

Green Revolution: A war between Hunger and self sustainability

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History of Green Revolution

The term "Green Revolution" was first used in 1968 by William Gaud, a former director of United States Agency for International Development (USAID). In his words, "These and other developments in the field of agriculture contain the makings of a new revolution.....I call it the Green Revolution." The initiatives by Norman Borlaug helped the world, especially the developing nations to overcome major agrarian crisis. Thus he is referred to as the "Father of the Green Revolution," and was awarded the Nobel Peace Prize in 1970.

In India, the credit of a successful Green revolution goes to the much revered scientist, Professor Mankombu Sambasivan Swaminathan, whose main goal was to eliminate hunger and poverty using environmentally sustainable agriculture, food security and preservation of biodiversity.

Norman Borlaug won the Nobel Prize for Peace, and he subsequently acknowledged in a letter that 'to you Dr Swaminathan, a great deal of the credit must go for first recognizing the potential value of the Mexican wheat dwarfs. Had this not occurred, it is quite possible that there would not have been a Green Revolution in Asia.'

What is Green Revolution?

Green revolution can be credited with saving billions from starvation by involving high-yielding varieties of cereals, better irrigation infrastructure, modernized distribution of seeds, synthetic fertilizers, and pesticides to the farmers.

Components of Green Revolution

High Yielding Varieties (HYV) of seeds:

The HYV seeds were the most important component, characterized by shorter stems, which could resist damages by wind and had larger leaf surface for photosynthesis, short maturing period and better response to chemical fertilizers. As per Prof. M.S. Swaminathan green revolution not only removed the tag of 'begging bowl' image of India but also secured forests and land, due to the productivity improvement.

HYV seeds of wheat and rice in 1960s modernized agriculture and helped the transformation of farmers. transforming a traditional farmer into a commercial producer. National Seeds Corporation, established in 1963, plays a major role in taking various initiatives and responsibilities related to production and quality certification of the seeds.

Irrigation

Water is a necessity for crop development and irrigation played another major role. With the unreliable rainfall in India, it became important to explore other means of irrigation. HYV seeds need an optimum amount of water at proper timing. Ground water was extensively used with the help of Pump set or tube wells during the period. Several Dams and canals were also constructed. Further,

EXCERPTS: WILLIAM GAUD'S ADDRESS

“Over the last five months we have seen new evidence of their progress. Record yields, harvests of unprecedented size and crops now in the ground demonstrate that throughout much the developing world - and particularly in Asia - we are on the verge of an agricultural revolution.

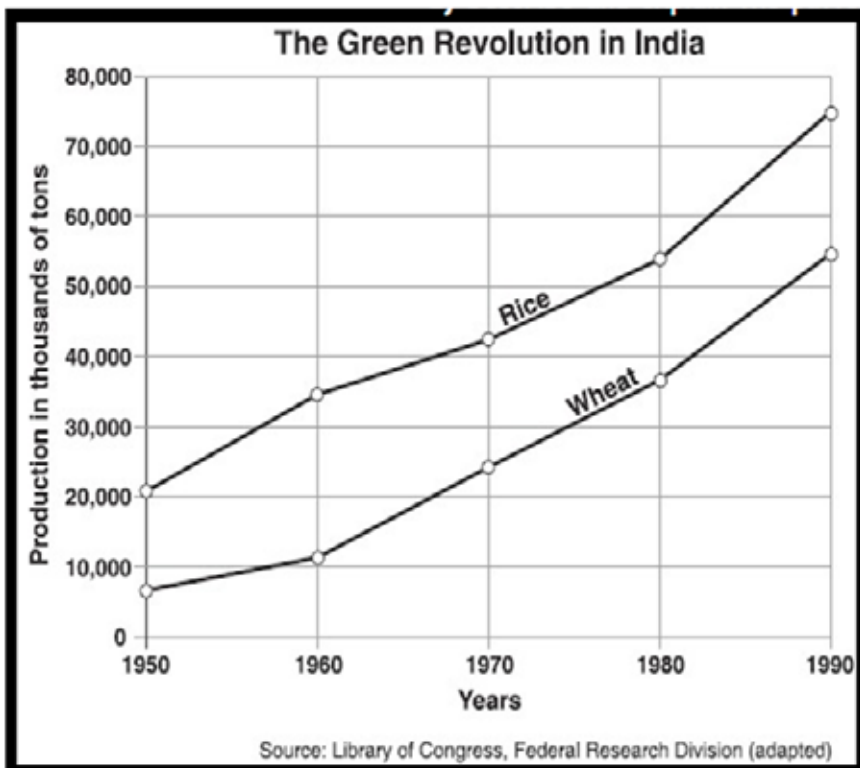
- In May 1967 Pakistan harvested 600,000 acres to new high-yielding wheat seed. They will bring in a total wheat crop of 7-1/2 to 8 million tons - a new record. Pakistan

- In 1967 the new high-yielding wheats were harvested from 700,000 acres in India. This year they will be planted to 6 million acres. Another 10 million acres will be planted to high-yield varieties of rice, sorghum, and millet. India will harvest more than 95 million tons in food grains this year - again a record crop. She hopes to achieve self-sufficient in food grains in another three or four years.

- Turkey has demonstrated that she can raise yields by two and three times with the new wheats

- The Philippines have harvested a record rice crop with only 14% of their rice fields planted to new high-yielding seeds. The Philippines are clearly about to achieve self-sufficiency in rice.”

Source: <http://www.agbioworld.org/biotech-info/topics/borlaug/borlaug-green.html>



green revolution helped with two crop season as against the traditional single season, dependent on monsoon.

Chemical Fertilizers

Besides irrigation, HYV seeds require fertilizers for optimum yield. In fact, the output of various states like Punjab and Haryana was proportional to the consumption of fertilizers. Nitrogen, Phosphorus and Potassium, being the major requirement, their usage is recommended in the ration 4:2:1. However, it changes depending on the crop and regional variations. The government tried to increase availability of these fertilizers through proper subsidies and distribution.

Insecticides and pesticides

Increased agricultural production also given birth to problems like pests, insects, weeds and rodents which could destroy up to 20 percent of the production. Thus rampant use of pesticides and insecticides was a practice during the revolution.

Other Components

Other less highlighted but crucial components to the revolution were agricultural credit, rural electrification and improvements in infrastructure, including transport and marketing. As it can be understood, the farmers needed credit for buying the HYV seeds, fertilizers and pesticides. The system of loans from local money lenders was very orthodox and unfavourable to the poor farmers. Farming was eased by the advent of cooperative and rural banks.

Haryana became the first state to electrify all the villages by 1970. Cheap electricity was needed especially for the tube wells for timely distribution of water.

Favourable marketing and transportation is crucial as it helps the farmers to buy seeds, fertilizers without much hassle and at the same time, it allows sale of the produced crops at an optimum cost and thus saves them from exploitations. It also helps in saving fuels, money and energy if transportation facility is good and



Source: James Kiloran et al., *The Key to Understanding Global History*, Jarrett Publishing Co. (adapted)

markets are near.

Impacts of Green Revolution

The biggest impact of green revolution was that India became self-sufficient and was no longer the 'begging bowl' even though the population more than doubled. With the introduction of mechanized farming, time and resources could be saved and surplus output was observed. Rural areas got access to cheap electricity better transportation which ultimately helped in their development.

As more water, fertilizers, pesticides, and other chemicals were needed, the local manufacturing sector flourished, creating new jobs and contributed to the country's GCP. Increased irrigation-requirement led to creation of new dams to collect the rainwater. The resulting hydro-electric power also boosted the industrial growth, led to cheap electricity and improved the quality of life in the

villages. The successes are immense but it also showed the negative aspects of green revolution in the long run.

Green Revolution: The Dark side

The major problems that emerged included contamination as well as depletion of groundwaters, greenhouse emissions, loss of crop genetic diversity and eutrophication of water bodies and coastal marine ecosystems through organic and inorganic nutrients that cause oxygen depletion, spread of toxic species and changes in the structure of aquatic food webs. Further, there was loss of soil fertility and increased incidence of crop and livestock diseases.

Problems for small farmers: The mechanization of farming reduced the dependence on human labor. Further, the input cost made it difficult for small farmers to thrive in the long run. Increasing suicide rates may be an indirect outcome of green revolution. It is also postulated that many pesticides/insecticides may be neurotoxic, leading to increased depression and suicidal tendencies among farmers.

Health hazards: The rampant used of chemicals in the form of fertilizers, insecticides and pesticides polluted soil and water. The increase in cancer incidences in states which were hubs of green revolution is worrisome.

Conclusion

The environmental effects of current farming methods may seriously haunt us in future. New and greener approaches are needed for a sustainable agriculture which can feed the ever growing population. An ideal revolution will involve "practices that can provide sustainable yields, preferably comparable to those of high-intensity agriculture but with fewer environmental costs". As Prof Swaminathan rightly points out, we need an 'evergreen revolution' now.

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