

# The Green Revolution

## Penn State Hazleton Students Investigate the Quiet Revolution of the Sixties.

The student essays that follow were produced in March 2006 for Jim Manis's English 015, Rhetoric and Composition course, a freshman writing course that is a required course for college undergrads at The Pennsylvania State University.

These essays were produced in response to the second assignment for the course, which required the students to read two articles on the subject of The Green Revolution. The students were told that they should consider themselves as "staff writers" for a student publication on the topic. They need not be exhaustive in their approach to the topic, but each should consider him/herself as producing an article on the topic for the publication. The essays were then selected by the class, without faculty interference or further direction, as being the essays which they thought best represented the class and the subject.



The instructor has decided to publish the essays produced for the assignment, in part as response to sources outside of the university who have expressed an interest in the opportunity to see examples of the kind of writing that freshmen produce within the university.

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# Starvation: A Problem Not Yet Solved

By Amy Peca

DURING THE 1960s there was an important breakthrough in food production. Dr. Norman Borlaug's development of new and different kinds of seeds from crops fueled the Green Revolution ("Canada and the World Background" 5). This revolution was a step forward for not only the United States, but also for third world countries (Donlan 62). The first thought was that hunger and starvation would decrease and good health would increase. People are now seeing that because of poverty, new technology, and the high population, the Green Revolution has not solved the quest for fulfillment.

Many people in the United States and third world countries still suffer from starvation ("Canada and the World Background" 5). This has much to do with the high poverty rates all over the world. Not only are people suffering in poverty, but also farmers are struggling. Since the Green Revolution evolved, the farmers have needed to update their methods and ways of handling crops ("World Background" 5). Because farmers have needed to update their farming techniques, "the poorest people can't afford to buy the Green Revolution food" ("World Background" 5). People are unable to keep up with the rising prices and therefore cannot properly nourish themselves and their families.

The new technologies of farming have also developed, causing people to struggle financially to keep up with the new trends of the Green Revolution. Today farming is not a job that can be done without proper training: "successful agriculture nearly requires college training in management, statistics, to say nothing of biology and chemistry. And even less well-recognized, successful modern farming requires a successful modern economy" (Donlan 62). Farmers who used to just take on family responsibility, now have to go through college and receive proper education to be considered a suitable farmer. New technologies, such as pesticides and irrigation, come with expensive costs ("World Background" 5). These features used in farming have eliminated some of the poorest farmers who cannot afford to pay for the up to date advances. Though technology is much needed for the advance of food production and the Green Revolution, some people cannot afford to use the new technologies, inevitably placing themselves in poverty and becoming vulnerable to starvation.

As the years go on, the population is steadily increasing throughout the world. Because of overpopulation in some areas of the world, food availability is affected (Donlan 62). As the population increases, the poverty rate also increases and creates problems for those who cannot afford the basic necessities including food consumption. The poverty rate is not the only problem with the increased population: "the only thing more dangerous than an overpopulated impoverished world is an overpopulated wealthy world" (Donlan 62). People do not realize how much of the food resources they are using and wasting. There is more demand, as the population grows, for food and resources. Food resources will most likely not run out in the near future, but there needs to be awareness about the increasing population and its demands (Donlan 62). The rising poverty rates fuel the high numbers of people being malnourished and starving.

The Green Revolution of the 1960s was a giant step for food production around the world. Though there were many advantages that came from it, an important disadvantage that has developed is the very high starvation rates. Many people are still suffering from starvation and malnourishment. Not completely stopping the starvation rates:

The green revolution has slowed in the endless race against starvation .... The greatest miracle of the scientific age is pausing for breath, not halting the race for good. But they also say that fear and misunderstanding have made it more difficult for them to resume the pace.

(Donlan 62)

Although the Green Revolution has done many positive things for the world, it has not stopped hunger around the world. The poverty rates, new technologies, and growing populations are all factors that are slowing the process to stop hunger and starvation around the world.

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# The Not So Green Revolution

By Robert Colaneri

DURING THE 1960s and 1970s, there was a new form of agriculture that involved the altering of the genetic makeup of plants to increase harvest yields. This was called the “Green Revolution.” This revolution was a direct response to the extensive world population growth. It was believed that the green revolution was the answer to all hunger problems around the world, but as years progressed the revolution caused harm to the environment.

The Green Revolution had two main points. One was to grow new seeds that would triple the annual amount harvested per year. The second point was the use of, not widely understood at the time, dangerous pesticides and fertilizers. As William S. Gaud, administrator of the Agency for International Development (A.I.D.), stated, “A.I.D. will finance 200 million dollars worth of fertilizer on a loan basis for India in 1969” (2). Two hundred million dollars of a damaging chemical released into the atmosphere in one year would have catastrophic effects on the planet. At this time, people did not understand global warming and environmental problems that would face the planet later in the century. They only saw the benefits as Gaud said, “the world is on the brink of an unprecedented opportunity. The critical food problem of the next 20 years can be solved” (3).

Today we are faced with the same problem the world was faced with thirty-five years ago. With the growing population and lack of food being produced, many people feel that it is necessary to introduce another, Green Revolution, or as Doctor Peter Rosset terms it, “Green Revolution II” (1). According to Business Week Magazine, “even though Indian granaries are overflowing now, 5,000 children die each day from malnutrition” (3). This is in a country where the Green Revolution was a success. There has been an increase of food produced in India but, since nobody can afford it, it goes to waste and people starve. It does not matter that more food is being grown. It is not reaching the people, so it is just being wasted.

Then there is the environmental problem with the techniques of the Green Revolution. There is evidence that the farming style used is not ecologically sustainable. In the 1990s farmers started to uncover a developing trend. After they achieved a dramatic increase in the early stages of the technological advance, yields have steadily decreased and have not been up to standards (Rosset 9). This shows deterioration in the land and in twenty years the world hunger problem will be in the same precarious predicament it is in now.

The Green Revolution, in theory, is a very good plan to reduce the problem of hunger, but the problem is that far too many people who need the aid do not have the means to obtain it. Companies, such as Monsanto, DuPont, Novartis, and other chemical-cum-biotechnology companies, tell us that with their help crop production will increase and starvation will decrease. There are still the questions of whether the food will reach the starving and if the risks to the environment are properly addressed. The bottom line: We have environmental problems as it is and experts say that “Green Revolution II” is no more likely to end hunger than the first one (Rosset 9).

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# The Green Revolution:

## Comments from the Creator and Some Interesting Facts

By Tony Steller

IN 1945 a revolution began, but not the type of revolution most people think about. It was the “Green Revolution.” An American by the name of Dr. Norman Borlaug started this revolution when he began to work for a program, which was being funded by the Rockefeller Foundation, as he states in an interview with ActionBioscience.org, an online organization. This revolution changed the world and temporarily held back hunger from overtaking many strong nations.

Dr. Borlaug stated in his interview that his team worked on a new breed of wheat for 20 years and finally got a variety that would yield two to three times more grain than any other kind on non-hybrid wheat. They used this new wheat to help poor farmers of Mexico gain a bigger crop yield. Then the program expanded in the 1960s to two other countries, Pakistan and India (ActionBioscience.org). Dr. Borlaug mentions during the interview that Pakistan increased its wheat production by 3.8 million tons in just five years and that in India it had increased by 7.7 million in the same time frame (ActionBioscience.org).

In 1968, the administrator for an agency of the U. S. wrote in a report that the astonishing achievements in the two countries and is quoted by Borlaug: “It looks like a Green Revolution” (ActionBioscience.org). This was how the term was coined and has stuck, with the impressive display of new farming techniques.

Once the Rockefeller Foundation created the International Agricultural Research Center, the new breed of seeds quickly spread over from Pakistan and India to Asia. After this move, new breeds of corn and rice were quickly developed. After many years of the revolution taking its toll, the rice crops in Asia were 75 percent of this new breed of rice (Rosset 2). Many other countries had quite an increase in their crop yields as well. The world as a whole had about 40 percent of its crops changed over to the new seed varieties. Most of this percentage comes from the crops produced in Asia (Rosset 2).

Over a twenty-year period, between 1970 and 1990, a survey was taken of the estimated food output and the estimated number of hungry people in the world. The results, given in an article written by Peter Rosset, were an 11 percent increase in food per person and a 16 percent decrease in the number of hungry people. Upon a closer look at the results from the survey, it was found that if China was removed from the statistics then the number of hungry in the world had actually increased by 11 percent (Rosset 4).

The “Green Revolution” had started in the United States and helped the rest of the world. It has helped many countries throughout the world, including our own. Our corn crops have tripled their yields since 1950 and smaller gains in rice and wheat have also occurred (Rosset 6). Many see the Green Revolution as an event of extreme importance in history that has helped save millions of people from starvation. However, not everyone agrees with the practices that have brought about the results, citing environmental problems associated with the heavy use of pesticides and fertilizers and the potential for serious difficulties

resulting from a reliance on genetic engineering. Nevertheless, proponents of the Revolution point out that the use of fertilizers and genetic manipulation in plant and animal husbandry are as old as agriculture itself.

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# The Green Revolution: A Complete Success or an Absolute Failure

By John Kmiecinski

THROUGHOUT THE 1960s the idea of fighting hunger with technology was a frequently debated issue (Ganguly). For the big corporate businesses, it was a dream come true, but for the average family farmer, the price of the technology could be out of reach (Lessons from the Green Revolution). The use of this new technology was known as the “Green Revolution” (Lessons from the Green Revolution). The Green Revolution may have produced plenty of world wide food, but it still did not solve the world hunger problems (Lessons from the Green Revolution).

The story of the Green Revolution is told like this: “The miracle seeds of the Green Revolution increase grain yields and therefore are a key to ending world hunger. Higher yields mean more income for poor farmers, helping them to climb out of poverty, and more food means less hunger (Lessons from the Green Revolution). People throughout history have been looking for and finding new ways to farm their lands and produce a greater supply of food to support the growing population (Lessons from the Green Revolution). The term, “Green Revolution,” was used to describe the new breakthroughs that would produce greater amounts of food in shorter spans of time (Lessons from the Green Revolution).

In test plots located in areas of northwest New Mexico, scientists found that improved varieties of wheat seeds dramatically increased the amount of wheat (Lessons from the Green Revolution). “Much of the reason why these “modern varieties” produced more than traditional varieties was that they were more responsive to controlled irrigation and to petrochemical fertilizers, allowing for much more efficient conversion of industrial inputs into food” (Lessons from the Green Revolution). These “miracle” seeds were discovered in Asia and shortly after the wheat experiments in New Mexico, there were new strains of rice and corn developed as well (Lessons from the Green Revolution).

As the revolution gets introduced to rich and poor farmers the only groups of people that are making profits from this revolution are the rich farmers (Lessons from the Green Revolution). “The poor farmers cannot afford to buy fertilizer and other inputs in volume; big growers can get discounts for larger purchases” (Lessons from the Green Revolution). For the best results the seeds require the right amount of chemical fertilizer, pesticides, and water (Lessons from the Green Revolution). “Because the farming methods that depend heavily on chemical fertilizers do not maintain the soil’s natural fertility and because pesticides generate resistant pests, farmers need ever more fertilizers and pesticides just to achieve the same results” (Lessons from the Green Revolution). Even though the richer farmers are making more money they spend it on tractors and other machines, which are not needed to plant the new seeds (Lessons from the Green Revolution). “This leads to the industrialization of farming” (Lessons from the Green Revolution). With this new turn farming costs more, even though a greater amount of crops will be grown the

cost of the equipment will use up most of their profits (“Lessons from the Green Revolution”).

In conclusion the green revolution did not cure hunger it just made the way of farming different. The new pesticides and chemical fertilizers caused the lands to become unfertile and the costs go up.

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# The Green Revolution Revisited

By Chris Wojcicki

A MAJOR REVOLUTION during the 1960s, called the “Green Revolution,” changed millions of lives in many starving countries (Muoz). The Green Revolution was a major breakthrough in the production of such foods as rice and grain, and was used to suppress starvation in countries such as India (“Appropriate Technology”). Using “varieties of seeds (created through crossbreeding), fertilizers, machinery and pest control systems,” a man who is considered “the father of the green revolution,” Norman Borlaug, transformed the farming industry worldwide (Muoz). With such a major revolution in agriculture, that is still used today, a “serious concern is being voiced over the economic unviability and ecological unsustainability of this high tech farming strategy” (“Appropriate Technology”).

Norman Borlaug, an agricultural scientist in the 1960s, researched “genetically modified crops,” or seed manipulation, by taking the highest yielding or best quality seeds of each crop and breeding them with other seeds of higher or the same quality to create a more productive crop (Muoz). Although his contributions to help solve the starvation in third world countries were large they are challenged today to the extent of being good for the world or bad (“Appropriate Technology”).

The miracle of Norman Borlaug’s research has seemed to cause some concern in India by causing “rising costs of inputs and lower prices for food grains” (“Appropriate Technology”). With lower food grain prices in effect farmers have become indebted and are now being found to commit suicide because of it (Appropriate Technology). The increase in food production, which has been happening in India since the Green Revolution, has caused “ground water table depletion” and “soil imbalances which in tandem with drastic unforeseen climatic changes that could lower agricultural yields in the years ahead” (“Appropriate Technology”). Even though increased food production has halted starvation, apparently there are some unforeseen events that are taking place and reeking havoc on the people of Indian states. Although food security problems took place in the 1960s, the world will have future problems because the population of the world’s people grows by 85 million in each year (Muoz).

Even though the green revolution has helped millions of people, Indian states still suffer because not enough food can be produced to support the forty percent “that have become a major casualty of the green revolution” (“Appropriate Technology”). With India’s food production “estimated at 15 million tons per annum, whereas 25 million tons are needed,” India’s poverty stricken people will eventually die out (“Appropriate Technology”). The world’s population, which is estimated to be 6.2 billion, makes some people wonder if helping poor, or disease ridden people is truly the right thing to do to ensure our future survival (Muoz). I wonder if that is true.

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# Green Revolution: The Impact of the Revolution

By Ibis Saracina

The Green Revolution had a major effect in the 1960s. It increased food production in many countries and has kept food production with the population of the people.

The Green Revolution was the term widely used in the 1960s to describe the effort to increase and diversify crop yield in agriculturally less advanced regions of the world. “It increased in food production stemming from the improved strains of wheat, rice, maize and other cereals in the 1960s developed by Norman Borlaug in Mexico and other countries under the sponsorship of the Rockefeller Foundation” (Vaughan). Different crops were produced during the Green Revolution in India, Pakistan, Philippines, Mexico, Sri Lanka and other underdeveloped countries. “Much of Indonesian archipelago’s 13,677 islands are covered with an emerald-colored patchwork of rice paddies” (Vaughan).

The Green Revolution technology fell in two major categories for farmers, breeding of new plant varieties and application of modern agricultural techniques in new areas. Some of the agricultural techniques that the farmers use were introduced at this time: chemical fertilizers, irrigation, heavy machinery, pesticides, and herbicides. “Planet Breeding was the practical application of genetic principles to the development of improved strains of agricultural and horticultural crops” (Spurgaitis). Improved wheat and rice gave a spark in the green revolution for people in the developing world in the 1960s and 1970s. “Planet Breeders can adapt old crops to new areas and uses; increase yields; improve resistance to disease; enhance the nutritional quality and flavor of fruits and vegetables; and develop traits that are useful for storage, shipping, and processing of foods” (Spurgaitis). It made it easier to grow wheat and rice provided more uses for them.

Some of the achievements of the Green Revolution were the increase in yields. “Green Revolution techniques have increased the production per unit area of wheat and other food crops in some major developing countries like India” (Vaughan). Increasing the production was good, especially if the population has increased. “The government is now tackling the job of giving all of Indonesia’s 2.5 million rice farmers 30 hours of training in integrated pest management by 1994” (Vaughan). This was good for the farmers and agricultural workers because they got more income, the program became a success, and the production costs went down and they made more money.

Some of the criticisms of the Green Revolution were the loss of biodiversity, food quality and the health effects. “The spread of Green Revolution hybrids and the associated techniques have resulted in the cultivation of many fewer varieties of crops. Some crops have been seen upwards of a 90% reduction of crop varieties (Vaughan). Dependence on one or more cultivars would mean an exposure to famine due to the new crop pests. “The chemicals—insecticides and pesticides needed to protect the HYV crops are not only

toxic to insects or pests, but also to humans” (Vaughan). The people cannot afford to buy protective suits, so their body absorbs the pesticides, and they are then being poisoned.

The world’s population has been increasing over the past few years. The food production must increase as the number of people increase. Since the 1960s, world food production has grown faster than population, mainly because of the Green Revolution. The grains provide about 50 percent of the calories people consume each day, so it is very healthy for the body. If it were not for the Green Revolution, millions of people would have been dead during the period when they needed it the most. “Today, there should be enough food to provide everyone, every day, with two and a half pounds of grain, beans and uts; a pound of fruits and vegetables; and nearly a pound of meat, milk and eggs” (Spurgaitis). Even with all this food, people still go hungry daily.

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# The Green Revolution: A Few Lessons

By Nicole Luchetta

THE GREEN REVOLUTION, which began in 1945, was the increase in food production stemming from the improved strains of wheat, rice, maize and other cereals in the 1960s by Dr. Norman Borlaug in Mexico and others under the sponsorship of the Rockefeller Foundation (Rosset et al.). Some say the revolution was a promise to end hunger through miracle seeds.

Norman Borlaug was considered the father of the Green Revolution. In 1970 he was awarded the Nobel Peace Prize. He attended the University of Minnesota and was trained in forestry and pathology. He was able to develop special wheat strains that allowed Mexico to become more independent agriculturally (Davidson 73). Instead of needing to import all of their wheat they were able to provide for themselves. The wheat that was produced hybrid strains were created by cross-breeding a large range of varieties. This wheat that was produced helped not only Mexico but also other developing countries, such as India and Pakistan, to increase the productivity of their crops (Rosset et al).

Even though there was an increased amount of food available, people in places such as India were suffering from hunger for different reasons, the need for equitable distribution of food. There were warehouses filled with food, but the people who really needed it were not able to afford it. Because of unemployment or underemployment, a large amount of the low-income families lack the purchasing power to buy enough food (Davidson 74). "Introducing any new agricultural technology into the social system stacked in favor of the rich against the poor" (Rosset et al).

Farmers who are poor cannot afford to buy large amounts of fertilizer and other materials that are needed to tend to their crops. These smaller farms also do not receive discounts for buying large amounts like the more wealthy farmers do. The best results require the right amounts of chemical fertilizer, pesticides, and water (Rosset et al). In Africa famine is widespread while huge surpluses in the United States and Canada have depressed agricultural prices and have caused many of our own farmers to end up in bankruptcy (Davidson 74).

It seems that even though more food was produced in the end it did not solve the problem of world hunger. More food was produced, but the people who needed it the most were not able to get it. "Mountains of additional food could not eliminate hunger as hunger in America should never let us forget" (Rosset et al).

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# The Green Revolution: Winners and Losers

By Brett Ednie

THE TERM, “Green Revolution,” was coined in the 1960s to highlight a particularly striking breakthrough. The idea behind the Green Revolution is that more food will be grown through the magic of chemicals and genetic engineering than by using conventional farming methods. Therefore, the increased grain yields a key to ending world hunger. The higher yields also mean more income for poor farmers helping them to climb out of poverty, and more food means less hunger.

In the test plots in northwest Mexico, there were improved varieties of wheat and increased yields. These “miracle” seeds quickly spread to Asia, shortly after new strains of rice and corn were developed as well (Rosset).

The Green Revolution’s goal of focusing on increasing food production cannot alleviate hunger because it fails to alter the tightly concentrated distribution of economic power. A major study was conducted by the World Bank, which concluded that a rapid increase in food production does not necessarily result in less hunger. If the poor do not have money to buy food, the amount of food available will not help them (Rosset).

According to Saby Ganguly, the Green Revolution changed India from a starving nation to one of the world’s leading agricultural nations. There were three basic elements in the method of the Green Revolution:

- 1.) Continued expansion of farming areas
- 2.) Double cropping existing farmland; and
- 3.) Using seeds with improved genetics.

(Ganguly)

The Green Revolution created plenty of jobs, not only for agricultural workers, but also industrial workers by the creation of lateral facilities, such as factories and hydro-electric power stations (Ganguly).

According to Business Week magazine, India granaries are overflowing now, due to the success of the Green Revolution in raising wheat and rice yields. Each day in India, five thousand children die resulting from malnutrition, mostly because the poor did not have the money to buy the food. One third of India’s population, which is three hundred million, are poverty-stricken. That led the Indian government to try to store millions of tons of foods (Rosset).

If the Green Revolution or any other strategy to boost food production is going to succeed to alleviate hunger, they must address the economic, political, and cultural rules that people make. The people who benefit are usually the ones with the most money. Poor farmers cannot afford to buy fertilizer and other inputs in volume. The poor people buying food end up paying more and receiving less. The only ones

receiving the discounts are the big growers. The poor farmers cannot hold out for the best price for their crops because they are so desperate for money (Rosset).

One of the biggest problems is that the Green Revolution is not ecologically sustainable, even for the large farmers. The crops dramatically increase in the first ten years, peak out, then steadily drop every year after. If the yields do not decline, the rate of growth will slow down rapidly or level off (Rosset).

One point has been made obvious after years of studying the Green Revolution. The point is that “an increase in food production can and often does increase hunger” (Rosset). According to Peter Rosset,

hunger is never caused by a shortage of food and cannot be eliminated by producing more food. That is why skepticism is needed when any chemical cum-biotechnology companies state that genetic engineering will boost crop yields and feed the hungry. Too many people do not have access to the food that is already available because of deep and growing inequality.

(Rosset)

In conclusion, producing larger and more abundant crops is not the answer to solving world hunger. Instead it seems to make the rich richer and the poor poorer. For the Green Revolution to become a success the larger production of food must go to the poor and only to the poor.

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