURTHER READING

1) Agrawal, A. N. (2019). *Indian Economy: Developmental Problems and Policies.* New Delhi: New Age International Publishers.
2) Datt, G and Mahajan, A. (2016). *Datt & Sundharam's Indian Economy.* New Delhi: S. Chand & Co.

3) Kapila, U. (2003). *Indian Economy since Independence.* New Delhi: Academic Foundation.

4) Misra, S.K. & Puri, V.K. (2018). *Indian Economy.* New Delhi: Himalya Publishing House.

4.10 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: (a) True (b) True

Ans to Q No 2: It is true that the condition of the rural cultivators in India has turned worse over the years. This is evident from the fact that the proportion of agricultural labourers has increased from 20 per cent to 27 per cent between 1951 and 2001 but that of cultivators registered a decline from 50 percent to 32 percent. This shows clearly the growing pauperisation of the rural peasantry of the country.

Ans to Q No 3: The major factors for such success of agriculture were: increase in the net areas sown, expansion of irrigation facilities, land reforms specially consolidation of land holdings.

Ans to Q No 4: (a) False (b) False

Ans to Q No 5: Industrialization, deforestation, encroachment of wetlands, grasslands have affected the annual rainfall and availability of water. These are bound to affect the land use system as well. Redistribution of rainfall and surface water will also adversely affect the biodiversity, productivity of both the terrestrial and aquatic eco-systems.

Ans to Q No 6: The apex body for education, research and extension education in the field of agriculture is the Indian Council of Agricultural Research (ICAR. India's transformation from a food deficit to a food surplus country is largely due to ICAR's smooth and rapid transfer of farm technology from the laboratory to the land.

Ans to Q No 7: (a) False (b) True

Ans to Q No 8: The three basic elements in the method of the green revolution in India are:

- Continued expansion of farming areas;

- Double-cropping in existing farmland; and
- Using seeds with improved genetics.

Ans to Q No 9: (a) False (b) False

Ans to Q No 10: Because of their narrow genetic base, HYVs are inherently vulnerable to major pests and disease. The Central Rice Research Institute of Cuttack has found out that the 'high yielding varieties' are susceptible to major pests with a crop loss of 30 percent to 100 percent.

Ans to Q No 11: (a) False (b) False



4.11 MODEL QUESTIONS

Short Questions (Answer each question in about 150 words)

Q 1: Write a short note on the growth of agriculture in India since independence.

Q 2: Discuss briefly the present status of productivity of Indian agriculture.

Q 3: Trace the major achievements of the new agricultural strategy in India.

Q 4: Enumerate the weaknesses of the new strategy of agriculture in India.

Essay type Questions (Answer each question in about 500 words)

Q 1: Discuss the role of Agriculture in Indian Economy.

Q 2: Write an essay on the trends of agricultural production and productivity.

Q 3: Explain the major impediments to Indian agriculture.

Q 4: What is meant by the new agricultural strategy in the context of India? Discuss the new agricultural strategies and their impact on Indian agriculture.

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