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Green Revolution and Revolutionary changes in Indian Agriculture

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Abstract

The Green revolution is a milestone of Indian agricultural sector. In the era 1990; the country faced a food grain deficiency, to overcome such a problem, high yields variety seeds, chemical fertilizer, the availability of chemical fertilizers and modern techniques are used in Indian agriculture. It affects the food grains production are increased, especially in the states of Punjab and Haryana and North Asia farmers production are increased in large amounts and enhance the capability of food security in India. Basically, small and marginal farmers not have efficient of capital and equipment to take the benefits, so they are excluded from green revolution benefits, which increase social inequility, increased larger amount of water pollution, somewhere the problems of migration arise. This study are elaborates on socio, economic and environmental impact of green revolution are described, with that organic and sustainable agriculture, water conservation are reviewed. The objectives of study is 1. To study the origin of green revolution in India 2. To study the impact of the green revolution in Indian agriculture 3. To study the impact after the implementation of the Green Revolution in Indian agriculture. The secondary data are used to this study. The information is collected from published &unpublished sources, including reports, manuals, and previous research articles related to agriculture sector. Concludingly, not only to increase agriculture production, sustainable, socially inclusive of farmers is needs pillars of modern agriculture policy.

Keywords: Green Revolution, Indian agriculture, High-yield variety (HYV) seeds, Chemical fertilizers and pesticides, Socio-economic impact, Environmental impact, Food security, Punjab and Haryana, Water pollution, M.S. Swaminathan, Norman Borlaug, Irrigation, Agricultural machinery, Government subsidies and credit, Small and marginal farmers

Introduction:

India is an agro-based country. The dependence of peoples mostly depends directly or indirectly on agriculture sector for there livelihood. After independence, dependent India, faced a food grain deficiency to drought and low rainfall. Traditional agriculture and traditional methods were used in agriculture sector, and production from the agriculture sector was very low. The increasing population and need for food grains, India are depends on the food grains on foreign country, like America, Canada for import of food grains. To overcome such issue, India decides to revolutionary changes in agriculture sector, so in 1960 the "Green Revolution" are adopted. This revolution contains one of revolutionary, technical, scientific and managerial changes. The green revolution adopts a high-yield variety seeds and, chemical fertilizer, Pesticides and modern irrigation techniques are increased. M.S. Swaminathan is the pioneer of the green revolution in India. They used high-yield seeds in agriculture with the co-operation of Norman Borlaug. Firstly, Punjab, Haryana and North India use these techniques in agricultural sector. As a result, the production of wheat, rice are increased. Moreover, India is moving towards in a self-sufficiency in food production. The green revolution are not only increased the production in agriculture sector, but in rural sector, The infrastructure like road, electricity and, irrigation system was developed and, a lot of deprived families improved their economic conditions with stable employment in the rural sector.

So, the green revolution has seen some limited effects. The large farmers are taking advantages of this revolution, while small and marginal farmers are unable to use such modern tools. Despite that, the use of high fertilizer, high use of ground water resources, and land related environmental issues are arising, nevertheless, The Green revolution has given food security and it has become a dominant exporter in the world.

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Objective of Study:

1. To study the origin of green revolution in India
2. To study the impact of the Green revolution in Indian agriculture
3. To study the impact after the implementation of the Green Revolution in Indian agriculture

Research Methodology:

The secondary data are used to this study .The information is collect from published & unpublished sources, including reports,manuals,previous research articles related to agriculture sector .

Origin of Green Revolution:

The world 'Green Revolution' was 'firstly used by William Gaud "American agri Scientist. The origin of the Green Revolution in India in the mid -1960 .The country, like India , suffers hunger and food deficiency ,In 1943 ,Bengal famine and food crises after the revolution led ,the government to decides on revolutionary changes in the agriculture sector. The swaminathan leadership , uses high -yield variety seeds, irrigation system, fertilizer and modern techniques in Indian agriculture to increase production, resulting in the implementation of the Green Revolution in India, basically in the states of Punjab, Haryana and Maharashtra ,and west and South asia states are implemented the green revolution in India .

Status of Indian Agriculture before the Green Revolution:**1. Traditional Agriculture System:**

Agriculture in India was traditional and monsoon -based, before the implementation of the Green Revolution .The tradition tool was used in that sectors, such as bullock plough are used to plough the field, and sowing, harvesting and related works was mainly based on human effort. The rainwater was the main source of irrigation because, there was no irrigation facility was available, use of fertilizer and, pesticides was very rare. The efficiency of machinery and working capacity was very low.

2. Efficiency in Productivity:

The production was very Low, due to modern techniques. The per -acre production was very low as compared to the world level .The farmers are phases crop loss from the drought ,heavy rain and pest. The low availability of irrigation is the main cause of low productivity. Low level of technical skills in agriculture.

3. Socio-Economic Conditions of Farmers:

Most of the farmers were marginal and landless; they had low availability of production resources. The economic condition of these farmers was very low, their livelihood depend on the agriculture, to survive regularly goes to very difficult,Education,health and social services are far away from them. Indebtedness creates a farmer in economic crisis. Indirectly their social stays of tem were low.

4. Migration and Food crisis:

Due to low income levels, the people from the rural sector migrated towards the urban sector. The drought condition is the main cause of

migration towards the rural sector. There occurs a low level of employment in the agriculture sector. The country imports the food grain.

5. Government low efforts:

After the independence, the government took initiatives regarding farmers, such as the creation of cooperative societies, loans to the farmers, training for farmers, but the actual implementation of such programs was very low. To provide modern techniques in the agricultural sector, the amount was very low, technical knowledge was not spread, and there were inefficiencies in money and management . Due to this most of the planning was not successful. So it will be necessary, to remedy agricultural problems .This lacuna is recovered the Green revolution.

Green Revolution Includes –**1. High -Yields Variety Seeds-**

In the Green Revolution ,the central use was HYV .These seeds give a higher production as compared to traditional seeds, Mainly wheat , rice and maize crops are highly efficient in HYV .The Norman Borlaug invented wheat varieties are efficiently used all over the country. In low duration, and high production, are the specialties of these crops .As a result, the production capacity was increased by a large amount, and automatically the prices of food grains were under control.

2. Chemical fertilizer and pesticides:

To increase the production in the agricultural sector, the use of chemical fertilizer is used in large amounts. The use of nitrogen (N), phosphorus (P) and potassium (K) NPK fertilizers are often used to supplement the soil with these vital elements, promoting healthy plant growth and increased yields. Other than that, the use of pesticides reduces diseases and pests, alternatively, crop losses are declined and increased stability in production. The use of chemical fertilizer and pesticides for long term, it affects the land utility, so it creates environmental and health problems, but in the long term economic benefits were high.

3. Development of Irrigation –

Before the implementation of the Green Revolution ,agriculture was mainly based on THE monsoon .But recently the use of irrigation has developed .Cannals, Tube wells , and well are used to expansion of irrigation facilities .The availability of irrigation facilities provides all season crops. The farmers take the opportunity to multiple crop systems, which helps economic stability though, multiplicity of cropping systems.

4. Development of Machinery-

The Green Revolution gives importance to modern instruments such as tractor, thresher, pumpset, harvester, etc, with this instrument; it helps to increase the productivity, and reduces the labor effort and time. It reduces the time to work in large area, it increases the crop production accuracy and quality, so the dependency on labour are reduced, production costs are also reduced and net profit is also

increased. In a rural economy, the machinery industries are developed.

5. Availability of Debt and Subsidies to farmers:

To implement the green revolution, the government gives economic help and, banks provide credit loans to farmers at regional rates. The subsidies are provided for fertilizer, seeds, irrigation instruments. In rural area co-operative society provides credit facility to farmers. By the help of such subsidy, the poor and small adopted modern techniques, it resulting in an increase in production and investment are also increased.

Impact of Green Revolution:

Positive Impact –

The Green revolution in Indian agriculture had a revolutionary impact a revolutionary changes. Such as an increase in food production, mainly wheat and rice has double production. After 1960, India became a self sufficient in food production and dependency on other countries is declined. The use of HYV seeds, chemical fertilizer and modern techniques in irrigation, it increases the professionalism in the agriculture sector. The farmers are using the modern techniques in their fields, it affects the productivity and increases it. In some states like Punjab, Haryana and Maharashtra states farmers income and lifestyle increased. Despite that, agriculture related industries like, food processing, fertilizer industry and irrigation machinery have increased. In rural area employment opportunities are increased and agricultural education, training institutes are also established. The Green revolution helps our countries social and economic stability and strengthens food security.

Negative Impact:

The Green revolution promotes high production, but some serious problems occur. The green revolution is beneficial to only large and middle farmers. It excludes the benefits of people such as, small and marginal, labor, a woman etc, so it affects social discriminations. The excess use of chemical fertilizer and pesticides affect soil fertility, enlarges the need of water and reduces water level, water pollution increased. It automatically environmental denegoures increases. Use of HYV seeds, in case of traditional seeds. The farmers are destroying their seeds dependence, and increasing the expenditure, other than that, its experiments are limited to some specific states, most of the states and districts are excluded such benefits, so it affects the region imbalance. The increasing production revolution was creates some serious problems towards environment, society and long term sustainability.

Environmental Effects:

1. Declined Land Productivity and Increasing Production Cost

In the period of green revolution, to increase the production, the use of chemical fertilizer are increased, but use of large amount of chemical fertilizer affects natural fertility of soil. An aleternative, to excess production, excess fertilizer, water and pesticides was needed and it causes the production cost to increased, but the production declined, it directly affecting the

profit margin of farmers. To improve the health of the land, these excess expenses burden the farmer automatically; agricultural fields become highly risky and generate low profits

2. Deficiency of Water and Irrigation Expenditure-

The Green revolution gives importance to high water need crops, it has affect high use of groundwater, because of this use of tube well, motor, diesel or electricity are increased. Consequently, farmers irrigation expenditure increased, but in some regions, there has been low production and it results in a low return on investment.

3. Economic burden of subsidy and dependency on chemicals:

The Use of chemical fertilizer and pesticides has increased in large amounts. For this governments stats various types of subsidies, because of this, short-term production increases, but in the long term, the use of chemicals affects the land. Due to this large amount of subsidies government's fiscal burden is increased. Unproductive subsidies expenditure restricts productive expenditure of government.

4. Declining biodiversity and imbalance in market –

The Green Revolution gives importance to selected cash crops, because of this, the demand and production of traditional crops is declined. These agricultural productions created imbalance in the market. The price volatility found; because of crop diversification. There is increased a risk capacity of farmers, and there is no fair competition in market.

Conclusion:

The Green revolution changed the trends and patterns of agriculture in India. In the era 1960, this revolution, country overcame the problems from food deficiency and secured their food with food stability or food security. The country make him self-sufficient in food production, income of farmers are also increased, the new techniques are spread all over in agriculture sectors, agri related programs are increased and it help economic stability in farmers life. Besides the success of the Green Revolutions, some questions are also raised. The benefit of this revolution not only some selected states and is limited to big farmers. The marginal, small farmer, land less laborer are far from these benefits, because of this social discriminations are increased.

The Use of highly chemical fertilizers and pesticides, the fertility of land, the declined ground level water and negative impact on the environment, increase the expenditure of agriculture and declined sustainability. So positively we say that, the green revolution contributes a major role to food security, but in future point of view, agriculture is not only for high productivity, but also for sustainable, environment.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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