



## THE IMPACT OF GREEN REVOLUTION ON SMALL FARMERS IN DEORIA DISTRICT

1. DEVENDRA PRATAP MISHRA 2. SUSHANT DAS

LASSO. PROF., GEOGRAPH, YMMMPG, College, BhatparRani, Deoria 2. ST. JOHNS COLLEGE, AGRA, (U.P.) India

**Abstract-** *The greatest challenges facing the nation in the coming years will be to provide safe food for the growing population in the country. In this regard the green revolution was initiated in the late 60's and it has played a leading role in making the country self-sufficient in food grains. The technology of the Green Revolution involved bio-engineered seeds that worked in conjunction with chemical fertilizers and heavy irrigation to increase crop yields. The technology was readily adopted in Deoria district and was a great success in the beginning. However, there were many farmers who could not afford the inputs necessary to participate in the Green Revolution but as they started their margin of profit get effected. Even their land had the adverse effect of the green revolution.*

*This study is based on primary survey work of 90 farmers and their experiences from the five villages (Kanhali, Tendua, Siswa, Sonbarsa, and Sahiya) of Deoria District. This paper will analyze the negative impact of the Green Revolution on small farmers and their agricultural land.*

**Introduction-** The Green Revolution was reached in the 70's in Deoria district design to feed the growing population in the district. It has credited with increasing yields in many of villages where the technology has been adopted, but the benefits experienced have been unequal across regions and groups. The small farmers experienced lower profit margin and degradation of their agricultural land which lead them to migrate to the urban places in search of better opportunity. Many farmers even sold their agricultural land.

The green revolution is widely regarded as the technological advancement that pushed agricultural development onto a new frontier, the mass increase of product was the miraculous result. One might think, as many scholars have, that this would solve a great deal of widespread famine throughout the world; however, there are those that would argue otherwise. In particular, studies provide evidence that these technological advancements have only helped very specific areas, and done little for many impoverished and malnourished communities.

Amartya Sen wrote on the subject of starvation that it is, "the characteristic of some people not having enough food to eat. It is not the characteristic of there not being enough food to eat." This perspective has guided many authors regarding the views surrounding the green revolution, as it points out the exact issue behind the assumption that more food means less hunger. Those who find issue with Sen's arguments, such as Mark B. Tauger, who wrote an entire amendment in disagreement with Sen's work, rely heavily on the data and numbers in support of the green revolution's positive effects.

In Tauger's article, titled "Entitlement, Shortage, and the 1943 Bengal Famine: Another Look", he disassembles Sen's arguments about widespread food production, and argues his own views on what this meant for the world's population. He states, "The International Rice Research Institutes, one of the research and development institutes set up as part of the Green Revolution, bred high-yielding rice varieties from the 1960s onward that allowed world rice production to double in the 25 years from 1966 to 1990, which allowed 700 million people to be fed."

Another author who would disagree with Sen's statements Gurdev S Khush, whose article "Green

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Corresponding Author

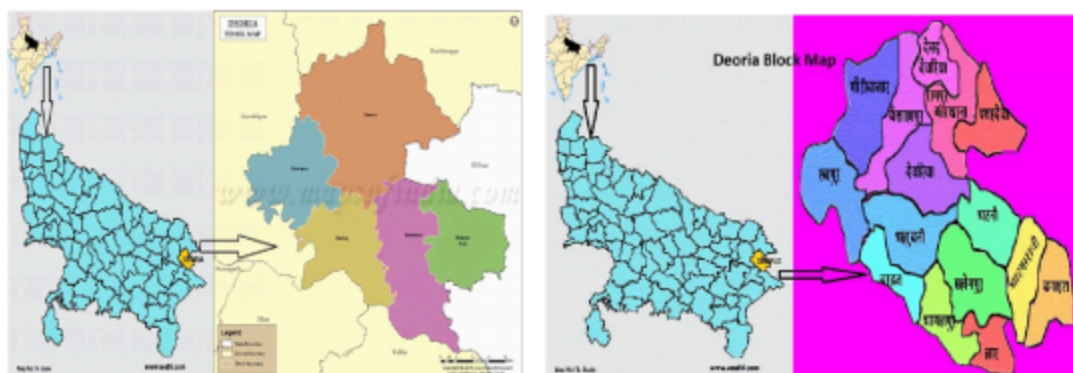


Revolution: The Way Forward" is more of a glowing review towards the scientific advancements made by the green revolution's technology. "Fortunately, large-scale famines, and social and economic upheavals, were averted," he asserts on page 815, "thanks to the marked increase in cereal-grain yields in many developing countries that began in the late 1960s." Khush goes on to argue that the increase in food product has met the needs of the growing population of the earth, by outlining the genetic changes in "yield potential" (the ability to produce a certain amount) within several products such as rice and other grains. Although Khush takes a highly scientific approach, his views on the green revolution's effect are very common, in that when the product increased, instances of famine decreased.

Gordon Conway describes the relationship between the green revolution and famine prevention most accurately when he states it is "uneven", referring to his detailed research of undernourished populations in countries, years 1970 through 1990. "At best," he claims, "under-nutrition in the non-green revolution lands has been prevented from growing; at worst, many poor farm households in these lands may be getting less food, since their grain yields have increased little and they are receiving lower prices Conway also states that "Potential famines, as would have occurred following the 1987 drought, have been averted, but the overall impact on chronic under-nutrition has been small". This sort of view favors heavily on the side that Sen took, and seems to be the general data collected on the green revolution's impact on famine. Ultimately, there is no conclusive evidence to push the argument in either direction, only claims that substantiate both sides in various perspectives. One claim that can be decided upon, however, is that the green revolution was not the magical cure to famine, as was originally thought. As Sen was getting at, simply having enough food is not going to end hunger worldwide. But it does go to show in works such as Tauger's and Khush's that the new technology brought about by the green revolution did improve conditions and prevent many cases from starvation.

**STUDY AREA:** Deoria district is situated in the north eastern part of Uttar Pradesh. Formerly it was a tehsil of Gorakhpur district but got separated in 1946 as the independent district. The study area extends from 26° 06' N and 26° 48' N latitudes to 83° 23' E and 84° 16' E longitudes. It has a total area of 2527.2 sq. km. In the north, the study area is bounded by the District Kushinagar while the districts of Ballia and Azamgarh of Uttar Pradesh form its Southern boundary. In the east, it is delineated by the Uttar Pradesh-Bihar border across which lie the West Champaran, Gopalganj and Siwan districts of Bihar. Gorakhpur district, from which the study area has been separated, forms its Western boundary. The river Ghagara flows along the southern boundary of the district.

According to the 2011 census Deoria district has a population of 3,098,637, roughly equal to the nation of Mongolia or the US state of Iowa. This gives it a ranking of 114th in India (out of a total of 640). The district has a population density of 1,220 inhabitants per square kilometer (3,200/sq mi). Its population growth rate over the decade 2001-2011 was 14.23%. Deoria has a sex ratio of 1013 females for every 1000 males, and a literacy rate of 73.53%.





**METHODOLOGY:** This paper is based on the primary survey work of 90 farmers and their experiences from the five villages (Kanhauri, Tendua, Siswa, Sonbarsa, and Sahiya) of Deoria District, which is usually collected by the questionnaire and through the individual interviews. The information about the degradation of land is collected from the Farmer's Portal and also from the experiences of the farmers. The secondary data is collected from the NGO's working especially in training the small farmers to carry sustainable agriculture in Deoria District and through the reviewed published sources like the websites which are designed to provide information for the sustainable agriculture, books and periodicals. The approach to analyze the agricultural data is ecological and the methodologies used are both observational descriptive and observational relational, during the whole research work in absence of data at some places hypothetical method is also applied to get the desired result.

**OBJECTIVE OF THE STUDY:**

1. To understand the need of small farmers in Deoria District.
2. To assess and evaluate the factors which are responsible for the migration of small farmers to the urban places.
3. To analyze the methods of farming introduced by the Green Revolution and to evaluate the effect of these methods on the degradation of the agricultural land in Deoria District.

**ANALYZING THE POPULATION GROWTH AND ITS IMPACT ON GREEN REVOLUTION:** Increasing population growth is a major concern in the modern era. The ever increasing demographic dynamism has become a burning point in the recent years for discussion among the social scientists, including population geographers. Recent population explosion and economic recession of 1980-83, the widening gap between the per capita income of developed and developing countries, increasing environmental damage and increasing population pressure upon the limited resources have compelled the social scientists and population geographers to discuss and explain the causes and the effects of demographic dynamism in this field of demographic study.

The most important problem arise in the modern times is to feed the ever increasing growing population. This lead to the development of modern farming methods and it was started as the Green Revolution on the International forum. The Green Revolution refers to a set of research and development of technology transfer initiatives occurring between the 1930s and the late 1960s (with prequels in the work of the agrarian geneticist Nazareno Strampelli in the 1920s and 1930s), that increased agricultural production worldwide, particularly in the developing world, beginning most markedly in the late 1960s.

The Initiatives, led by Norman Borlaug, the "Father of the Green Revolution", who received the Nobel Peace Prize in 1970, credited with saving over a billion people from starvation, involved the development of high-yielding varieties of cereal grains, expansion of irrigation infrastructure, modernization of management techniques, distribution of hybridized seeds, synthetic fertilizers, and pesticides to farmers. In India during late 1960s, there was threatening to food security due to population increase and frequent droughts. So, the government of India had entered collaboration with USA for reforming farming practices by adding chemical products for cultivation, diseases and weed management.

After independence in 1951 the population of Deoria district was 1069274 which had increased to 1421966 in 1971 with the decadal growth of 18.3% and till 1991 it had reached to 2204872 with the decadal growth of 24.9%. So, to feed this growing population had motivated farmers to experiment with the modern farming method. In the beginning it had given them more yield than they expected, so very soon most of the farmers had accepted this method of farming without knowing the consequences.

**STUDY ANALYSIS OF THE IMPACT OF GREEN REVOLUTION ON THE SMALL FARMERS:** The Green Revolution technology employed the use of high-yielding varieties of seeds as well as chemical fertilizers. The problem with indigenous seeds was not the facts that were not high-yielding;





rather it was their inability to stand up to heavy applications of chemicals. The new varieties were created in conjunction with the fertilizers were heavy irrigation to produce higher yields. Independently, the seeds as well as the fertilizers were fairly ineffective, but used together they were promised to double or even triple crop yields (Newman 2007).

After analyzing the data collected from the primary and the secondary sources it had been seen that the Green Revolution had a negative impact on the small farmers and their agricultural land. In the beginning of 70's when the so called hybrid seeds, chemical fertilizers and pesticides were distributed by the government on much lower subsidy the farmers experienced much higher yield, some of them double and even triple. But as the governments lower the subsidy, it affected the small farmers and their cost of investment in their field increases as they started taking loans from the local money lenders. At the same time due to the higher yield the cost of agricultural produce remain the same. Green Revolution technologies imply the use of genetically modified seeds which demands more irrigation. The farmers in Deoria depend mostly on the canal irrigation for which they need to pay. All these factors together result in the lower income of the farmers. This led their migration to the nearby town for more earning to sustain their family. Changes toward external inputs not only had negative consequences for the ecology of the villages, they had social implications as well. Before the Green Revolution, agriculturalists relied on mutual relationships within their villages. After the introduction of Green Revolution technology they found themselves solely dealing with banks and agribusiness, thus weakening relationships within villages (Shiva 1993).

As the Green Revolution grew, so too did the use of new technologies, specifically the use of synthetic chemicals on crops. One staple of the Green Revolution has been the development and use of pesticides. "A pesticide is defined as any substances intended for preventing, destroying, or controlling any pest, including vectors of human or animal diseases, unwanted species of plants or animals that cause harm during the production, processing, storage, transport, or marketing of food, agricultural commodities, wood and wood products, or animal feedstuffs, or which may be administered to animals for the control of insects, arachnids, or other pests in or on their bodies" (Anwar).

The use of pesticides, however, is controversial. While they are used to, essentially, keep the wild out of farms, the toxins affect more than the environment, the ecosystem, and the organisms. Pesticides are also ingested, breathed in, and absorbed through the skin by humans. Pesticides are also the number one tool of farmers in ensuring that they can grow a crop and make a profit. Most fruits and vegetables that touch the dinner table have come in contact with pesticides. Even those processed can still maintain elements of those pesticides. Due to the seemingly unavoidable chemicals being used in such high numbers, it has become a controversial Green Revolution invention.

Pesticides have caused immune suppression in humans not only in developing countries, but encompassing the globe (Acquavella). Pesticides can also cause a degenerative disorder of the nervous system in the form of Parkinson's and other diseases (Xu). There is evidence-linking exposure to pesticides to an "elevated rate of chronic diseases such as different types of cancers, diabetes, neurodegenerative disorders like Parkinson, Alzheimer, and amyotrophic lateral sclerosis, birth defects, and reproductive disorders" (Mostafalou). Pesticide exposure has also been linked to parental infertility, birth defects, childhood cancers, spermatotoxicity, retarded intrauterine growth, and chromosome damage (Schettler).

The farmers in Deoria had been affected by the toxicity of the pesticides as some farmers and their family members had been found suffering from cancers, diabetes, neurodegenerative disorders like Parkinson, Alzheimer, and amyotrophic lateral sclerosis, etc. Most of the farmers were unaware of the consequences of the pesticides and even not using the safety measures against the pesticides and herbicides when they use in their field. The increasing cost of medicine for these chronic diseases causing them poor. The Green Revolution hardly seems to have made much of an impact in terms of well-being the district.



Rural poverty abounds, malarial mosquitoes breed in stagnant pools of water, and bullock carts far outnumber motor vehicles. And behind the walls villagers speak of cancer, which they said was on the rise along with other ailments such as renal failure, stillborn babies, and birth defects that researchers attribute to the overuse and misuse of pesticides and herbicides. In many cases, rural farmers don't know proper usage and disposal techniques, with few using protective clothing or equipment when handling highly toxic chemicals. In farming villages, pesticide containers are sometimes reused as kitchen containers. And many farmers assume that applying more pesticides and herbicides may be better, without understanding that the heavy use may gradually poisoning water supplies.

Farmers were left discontented and indebted as the result of degraded soil, and pest-ridden crops. This resulted in disillusionment and tension between the farming community and a newly centralized state taking charge of agricultural policy as well as agricultural commodities' prices, finance and credit (Shiva 1993). The negativity of the chemical fertilizers and pesticides were seen in the degradation of the agricultural land in the imbalance in nutrient status causing significant deficiency of N, P, K, Zn, S, Mo and B and disturbance of soil texture and its physicochemical properties. Environmental degradation like depletion of stratospheric ozone, nitrate toxication etc. causing health hazards like cancer, methamoglobinemia respiratory illness, hypertension etc. Excessive use of chemical fertilizer (80-110 kg/ha) as reported from some villages in Deoria causing destruction of useful microorganisms, insects and worms in soil.

**CONCLUSION:** Green Revolution has created some adverse effects, which are of serious concern. The negative impact of the Green Revolution on small farmers and the degradation on their farm land is as follows:

1. The small farmers experienced lower income due to the excessive use of chemical fertilizers, pesticides, increased irrigation and lower price of the commodities.
2. The small farmers start becoming poorer as they don't get the proper price for their agricultural produce
3. Due to the lack of knowledge in using the safety measure the farmers getting affected by chronic diseases which are resulting into lower quality of life.
4. Disparity in consumption of fertilizers where the village-wise fertilizer consumption in the district varies from 20-110 kg/ha.
5. Excessive use of chemical fertilizer (80-110 kg/ha) as reported from some villages in Deoria causing destruction of useful microorganisms, insects and worms in soil.
6. Imbalance in nutrient status causing significant deficiency of N, P, K, Zn, S, Mo and B and disturbance of soil texture and its physicochemical properties.
7. Environmental degradation like depletion of stratospheric ozone, nitrate toxication etc. causing health hazards like cancer, methamoglobinemia respiratory illness, hypertension etc.
8. Pollution with heavy metals and pesticide chemicals causing serious damage to food quality from the safety point of view.

#### REFERENCES

1. Acquavella, John. "A Critique of the World Resources Institute's Report "Pesticides and the immune System: The Public Health Risks" Environmental Health Perspectives 106.2 (1998): n. pag. JSTOR. Web. 4 Apr. 2013
2. Anwar, Wagida A. "Biomarkers of Human Exposure to Pesticides." Environmental Health Perspectives 105 (1997): 801-06.
3. Bowbrick, Peter (May 1986). "A Refutation of Professor Sen's Theory of Famine"
4. Conway, Gordon. The Doubly Green Revolution: Food for All in the Twenty-first Century. Ithaca,



- NY:Comstock Pub. Associates, 1998.
5. Das, Sushant. "Population Dynamics of Deoria District of U.P." Ph.D. Thesis, 2004, B.R.A.Agra.
  6. Dreze, Jean. "Famine Prevention in India," in *The Political Economy of Hunger*. Ed. by Jean Drèze, Amartya Sen, and Athar Hussain. Oxford: Clarendon Press 1995.
  7. Kush, Gurudev, S. "Green Revolution: The Way Forward". An article.
  8. Mostafalou, Sara, and Mohammad Abdollahi. "Pesticides and Human Chronic Diseases: Evidences, Mechanisms, and Perspectives." *Toxicology and Applied Pharmacology* 288.2 (2013): 157-77. Print.
  9. Newman, Bryan. "A Bitter Harvest: Farmer Suicide and the Unforeseen Social, Environmental and Economic Impacts of the Green Revolution in Punjab, India." Development Report No. 15 Jan 2007 Food First: Institute for Food and Development Policy, Web.
  10. Rathindra, Nath Roy. "Trees: Appropriate tools for Water and Soil Management." *The Green Revolution Revisited: Critique and Alternatives*. Ed. by Bernhard Glaeser. London: Allen & Unwin 1987.
  11. Schettler, Ted. *Generations at Risk: Reproductive Health and the Environment*. Cambridge, MA: MIT, 1999.
  12. Sen, Amartya. *Poverty and Famines : An Essay on Entitlements and Deprivation*. Oxford: Clarendon Press, 1982.
  13. Shiva, Vandana, (1991) *The violence of the Green Revolution - Third world agriculture, ecology and politics*, London, Zed books - Third World Network.
  14. Shiva, Vandana, (1993) "The Violence of the Green Revolution" eBook on Web.
  15. Tauger, Mark B. "Entitlement, shortage, and the 1943 Bengal Famine: Another Look." *The Journal of Peasant Studies*, Vol. 31, NO. 1, October 2003, pp. 45-72
  16. Xu, Xiaohui. "Parkinsonism and Occupational Exposure to Pesticides." *Associations of Serum Concentrations of Organochlorine Pesticides with Breast Cancer and Prostate cancer in U.S. Adults* 118.1 (2010): n. pag. Web. 4 Apr. 2013.

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