

# **Analysing the Impact of Green Revolution on the Environment**

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## **ABSTRACT**

The term "Green Revolution" describes a set of R&D and technology transfer programs that took place between the 1940s and the late 1960s and enhanced agricultural production globally, especially in developing nations. The growth started to become more noticeable in the late 1960s. The majority of countries saw a rise in agricultural productivity during the extremely successful Green Revolution. However, the green revolution has had some negative effects on the environment, such as increased greenhouse gas emissions, deforestation, land degradation, and biodiversity loss. For instance, it's estimated that there were more than 3,000 different kinds of rice before the revolution. It is expected that just 10 modified varieties of rice are utilized at this time. Regarding the impact of the Green Revolution on natural biodiversity, perspectives differ. According to one theory, agriculture won't need to spread into new, uncultivated regions in order to support a growing human population if output increases per unit of land area. But in order to maintain output, farmers are now compelled to remove once wooded regions due to land degradation and the depletion of soil nutrients.

**Keywords: Green Revolution, Farmers, Environment, Land**

## **INTRODUCTION**

With precursors in the work of agrarian genetist Nazareno Strampelli in the 1920s and 1930s, the term "Green Revolution" refers to a series of research and development and technology transfer initiatives that took place between the 1940s and the late 1960s and increased agricultural production globally, especially in the developing world. The most notable of these initiatives started in the late 1960s. Under the direction of Norman Borlaug, the "Father of the Green Revolution," who was awarded the Nobel Prize in 1970 and is credited with saving over a billion people from starvation, high-yielding cereal grain varieties were developed, irrigation systems were expanded, management practices were updated, and farmers were given access to hybridized seeds, synthetic fertilizers, and pesticides.

## **EFFECT ON ENVIROMENT**

### **Loss of biodiversity**

The term "biodiversity loss" describes the reduction or elimination of biological diversity, which is defined as the range of organisms on Earth, their distinct biological organization levels and genetic variability, as well as the innate patterns seen in ecosystems. Both agricultural and natural biodiversity were impacted by the Green Revolution's expansion in agriculture. There is little question that the Green Revolution, by depending primarily on a small number of high-yielding cultivars of each crop, reduced agricultural biodiversity.

Only around one-fourth of the world's land area is made up of tropical regions, where approximately three-quarters of all people live. Half of all species on Earth are found in the tropical rain forests.

One of the factors contributing to biodiversity loss, which has led to widespread resource exploitation and deforestation, is an overabundance of people. Natural ecosystems have been lost as a result of the devastation of the tropical areas, which is disastrous for the entire biosphere. Earth's flora and wildlife are harmed by natural disasters such as forest fires, droughts, floods, volcanic eruptions, earthquakes, etc. The weak and vulnerable species are wiped out by pesticides and other contaminants like hydrocarbons and hazardous heavy metals. Reduced plant productivity, decreased tolerance to environmental disturbances, and increased unpredictability in certain ecosystem changes like water usage, plant productivity, disease cycles, and pests are some of the effects of biodiversity loss in a region.

### **Green house emissions**

A glass building used for plant growth is called a greenhouse. The greenhouse's plants and air are heated by the sun's rays. Heat that is held within and unable to exit heats the greenhouse, which is necessary for plant development. The earth's atmosphere is the same in this regard.

The sun warms the earth's atmosphere during the day. Heat is reflected back into the atmosphere at night as the

earth cools. The earth's atmosphere's greenhouse gases absorb the heat throughout this process. This is the cause of the earth's surface warming, which enables life to exist on the planet. On the other hand, the earth's temperature has significantly grown as a result of the rising greenhouse gas concentrations. This has had a number of extreme consequences. Had the Green Revolution not contributed to the enhancement of agricultural germplasm, greenhouse gas emissions would have increased.

### **Dependence on non renewable resources**

Also referred to as non-renewable energy, non-renewable energy is a finite resource that will someday run out. It is essential to comprehend non-renewable energy sources and use them appropriately. The term "non-renewable energy" refers to fossil fuels, which include natural gas, coal, and crude oil. The types, instances, benefits, and drawbacks of non-renewable energy resources will all be covered in detail in this article. We will also examine the features and consequences of non-renewable energy, highlighting its limited supply and emphasizing the necessity of its ethical use.

Energy sources classified as non-renewable are those with limited supply that cannot be naturally renewed or replaced. These energy sources are produced by biological matter breaking down naturally or by nuclear reactions taking place in the Earth's core. While non-renewable energy contributes significantly to our current energy needs, its limited nature and environmental effect present concerns.

For millennia, non-renewable energy has propelled economic progress and served as the foundation of contemporary industry. However, because these resources are limited, it is necessary to investigate and create sustainable substitutes, such renewable energy sources like solar and wind.

The main sources of non-renewable energy are nuclear and fossil fuels. Let us delve deeper into each of these categories:

### **Carbon-based Fuels**

The remains of extinct plants and animals that experienced a process of decomposition over millions of years are what fossil fuels are made of. They fall into three primary categories:

### **Natural Gas**

Methane makes up the majority of the gaseous fossil fuel known as natural gas. It frequently occurs in close proximity to oil reserves. Natural gas is a multipurpose energy source that may be used for car fuel, cooking, heating, and power production.

### **Coal**

Solid fossil fuels like coal are created over millions of years as plant matter—such as trees, plants, and ferns—decomposes in extreme heat and pressure. It is recognized for having a high carbon content and is mostly utilized in power plants to generate energy.

### **Oil**

The breakdown of tiny organisms under extreme pressure over time, such as algae and zooplankton, produces oil, a liquid fossil fuel. An essential energy source for industry, transportation, and the production of other petrochemical goods is oil.

### **Nuclear Energy Source**

In nuclear power plants, where nuclear fission is used to create electricity, nuclear fuels are used. Uranium, which is present in very small amounts in the Earth's crust, is the most widely utilized nuclear fuel. Fission processes in uranium release a significant quantity of energy.

It's critical to comprehend the importance of nuclear and fossil fuels as non-renewable energy sources. Although they have been essential in helping us fulfill our energy needs, their extraction, usage, and impact on the environment need to be carefully controlled.

### **Land Degradation**

The loss or deterioration of rainfed, irrigated, range, pasture, forest, or woods' ecological or economic productivity and complexity as a result of natural processes, land uses, or other human activities is known as land degradation. Human activity is the primary cause of land degradation, since it results in the loss of soil fertility and quality. This poses a serious threat to the environment, which fuels further tragedies.

### **Here are some of the reasons why land is degrading.**

- Contamination of Soil
- Erosion of Soil
- Overgrazing
- Mineral Extraction Carried Out Repeatedly
- Drought

### **Human Health**

The goal is to create genetically modified millets that are resistant to both biotic and abiotic stressors. Malnutrition was formerly addressed by the introduction of genetically modified wheat and rice together with insecticides, but this quickly resulted in environmental devastation. Food shortages might return in the near future as a result of worsening land erosion and water depletion. To avoid future difficulties, any new interventions should be implemented with caution so as not to interfere with other systems. Any disturbance to

the ecosystem is predicted to have a cascading effect, meaning that if one food chain link is impacted, it will also impact other links in the chain. The majority of ecological damage is caused by human activity. Agricultural pesticides are present in soil, surface water, and groundwater and are discharged into the environment by air drift, leaching, and runoff. This may contaminate other vegetation, water, and soil. Animals, both marine and terrestrial, have been discovered to carry pesticide residues in nearly every ecosystem. The methods include bioconcentration—absorption through the gills or teguments—and biomagnification or bioamplification—consumption of contaminated food. Persistent organic pollutants have been identified at extremely high quantities in seagrass meadows and coral reefs within marine systems. Microbes and insects are also impacted by it. It destroys weeds and insects, poisons fish and other animals, and taints meat products including beef, goat, and chicken. In addition to lowering food safety, this can cause bioaccumulation in people, which will harm their nutrition and general health. Continual use results in biodiversity loss. Eating food contaminated with pesticides may cause nausea, vomiting, dizziness, cramping in the abdomen, and other symptoms. The loss of bumblebee colonies, a significant group of pollinators globally, is one example of how the number of pollinators is declining. The honeybee population is going extinct, which is extremely dangerous for human life. The habitat and place of the organism in the food chain determine the pesticide residue amount. The use of pesticides is expected to grow over the next several years, making this a severe problem.

## CONCLUSION

Millions of lives have been saved thanks to the green revolution, which has also significantly increased the productivity of food crops. However, detractors worry that farmers may start to rely more on big biotech companies and question the industry's promises of higher production. Although farmers have demonstrated interest in modified crops, since Monsanto was first permitted to sell genetically modified Bollgard cotton seeds in India in 2002, farmers have been planting an increasing amount of these seeds. In addition to the usage of genetically engineered seeds, fertilizer and pesticide use has also grown. Chemical fertilizers reduce the natural fertility of the soil, and insecticides create resistant bugs. For the same outcomes, farmers must use more herbicides and fertilizers. Due to environmental degradation, the green revolution is an ineffective, temporary fix for food security issues overall. Thus, a second green revolution is required, one that is both more inclusive and durable.

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