



# Green Revolution as Technological Fix to Agricultural Development

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## Abstract

The beginning of Human being's effort to meet the need for food production in parallel with the increasing number of population and environmental deterioration is lost in time. One of such known effort was green revolution which started in 1968 in order to revolutionize agricultural sectors through the utilization of modern technologies. Since agriculture is the fundamental source of livelihood for the majority of human population especially in developing countries, it will always be helpful to study any agricultural aspects to take lessons from it. Accordingly, this review article tries to study the historical, implementation and shortcoming of green revolution. The study only used secondary data materials.

**Keywords:** Green revolution; Agricultural Technology; High Yielding Variety

## Introduction

Over centuries, Owing to some natural factors or unnatural (human-made) factors different societies across the world were encountered significant decrease in food production eventually leading into chronic food shortage that affected the life of millions of peoples and also resulted in death of large number of human individuals. In one way or another there have been responses from the people to deal with the problem of hunger at different time. As such, the so called "Green Revolution" is a technological response into the world-wide hunger that took place after Second World War. It was a great movement characterized by introduction of agricultural technology from developed nation in to developing countries with the intension of replacing traditional agricultural techniques with improved modern techniques so as to increase food production output and subsequently to put to an end the problem of food shortage. This review paper tries to analyze Green Revolution and then to discuss its historical development, implementation and failure. It will be dealt as follows.

## Definition

The term green revolution was first used in 1968 by William Gaud the former director of United States Agency for International Development (USAID) to describe agricultural policy that has been adopted to deal with the world-wide hunger after Second World War. This policy was termed as green revolution because, it was characterized by great movement toward increasing agricultural output so as to meet the argent need for food production, that were exacerbated by population growth, whilst making intensive use of agricultural technologies that has been devised over centuries by developed nations mainly in United State and western European countries [1]. Green revolution is the extension of earlier agricultural revolution that was under taken in different nation such as France and England (David B. Grigg). But, the unique manifestation of green revolution in relation to the earlier phase of agricultural revolution was its intensive use of improved agricultural technology specially that of high yielding varieties (HYVs) that is adoptive to different

changing condition. So, Green Revolution is a term used for rapid increases in wheat and rice yields in developing countries brought about by improved varieties combined with the expanded use of fertilizers and other chemical inputs that has had a dramatic impact on incomes and food supplies in many developing countries [2].

### Historical Back Ground

Green revolution was a giant movement that took place the period after Second World War mainly between 1940s and 1960s. This movement was initially coming at the request of Mexican government to establish agricultural research station to develop more varieties of wheat. As it was also true for many other nations of the world, in 1940 Mexico needed high food production that could be used to feed the rapidly growing population of the country [3-5]. To this account, the Rock Feller Organization in cooperation with Mexican government created Office of Special Studies within the Mexican Department of Agriculture. One of the pioneers in this effort was the plant pathologist Norman Borlaug who won the Nobel Peace Prize for his green revolution work in 1970. He was often regarded as the Father of Green Revolution. The overall agricultural endeavor by Rock Feller Organization in Mexico were succeeded in engineering better seeds that was resulted in increased agricultural output to greater amount. News of this cooperative undertaking and agricultural improvement in Mexico Spread rapidly to other countries in Latin America and Asian countries. Eventually, inquiries to invite rock feller for collaboration began to come from other Latin American and Asian countries like India, Pakistan, Bangladesh, Indonesia and China and parts of Africa [7-9].

In 1957, the Rock Feller Foundation started its agricultural program in India and three years later the Rock Feller Foundation and Ford Foundation jointly created the International Rice Research Institute (IRRI) at Los Banos in the Pmphiliphins to find a rice as miraculous as the Pitic 62 and Penjamo 62 wheats, rice being at that time the main item of diet for six out of every ten people in the world. They were succede in developing HYVs specially IR8-rice that was termed miracle seed [10].

### Implementation of Green-Revolution

The initial aim of green revolution was to eradicate famine that has had deteriorated the well-being of many developing nation across the world. The plan was to maximize agricultural output because, as per the assumption of green revolution, once agricultural output has increased it will put to an end the hunger problem. So as to increase agricultural output, traditional agriculture must be replaced by modernized agriculture that makes intensive use of technology. This encompasses the use of hybrid seed, fertilizers, herbicides and pesticide, irrigation system etc. with such transformation in the agricultural sector, green revolution promised to eradicate famine. In account of this, the first practical implementation of green revolution had taken place in Mexico in 1940, funded by Rock Feller Organization. After

intensive research, the team has succeeded in developing hybrid seed of wheat, maize etc. that could give high yields. The developed hybrid seed was cultivated and resulted in the increased output. Accordingly, Mexico become the first country to testify the result of green revolution. In 1943 Mexico imported half of its wheat; in 1956, the green revolution made Mexico self-sufficient; by 1964, Mexico started to export wheat. The improvement of agricultural output in Mexico attracted attention from many developing nations mainly from Asia [11].

In 1960 Philippines in collaboration with Ford Foundation and Rock Feller Foundation established International Rice Research Institute (IRRI). A rice crossing between Dee-geo-woo-gen and Peta was done at IRRI in 1962. In 1966, one of the breeding lines became a new cultivar, IR8. IR8 required the use of fertilizers and pesticides but produced substantially higher yields than the traditional cultivars. Annual rice production in the Philippines increased from 3.7 to 7.7 million tons in two decades. The switch to IR8 rice made the Philippines a rice exporter for the first time in the 20th century. At the same time, heavy pesticide use reduced the number of fish and frog species found in rice paddies [12].

In 1961, India was on the brink of mass famine. Being impressed by the agricultural transformation that Mexico had under gone, India invited the green revolution to assure food security for its rapidly growing population. To this effort, green revolution was first introduced into parts of India with the collaboration of Rock Feller Organization. Later on, India began its own green revolution program of plant breeding, irrigation development and financing of agro-chemical. India also adopted IR8, a rice semi-dwarf variety developed by the IRRI that could give more grains of rice per plant when grown properly with fertilizer and irrigation. This IR8 rice variety was success through Asia and termed as miracle rice. India become one of the world's most successful rice producers and is now a major rice exporter [13].

There have been numerous attempts to introduce the successful concepts from the Mexican and Indian projects into Africa. These programs have generally been less successful, for a number of reasons. Reasons cited include widespread corruption, insecurity, a lack of infrastructure, and a general lack of will on the part of the governments. Yet environmental factors, such as the availability of water for irrigation, the high diversity in slope and soil types in one given area are also reasons why the Green Revolution is not so successful in Africa.

### The Short Coming of Green-Revolution

Besides maximizing food production, Green revolution was not as such successful as it was expected to be. This could be ascribed to many reasons. First and for most, green revolution was one directional- it only considers the increase in food production as the sole solution to eradicate hunger. For many farmers the cost of machinery was too much, and they couldn't afford it. Many very poor

farmers were tenant farmers, with little money to buy even the new seeds or fertilizer. Dam construction in some areas resulted in the flooding of some good farming land. The large amounts of fertilizers and pesticides required by HYVs also led to serious environmental problems as they inter water supplies. Areas where there was an increase in mechanization, there was an increase in unemployment fewer people needed to do the job this led in rural-urban migration with more people moving to the city causing urban problem. Many farmers who had tried to take on the new technologies became heavily in debt. These and other long-term problems made green revolution ineffective [14].

## Conclusion

Generally, Green Revolution was a movement that started after Second World War as response to world-wide hunger. The main aim of this revolution was to increase agricultural output by intensive use of modernized agricultural technology specially by using hybrid seed supplemented by mechanical and bio-chemical technologies. This revolution was succeeded in increasing food production by innovating HYVs of different cereals but, at its first stage it was mainly contributed to wheat, maize, rice and later on its contribution extended into other cereals. With its first move in Mexico, green revolution introduced into other parts of Latin America, Asia and also some parts of Africa. However, green revolution was mainly implemented in Asia than any other countries. And this revolution was not that much succeeded in eradicating poverty as it was first promised to do so. It also brought about many problems that accounts to its failure.

## References

1. Hazell Peter (2009) The Asian Green Revolution. IFPRI Discussion Paper (Intl Food Policy Res Inst). GGKEY: HS2UT4LADZD.
2. Per Pinstrup Andersen, Peter BR Hazell (1985) The Impact of Green Revolution and Prospects of the Future. International Food policy Research Institute Washington DC, USA 1(1).
3. Peter Rosset (2000) World Hunger: Essay on Green Revolution. Grove Press, USA.
4. Timp Bayliss Smith, Sudhir Wanmali (1984) Understanding Green Revolution. Cambridge University Press, New York, USA.
5. Farne (1980) Green Revolution. The Macmillan Press, London, UK.
6. Marine (1987) Proceedings of international meeting: Towards a second green revolution from chemical to new biological technologies in agriculture in the tropics. (1<sup>st</sup> edn), Elsevier, USA.
7. Timothy m (1998) Chinese aid and African development: Exporting green revolution. Palgrave Macmillan, UK.
8. Aunden Schendler (2009) Getting Green Done: Hard truths from the front lines of the sustainability revolution. public affairs, USA.
9. Bernhard Glaeser (2011) The green revolution revisited: Critique and alternatives. Routledge, London.
10. Peter B, Hazell C (1991) Green Revolution Reconsidered: the impact of High yielding rice varieties in south India. International food policy research institute, London, pp. 304.
11. Vandana Shiva (1991) The violence of green revolution: Third world agriculture, ecology and politics. Zed Book, London, pp. 264.
12. Doberah Lynn (2003) The grass root of green revolution: Polling American on environment. MIT press, cambridg, London, pp. 291.
13. John Entine (2011) Crop chemo phobia: Will precaution kill the green revolution? AEI press, Washington DC, USA.
14. Keijiuro Otsuka (2013) African green revolution: Finding ways to boost productivity on small farms, springer, Germany.



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