

The Green Revolution in India

Introduction

The dramatic transformation in agriculture practices that involves the use of new methods of cultivation and inputs refers to as Green Revolution in India. The green revolution consists of technological improvements which were mainly adopted to increase agriculture productivity. The green revolution occurs as a result of adoption of new agriculture strategy during mid 60's by Government of India to achieve self-sufficiency in the foodgrains production. These changes bring about a substantial increase in agriculture production in a short span of time.

Components of Green Revolution

The core components of new agriculture strategy are:

- (i) **Use of High-Yielding Variety(HYV) seeds** that matures in short span of time.
- (ii) **Application of fertilizers, manures and chemicals** in the agriculture production.
- (iii) **Multiple Cropping Patterns** that allows farmers to grow two or more crops on the same land as HYV seeds matures quickly. This helped the increase of total production.
- (iv) **Mechanization of farming** with the use of machines like tractors, harvesters pump sets etc in the agriculture occur in a big way.
- (v) **Better Infrastructure facilities** in terms of better transportation, irrigation, warehousing, marketing facilities, rural electrification were developed during the period of green revolution.
- (vi) **Price Incentives** involving provision of the minimum support prices for various crops so as to allow reasonable price to farmers for their produce. This offers incentive to the farmers to adopt new practices.
- (vii) **Better financial assistance** through spread of credit facilities with the development of wide network of commercial banks, cooperative banks and establishment of National Bank for Agriculture and Rural Development (NABARD) as an apex bank to coordinate the rural finance in India.

Impact of Green Revolution

The green revolution resulted quantitative and qualitative development in the agriculture in India. The quantitative improvement occurs as a result of steep increase in the production of agriculture output. The qualitative improvement resulted into adoption of modernized technology in the agriculture. The impact of green revolution can be discussed as follows:

1. Spectacular increase in agriculture production

The dependence on food imports is eliminated with the increase in agriculture production. The country becomes self-sufficient in foodgrains. In fact India was the second largest importer in 1966 and it imported no foodgrain in subsequent decades except during late 80's and early 90's mainly due to failure of monsoons or untimely rains or floods in different regions. However, it may be noted that in recent years annual growth in the food grain production is losing its momentum.

2. Improvement in productivity

The tremendous increase in agriculture production occurred as a result of improvements in productivity. The productivity was quite low in the pre-green revolution period. The substantial increase in the productivity occurred in wheat and rice in the earlier periods but later on it spread to other crops also.

3. Increase in Employment

Green revolution generated employment opportunities into diverse activities which were created as a result of multiple cropping and mechanization of farming. It helped to stimulate non-farm economy that generated newer employment in various services such as milling, marketing, warehousing etc.

4. Food grain Price Stability

The adoption of new agricultural technology has led to the increased production and marketable surplus of crops especially food grains that have resulted into price stability of food items.

5. Strengthening of forward and backward linkages with industry

The increase in agriculture production has strengthened the forward linkage of agriculture sector with industry in the sense of supplying inputs to the industry. The backward linkage with the industry has also received a boost as agricultural modernization created larger demand for inputs produced by industry.

Concept-Check Questions

- **What are the important components of Green Revolution in India?**
- **Explain the meaning of HYV seeds?**
- **What are basic requirements of application of modern techniques in agriculture?**

Problems with Green Revolution

The new agriculture strategy has resulted into increased productivity and returns for farmers. This has resulted in decline in rural poverty to an extent. However, the revolution resulted into increased income, wide interpersonal and regional inequality and inequitable asset distribution. The major problems associated with green revolution are as follows:

(1) Increase in personal inequalities in rural areas

The income inequality between rich and poor increases **due** to:

(i) The owners of large farms were the main adopters' of new technology because of their better access to irrigation water, fertilizers, seeds and credit. In other words, given the need for complex agricultural techniques and inputs, the green revolution benefits the large farmers. The small farmers lagged behind the larger farmer as small farmers had to depend upon traditional production method. Since the rich farmers were already better equipped, the green revolution accentuate the income inequalities between rich and poor.

(ii) Green revolution resulted into lower product price and higher input prices which also encouraged landlords to increase rents or force tenants to evict the land.

(iii) The mechanization pushed down the wages of and employment opportunities for unskilled labor in the rural areas thereby further widening the income disparities.

(2) Increased Regional disparities

Green revolution spread only in irrigated and high-potential rain fed areas. The villages or regions without the access of sufficient water were left out that widened the regional disparities between adopters and non-adopters. Since, the HYV seeds technically can be applied only in land with assured water supply and availability of other inputs like chemicals, fertilizers etc. The application of the new technology in the dry-land areas is simply ruled out.

The states like Punjab, Haryana, Western UP etc. having good irrigation and other infrastructure facilities were able to derive the benefits of green revolution and achieve faster economic development while other states have recorded slow growth in agriculture production.

(3) Environmental Damage

Excessive and inappropriate use of fertilizers and pesticides has polluted waterway, killed beneficial insects and wild life. It has caused over-use of soil and rapidly depleted its nutrients. The rampant irrigation practices have led to eventually soil degradation. Groundwater practices have fallen dramatically. Further, heavy dependence on few major crops has led to loss of biodiversity of farmers. These problems were aggravated due to absence of training to use modern technology and vast illiteracy leading to excessive use of chemicals.

(4) Restrictive Crop Coverage

The new agriculture strategy involving use of HYV seeds was initially limited to wheat, maize and bajra. The other major crop i.e. rice responded much later. The progress of developing and application of HYV seeds in other crops especially commercial crops like oilseeds, jute etc has been very slow. In fact, in certain period a decline in the output of commercial crops is witnessed because of diversion of area under commercial crop to food crop production. The basic factor for non-spread of green revolution to many crops was that in the early 1960's the severe shortage in food grains existed and imports were resorted to overcame the shortage. Government initiated green revolution to increase food grain productivity and non-food grain crops were not covered. The substantial rise in one or two food grain crop cannot make big difference in the total agricultural production. Thus new technology contributed insignificantly in raising the overall agricultural production due to limited crop coverage. So it is important that the revolutionary efforts should be made in all major crops.

It can be concluded that green revolution is a major achievement for India which has given it a food-security. It has involved the adaptation of scientific practices in the agriculture to improve its production and productivity. It has provided benefits to poor in the form of lower food prices, increased migration opportunities and greater employment in the rural non-farm economy. However, the inequalities between region and individuals that adopted green revolution and those who failed to adopt has worsened. Further, green revolution has led to many negative environmental impacts. The policy makers and scientists are urged to develop and encourage the new technologies that are environmentally and socially sustainable.

Role of Technology in Indian Agriculture

The important reason of low agricultural productivity in India is the unsatisfactory spread of new technological practices, including cultivation of HYV seeds. The adoption of new technology mainly the cultivation of HYV seeds requires intensive use of fertilizers and pesticides under adequate and often assured water supply. The use of HYV seeds involves higher yield risk as compared to the traditional seeds in the absence of proper irrigation facilities. The inadequate irrigation facilities in most part of the country explain the limited regional spread of modern technology. Nearly 64 percent of total cultivated area is rainfed. Further, the irrigated area is generally used for growing rice and wheat while other crops are grown mostly in the rainfed and unirrigated area. In this scenario the technological development in terms of adoption of HYV seeds with chemical and fertilizers is only limited to few regions having irrigation coverage and that too for wheat and rice. Thus the adoption of new technology requires **the development of irrigation facilities** at first place so as to increase its regional and crop spread.

Another, factor that inhibits the dissemination of modern technology is the small and marginal land holdings and **slow progress of tenancy reforms**. The lack of ownership rights on land provide no

incentive to adopt improved technology as the production is shared with the land owners and cost of adoption of new technology will be borne by the tenant cultivators. Thus institutional reforms in terms of land reforms have to be strengthened to improve adoption of modern technology.

The use of new technology improves the agriculture productivity. However, it also adds to the instability in the output growth. The application of new technology raises the response of output to water. Thus if applied under the rainfed conditions then the instability in output will be greater. However, the increase in output would be stable if applied under assured irrigated conditions. This requires effective public distribution system to stabilize prices during uncertain conditions.

Thus both institutional and technological changes have played important role in agriculture growth in India. The technological changes by themselves could not bring revolutionary productivity growth in the agriculture without the institutional and infrastructural changes. The new technology cannot be used if the agrarian system suffers from gross inequalities of land ownership and cultivation is in the hands of landless cultivators. Thus land reforms are required to abolish intermediaries and to undertake the reorganization of land holding. Further, modern technique also requires higher amount of investments. Thus organizational reform in terms of better availability of **agri-credit** is also important. In nutshell, it can be concluded that though technical reforms provide modern inputs to increase agriculture production but organizational and institutional reforms would provide suitable conditions to apply these modern inputs.