



IMPACT OF AGRICULTURE AND GREEN REVOLUTION IN INDIA

Vishal Kumar

**Assistant Professor in Geography, RNT Government Degree College Sarkaghat,
District Mandi, Himachal Pradesh.**

ABSTRACT:

In India, 75 percent of the population is dependent on agriculture. One earns his living by doing agriculture work. Agriculture occupies about 51 percent of the total area of India, pastures on 4 percent land, forests on about 21 percent land and 24 percent land is barren. Agriculture has been divided into two parts on the basis of the main source of getting moisture for agricultural crops are Irrigated agriculture and rainfed agriculture. In irrigated agriculture, the production of agriculture is supplied by means of irrigation and in rainfed agriculture, the production of agriculture has to depend on rain water. India has to depend on agriculture. Indian agriculture is based on monsoon. There is lack of irrigation here. The Green Revolution in India was mainly led by M.S. Swaminathan. As a result of the Green Revolution, there was a huge increase in the production of food grains, especially wheat and rice. The Green Revolution which took place during the period of 1967-68 and 1977-78 transformed India from the category of food grain deficient country to one of the leading agricultural countries of the world.



KEYWORDS: Agriculture, Green Revolution.

INTRODUCTION:

In the primitive stage, man used to feed himself by hunting wild animals. Later, he started using stem root fruit and self-grown food, and at this stage he must have invented the production of food by farming at some point of time. The primitive Kalik caves which have come to light in France. It is known from their excavation and study that man had become familiar with farming in the prehistoric age itself, the evidence of ploughing by planting vines comes from the ancient civilization of Egypt. In the Americas, only hoes and earthworms are found. There is no information about how much and how agriculture was developed in the Stone Age in India. But the excavation of the antiquities of Kanthe of Indus River has found abundant evidence that five thousand years ago, agriculture was in a very advanced state and the revenue was paid in the form of grains, such an estimate is found in Mohanjodaro, evidence of sowing of wheat and barley samples is found. The wheat grains found there belong to the species *Triticum sphaerocorum*. Wheat of both these castes is still available in Punjab which belongs to *HadiamBulgair* caste is of the same caste which are also found in the pyramids of Egypt. Sindh is famous for cotton even today.

Agriculture in India: -

Agriculture on about 51 percent of the total area in India, pastures on 4 percent land, forest on about 21 percent land and 24 percent land is barren and unused.

Type of agriculture: -

On the basis of the main source of getting moisture for agricultural crops, agriculture is divided into two classes.

- 1. Irrigated Agriculture: -** Irrigated agriculture refers to such an agricultural system in which water is supplied by means of irrigation to obtain agricultural production.
- 2. Varani agriculture: -** Varani agriculture refers to such an agricultural method. In which agriculture has to depend on rain to get the production.
 - Rabi crop :- It is sown in October and November and harvested in March and April. Its main crops are wheat, barley, gram, peas, mustard, potato, rye, linseed etc.
 - Kharif crop :- It is sown in June-July and harvested in November-December. Its main crops are paddy, sugarcane, sesame, soyabean, cotton, pigeon pea, groundnut etc.
 - Hot crop :- It is sown in May-June and harvested in July. For example, mustard, jute, maize flour.

Irrigation:

Along with the agriculture of India, the agriculture of Ramgarh district along with the agriculture of Jharkhand is based on monsoon. Here the monsoon itself is erratic. Due to which the need for irrigation increases. Only 22.96 percent of the total agricultural land in Jharkhand is irrigated. 58.3 percent of the total irrigated land is irrigated by surface water and 41.7 percent by underground water. Ramgarh district has a lot of irrigation facilities. Total agricultural land of Ramgarh district is 7835.00 hectares irrigated. Giving water artificially when there is a lack of moisture in agricultural works is called irrigation.

Irrigation pattern: -

The main reason for the poverty of Indian agriculture and farmers is that the farmers mostly depend on the rains because at the time of no rain and scanty rains, the farmers do not have any solution to stop the destruction of agriculture. Irrigation is everything in India. Importance of water Here the productivity of the land increases manifold. While nothing can be produced in the absence of water. Along with natural resources like surface, soil climate etc. irrigation facilities are the ultimate need for agricultural development today. Modern seeds, fertilizers and medicines are based on the availability of irrigation facilities. Humans have been doing this since ancient times to provide water to crops due to lack of rain or longing to produce more crops. Large reservoirs and huge canals were constructed. With the availability of irrigation, the productivity can be increased soon by the use of fertilizers, improved seed seeds and new agricultural methods.

Importance of irrigation: -

Irrigation is equally important in the country, as it is known from the geographical environment and agricultural pattern of the study area, considering the population growth in the districts, irrigation has been of great importance in the area for food production. Irrigation is very important for agricultural development. The importance of irrigation in the agricultural development is due to the following reasons.

- **Lack of rain:** Due to lack of rain and lack of means of irrigation, rabi crops cannot be grown. Under which the farmers leave the farm to do wages.
- **Irregularity of rainfall:** The time of arrival and departure of rain in the district is also not fixed. There is no coordination between the requirement of water for crops and the timing of rainfall. Kharif crops depend on rain. But the Kharif crop starts drying up due to its dependence on rain.

- **For the development of barren land :-** Irrigation is required to convert the cultivable barren land into cultivable area, the cultivable land in Ramgarh district was 54890.00 hectares.
- **For intensive agriculture:** - Along with population growth, increase in production is also necessary. Use of advanced seeds, chemical fertilizers and pesticides in agriculture is necessary for intensive agricultural production. Irrigation is of utmost importance to get the most out of them.
- By irrigation, some harmful insects and diseases are destroyed by the effect of water.
- Irrigated areas produce more than non-irrigated areas.
- Irrigation is of utmost importance for the production of many commercial crops and fruits and vegetables.
- Irrigation is very important for rabi crops.

Development of irrigation facilities:

Irrigation facilities have been developed on the basis of human growth. In ancient times, man used to irrigate the fields with the water of rivers, but now for the expansion of agricultural areas, man has also started using underground water. At various places, dams are being built on the rivers through which irrigation is being done. If we look at the development of irrigation before independence, it was negligible. Earlier there was Jagidari system in India. India was divided into many regional princely states. The main focus of most of the Samantas and Jagirdars was only to expand their comforts and facilities, not much attention was paid to agricultural development. After independence, the Government of India and the State Government made many schemes, through these schemes' priority was given to irrigation development programs.

Apart from rain water in some places of water is supplied by surface and underground water. Surface water is used by canals, lakes, ponds, ponds and rivers. While underground water is used by wells and tube wells. The means of irrigation are different in different regions. The main reason for this variation is the difference in geographical conditions. Because of which many means of irrigation are used. The main means of irrigation are wells, ponds, canals, rivers, dams etc.

- **Well:** - Irrigation from well is the ancient and popular means of irrigation in regions of India and Ramgarh district along with Jharkhand. The total irrigated area of India is irrigated by wells on 45 percent.
- **Ponds:** - Ponds are another important means of surface irrigation. Ponds are formed by the accumulation of rainwater in naturally formed pits on the ground. Tanks have been the main means of irrigation since ancient times
- **Canal:** - The physical environment of Jharkhand is not suitable for canal irrigation, yet small dams have been built on the rivers. From which canals have been taken out and irrigation is done.
- **Tube well:** - Tube well is a well of modern age in which water is extracted from the depth of the ground with the help of electric or diesel driven engine by inserting a hollow pipe till the permanent saturated limit of water.

Green Revolution:

- The Green Revolution was an effort initiated by Norman Borlaug in the 1960s. He is known as the 'Father of Green Revolution' in the world.
- In 1970, Norman Borlaug was awarded the Nobel Peace Prize for his work in developing high-yielding varieties.
- The Green Revolution in India was mainly led by M.S. Done by Swaminathan.
- The Green Revolution resulted in a huge increase in the production of food grains (especially wheat and rice), which began in the middle of the 20th century due to the introduction of new, high-yielding varieties of seeds in developing countries.
- Its initial success was seen in Mexico and the Indian subcontinent.
- The Green Revolution that took place during the years 1967-68 and 1977-78 changed India from the category of food-deficit country to one of the leading agricultural countries of the world.

Objectives of Green Revolution:

- **For the short term:** During the second five-year plan, the Green Revolution was started to overcome the problem of hunger in India.
- **Long term:** Long term objectives included rural development, modernization of overall agriculture based on industrial development, infrastructure development, raw material supply etc.
- **Employment:** To provide employment to the workers of both agricultural and industrial sector.
- **Scientific study:** To produce healthy plants, which are able to withstand favourable/unfavourable climate and diseases.
- **Globalization of Agriculture:** Spreading technology to non-industrial nations and encouraging the establishment of corporations in key agricultural areas.

Basic elements of Green Revolution:

- **Expansion of agricultural area:** Although the area of cultivable land was being expanded in the year 1947 itself, it was not sufficient to meet the growing demand for food grains.
- **Double Cropping System:** Double cropping was a primary feature of the Green Revolution. Under this, it was decided to get two crops in a year instead of one.
- Getting one crop every year was based on the fact that the rainy season comes only once a year.
- In the second phase of the Green Revolution, big irrigation projects were started for the supply of water. Dams were built and other simple irrigation techniques were also adopted.
- Use of improved genetics seeds: The use of improved genetics seeds was the scientific aspect of the Green Revolution.
- New varieties of high-yielding seeds, mainly wheat, rice, millet and maize were developed by the Indian Council of Agricultural Research.

Background of Green Revolution in India:

- In 1943, India was the country suffering from the worst food crisis in the world. About 4 million people in eastern India died of starvation due to the famine in Bengal.
- However, after the independence in the year 1947 till the year 1967, the focus was largely on the expansion of agricultural areas by the government.
- But the population growth of the country was increasing at a much faster rate than the food production.
- Rapidly increasing population emphasized the need to take immediate and drastic action to increase food grain production, the result of which emerged in the form of Green Revolution.
- The Green Revolution in India refers to the period when Indian agriculture was transformed into an industrial system due to the adoption of modern methods and technologies such as the use of high-yielding seed varieties, tractors, irrigation facilities, pesticides and fertilizers.
- It was funded by the Government of India and the Ford and Rockefeller Foundation of America.
- The Green Revolution in India is largely a wheat revolution because between 1967–68 and 2003–04 the production of wheat increased by more than three times, while the total increase in the production of cereals was only two times.

Positive Effects of Green Revolution:

- Increase in crop production: As a result, 131 million tonnes of food grains were produced in the year 1978-79 and India was established as the largest agricultural producing country in the world.
- The area under high-yielding varieties of wheat and rice increased substantially during the Green Revolution.
- Reduction in food grain imports: India became self-sufficient in food grains and had adequate reserves in the central pool, even as India was in a position to export food grains.
- The per capita net availability of food grains has also increased.

- Benefits to the farmers: With the introduction of the Green Revolution, the income level of the farmers increased.
- Farmers re-invested their surplus income to improve agricultural productivity.
- Large farmers with more than 10 hectares of land benefited from this revolution especially by investing huge amount in various inputs like HYB seeds, fertilisers, machines etc. It also promoted capitalist agriculture.
- Industrial Development: The Green Revolution promoted agricultural mechanization on a large scale, which created a demand for various types of machines such as tractors, harvesters, threshers, combines, diesel engines, electric motors, pumping sets, etc.
- Apart from this, the demand for chemical fertilizers, pesticides, weedicides etc. has also increased significantly.
- Many agricultural products were also used as raw materials in various industries identified as agro-based industries.
- Rural Employment: There has been a significant increase in the demand for labor force due to multiple cropping and use of fertilizers.
- Due to the Green Revolution, various employment opportunities were created not only for agricultural workers but also for industrial workers due to the construction of facilities related to factories and hydroelectric stations.

Negative Effects of Green Revolution:

- Non-food grains not included: Although production of all food grains including wheat, rice, jowar, bajra and maize took place at the revolution level, other crops such as millets, pulses and oilseeds were kept out of the purview of the Green Revolution.
- Major commercial crops like cotton, jute, tea and sugarcane also remained almost untouched by the Green Revolution.
- Limited coverage of HLT: The High Yielding Varieties program was limited to only five crops: wheat, rice, jowar, bajra and maize.
- Therefore, non-foodgrains were kept out of the purview of the new strategy.
- Blight seeds were either not yet developed in non-food crops or farmers were unwilling to take the risk of using them.
- Regional disparities:
 - Green Revolution technology further exacerbated inequalities in economic development at the inter-regional and intra-regional levels.
 - The effect of Green Revolution has so far been seen only on 40 percent of the total cropped area, 60 percent of the area is still untouched by it.
 - Its maximum impact is in Punjab, Haryana and western Uttar Pradesh in the north and Andhra Pradesh and Tamil Nadu in the south.
 - Its effect is hardly felt in the eastern region including Assam, Bihar, West Bengal and Odisha and in arid and semi-arid regions of western and southern India.
 - The Green Revolution affected only those areas which were already in a better condition from the point of view of agriculture.
 - Thus, the problem of regional disparity has further increased as a result of the Green Revolution.
- Excessive use of chemicals: The Green Revolution resulted in the widespread use of pesticides and synthetic nitrogenous fertilizers for improved irrigation projects and crop varieties.
- No effort has been made to educate farmers about the high risk associated with intensive use of pesticides
- Pesticides were usually sprayed on crops by untrained agricultural laborers without following instructions or precautions.
- This causes more harm than good to the crops and also causes environmental and soil pollution.
- Water Consumption: The crops included in the Green Revolution were water intensive crops.

- Most of these crops were cereals/food grains which require about 50 per cent of the water supply.
- Canal systems were introduced, as well as the increased use of irrigation pumps, which further lowered groundwater levels, such as intensive irrigation of crops requiring high water supplies, such as sugarcane and rice.
- Punjab is a major wheat and rice growing region, so it is one of the most water-stressed regions in India.
- Effect on soil and crop production: Adopting the same crop rotation again and again to ensure increase in crop production leads to depletion of nutrients in the soil.
- According to the needs of new types of seeds, fertilizers were used more by the farmers.
- The use of these alkaline chemicals has increased the pH level in the soil.
- The use of toxic chemicals in the soil killed beneficial pathogens, leading to a further decline in yield.
- Unemployment: Agricultural mechanization under the Green Revolution, except in Punjab and to a lesser extent in Haryana, has led to widespread unemployment among agricultural laborers in rural areas.
- The biggest impact of this was seen on the poor and landless labourers.
- Health Effects: Large scale use of chemical fertilizers and pesticides such as phosphamidon, methomyl, triazophos and monocrotophos has resulted in serious health ailments including cancer, kidney failure, stillbirths and birth defects.

Green Revolution-Krishonnati Yojana

- In the year 2005, the Green Revolution-Krishonnati Yojana was started by the Government of India to promote the agriculture sector.
- The government is planning to develop agriculture and allied sector in a holistic and scientific manner to increase the income of the farmers through this scheme.
- It consists of 11 schemes and missions under one umbrella scheme:
 - Integrated Horticulture Development Mission (MIDH)
 - National Food Security Mission (NFSM)
 - National Mission on Sustainable Agriculture (NMSA)
 - Presentation of Agricultural Extension (PAE)
 - Sub Mission on Seeds and Planting Material (SMSP)
 - Sub-Mission on Agricultural Mechanization (SMAM)
 - Sub Mission on Plant Protection and Plant Quarantine (SMPPQ)
 - Integrated Scheme on Agriculture Census, Economics and Statistics (ISACES)
 - Integrated Scheme on Agricultural Cooperation (ISAC)
 - Integrated Scheme on Agricultural Marketing (ISAM)
 - National e-Governance Plan in Agriculture (NeGP-A)

Evergreen Green Revolution:

- The improvements brought about by the Green Revolution came at the cost of adverse environmental impacts in areas under intensive agriculture.
- However, in areas where population pressure is high, there is no other option but to produce more food.
- That's why the father of Green Revolution in India, Dr. M.S. Swaminathan, the need for an evergreen revolution was invoked by Swaminathan.
- The Green Revolution envisages that productivity growth should be driven by only those products that are environmentally safe, economically viable and socially sustainable.
- The Evergreen Revolution involves the integration of ecological principles into technology development and dissemination.

Conclusion:

Overall, the Green Revolution was a major achievement for many developing countries, especially India, which helped in ensuring national food security. It represents the successful adaptation and transfer of the scientific revolution in agriculture that industrialized countries had already appropriated. However, apart from ensuring food security, less attention was paid to factors other than the environment, poor farmers and making them aware of the use of chemicals. As a way forward, policy makers should target the poor more precisely to ensure that they receive more direct benefits from new technologies and that the technologies adopted are more environmentally sustainable and sustainable. At the same time, taking lessons from the mistakes of the past, it needs to be ensured that such initiatives cover a wide area rather than a limited one, to benefit all.

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