National Journal of Multidisciplinary Research and Development
ISSN: 2455-9040
Impact Factor: RJIF 5.22
www.nationaljournals.com
Volume 3; Issue 1; January 2018; Page No. 38-40

Green revolution and environmental degradation

Dr. Anju Bala
Associate Professor, Department of Geography, Govt. PG. College for Women, Rohtak, Haryana, India

Abstract
At the time of Independence, India had to import large amount of food grains for increasing population. To ensure maximum profit in shortest time, India adopted a new technology based agriculture strategy putting more emphasis on high yield variety seeds, more irrigation facilities, modern means of agriculture, with high dependency on chemical fertilizers and pesticides and insecticides that was called Green Revolution. The introduction of high yielding seeds and increased use of fertilizers and irrigation increased our production to make India self sufficient in food grains and raised farmers income and reduced poverty. But Green revolution adversely affected our environment. Excessive use of fertilizers and pesticides has caused air and water pollution. Modern means of production killed micro organism and reduced soil fertility. The reduction of pasture lands and bio- diversity, water- logging, soil erosion and depletion of forests are the common drawbacks of green revolution. The present paper is an attempt to highlight the Characterstics of green revolution and its impacts on environment.

Keywords: green revolution, irrigation, pesticides, insecticides, poverty, environmental degradation

Introduction

Green revolution first used by William Gadd, the American scientist refers to the phenomenal increase in the food grains production during 1960. Green revolution has different meanings. For agricultural geographers, it refers to broad transformation of agricultural sector to reduce food shortage, for others it is specific plant improvement, development of HYV which changed the agricultural landscape and reduced poverty, hunger and undernourishment in certain regions of developing world. American agronomist Dr. Norman E. Borlaug is known as the father of green revolution in India. India green revolution was led by Dr. M.S. Swaminathan known as father of Green revolution in India. It signifies the tremendous increase in food grains production specially wheat and rice due to use of high yielding variety of seeds, chemical fertilizers, pesticides and irrigation. The new agricultural strategy adopted in 1965-66 aimed at raising the farm output through the use of HYV seeds, chemical fertilizers, pesticides, agricultural implements, machinery, and agricultural credit for agricultural products. According to U. Thant, Former General Secretary of United Nations Organizations green revolution is more than Pandora box rather than benefitted.

After independence population was increasing and there was urgent need for increasing food grains. Through Five Year Plans, Intensive Agricultural District Programms (IADP) and Intensive Rea Development Programme were started to increase production but during 1965-66 drought, India had to import about 20 million tonnes of food grains from U.S.A. At that time Govt. of India imported 20000 tonnes of high yield variety seeds from Mexico and production increased a lot and was called green revolution. The production of food grains increased from the average 81 million tonnes in1961-66 to241.6 million tonnes in 2010-11. The production of wheat increased from 23.8 million tonnes to 80.7 million tonnes and rice production increased from 42.2 million tonnes to 89.1 million tonne during the same period.

Characteristics of green revolution

1. Adoption of HYV seeds: High yield variety seeds of wheat, rice, maize, jawar, bajra were adopted were adopted to take maximum profit in short duration from a small piece of land.
2. Chemical fertilizers: After many years agricultural practices, fertility of soil becomes low. So to increase fertility, chemical fertilizers are used. The wealthy farmers of Punjab, Haryana are using a large amount of fertilizers.
3. Irrigation facilities: For cultivation of HYV seeds and intensification of agriculture, irrigation facilities are necessary. In areas of heavy rainfall. i. e. Brahmaputra valley and dry area of Rajasthan, the application of HYV seeds is not satisfactory. Canal and tube well irrigated areas of Punjab, Haryana and western Utter Pradesh has a lot of production due to irrigation.
4. Extension services: For well-being in agriculture, cooperation between farmers, farm supervisor, researcher and scientists is necessary to modify from traditional to modern farming.
5. Capital: A large amount of capital is necessary for purchasing high quality HVY deseeds, fertilizers, making arrangement of tube wells and pump sets. Pesticides but all these facilities are available only rich farmers. A very poor farmer cannot purchase costly seeds and pesticides.
6. Plant protection chemicals: The HYV seeds are very sensible to pests and diseases because in moist soil, insects and pests grow very fast. So, a number of pesticides, weedicides herbicides are used to save crops. But small and poor farmers cannot purchase these costly chemicals.
7. Mechanization: Traditional instruments like bullock cart,

sickle, and hoe cannot give more production using HYV seeds. So modern instruments such as tractor, thresher, and tillers are necessary for getting more production using better seeds and proper irrigation facilities.

8. Transportation facilities: Cheap transportation facilities are necessary to bring surplus to markets because perishable crops such as fruits and vegetables and dairy products can damage very fast. So, market should be close.
9. Storage facilities: In villages, farmers store their surplus in their houses. Many pests damage their production and moisture content also harmful for products. So, facility of godans and warehouse in compulsory to store surplus products.
10. Human factors: The adoption of HYV deseeds, irrigation facilities, using of modern machinery and use of pesticides and herbicides is possible if people are aware about new technology, easy to adopt new innovations and ready to take risks. So, for better performance of HYV seeds, efficient and educated person are compulsory.

Effects

There has been a fast increase in productivity and quantum of food grains. In pre independence period, (1900-47), the agricultural growth rate was 0.3 % and with adoption of new technology, this growth has reached to 2.8 % in 1966-67.Production of food grains increased from 108 million tonnes in1970-71 to 176 million tonnes in 1990-91 and increased to 218 million tonnes in 2009-2010(Table 1). Per hectare yield of wheat increased from 851 kg per hectare to 2938 kg per hectare and that of rice from 1013 kg per hectare to 2178 kg per hectare. The per capita food grain availability increased from 395 grams per day in 1951 to 444 grams in 2009-10.It ensured maximum production in shortest period. Green revolution generated new jobs for farm workers. As many farmers have migrated from n Uttar Pradesh, Bihar, Madhya Pradesh to northern states of Punjab and Haryana.

Table 1: Production of food grains in India (million tonnes)

Food grains	1950-51	1970-71	1990-91	1999-2000	2009-10
Rice	20.6	42.2	74.2	89.4	89.1
Wheat	6.5	23.8	55.1	75.5	80.7
Maize/coarse grains	1.07	7.5	9.0	11.4	16.7
oilseeds	-	9.6	18.6	18.4	24.9
Pulses	8.4	11.8	14.3	13.3	14.6
Total food grains	50.8	108.4	176.0	209.0	218.2

***Source*:** Economic Survey, 2010-11.

Environmental impacts

Green revolution has created many environmental problems such as depletion of forests, reduction of pasture lands, salinization, water logging, soil erosion, land, water and air pollution, reduction of bio diversity, decline in soil fertility, lowering of water table etc.

Some important environmental problems are:

1. Deforestation: A large number of trees have been cut due to expansion of agricultural into forest, pastures and cultivable land and construction of big dams for multi suppose projects. Consequently, very less forest have left in Punjab, Haryana and western Uttar Pradesh. Construction of many big dams and reservoirs for creating hydroelectricity have also caused deforestation
2. Salinity and alkalinity: In canal irrigated areas of Punjab, Haryana and Uttar Pradesh, farmers over irrigate their fields and salt from inside of earth comes on the earth surface with capillary action. These saline and alkalinize areas are called Kallar in Punjab and Reb in Uttar Pradesh. About 50 % of the arable land in Punjab has been damaged due to salinity.
3. Water logging: Green revolution has increased water logging in canal irrigated areas. Due to Indira Gandhi Canal, several thousand acres of productive agricultural land has become water logged. In some areas of Punjab and Haryana, water logging is a problem.
4. Lowering of ground water table: In semi arid areas of Punjab and Haryana, many commercial crops are grown with the help of ground water. This has created drinking water scarcity and possibility of salination of ground water. In Punjab, Haryana and Western Uttar Pradesh, the plantation of eucalyptus and poplar trees put a negative impact on water table as they draw more moisture from soil and make it unfertile.
5. Lowering of soil fertility: To take more production in short time, farmers grow two cereal crops (rice and wheat) and one cash crop Millet and cotton) in the same field in one year and do not leave the field fallow. Consequently, the fertility of soil decreases with time.
6. Danger of over flooding: Many dams have been build for electricity in different states. There can be possibility of flooding in case of accidental dam burst.
7. Soil erosion: Farmers grow two or three crops in a year to take more production and do not leave the land fallow, so soil becomes unfertile after some years increased problem of soil erosion. It is estimated that about 6000 million tonnes of top soil is leached per year in India.
8. The decline in micro organism: Modern technological agricultural practices such as ploughing by tractors, use of combine and harvesters damage the micro organism of soil and reduce soil fertility. Studies show that 9 out of 14 micro-nutrients have been
9. Air and water pollution: To protect their crops from pests and insects, farmers use a large amount of spray of pesticides and insecticides. These chemical pollute the air and cause many respiratory diseases. After mixing these pesticides into water, surface and underground water contaminates.
10. Impact on health: The spraying of poisonous pesticides and insecticides is a common practice in production of vegetables and fruits as many fruits have found traces of copper, zine, cadmium and arsenic. These cause ill impacts on our health. New diseases such as Bithazaris and Encephalitis and Malaria have been traced in canal irrigated areas of Punjab and Haryana.
11. Change in properties of soil: For taking more production through High yield variety seeds, there is a great requirement of higher irrigation facilities and large quantity of chemical fertilizers and pesticides. These chemicals change the chemical and bio-logical properties of soil.

Conclusion

After Independence, India was facing food crisis. So to ensure maximum profit in shortest time, India adopted a new technology based agriculture system having use of high yield variety seeds, more irrigation facilities, modern means of agriculture, with high dependency on chemical fertilizers and pesticides and insecticides that was called green revolution. It was a major achievement for many developing countries. The green revolution benefitted poor people of society but it affected the environment very badly by causing air and water pollution through use of pesticides and insecticides. New agricultural practices also reduced micro organism in soil that were responsible for soil fertility. So, there is a need to adopt new technologies that would be environment friendly and helpful in sustainable development of agriculture.

References

1. Gautam A. Agricultural Geography, Sharda Pustak Bhawan, Allahabad, 2016.
2. Economic survey, Govt. of India, 2010-11.
3. Hussain M. Agricultural Geography, Inter India Publications, New Delhi, 1979.
4. Khullar DR. India: A comprehensive Geography, Kalyani Publishers, New Delhi, 2014.
5. Sen Amartya. Poverty and famines: An essay on Entitlement and Deprivation, Oxford University Press, London, 1981.
6. Sharma PD. Ecology and environment, Rastogi publication, Meerat, 2012.
7. Singh S, Saroha J. Geography of India, Access Publishing India Pvt. Ltd, New Delhi, 2014.