THE GREEN REVOLUTION

The **Green Revolution** is a movement which refers to a **series of research, development, and technology transfer initiatives**. This happened between the **1960s and 1980s**. In this period agriculture was viewed only as more of a commercial sector than a subsistence one. The term "Green Revolution" was first used in 1968 by former USAID director William Gaud. The **inventor** of this revolution was the crop pathologist **Norman E. Borlaug**. The necessity of this revolution was the constant population growth. **Population was increasing exponentially so the food production was insufficient**. For this reason **new techniques** were introduced in agriculture. This was in order to defeat the consequence of the different famines. The greatest was the Chinese famine (1959-61) with between 15 to 43 million dead people (estimated).

The use of conventional inputs and absence of modern techniques further prevented the agricultural productivity. The **low productivity created different diseases** like the pest infection. So the agricultural marketing needed to encourage the farmers to increase their production and offer a greater portion of their products for sale in the market. The scientists believed that the threat of famine could be halted by revolutionary innovation in agriculture. Leading the charge was Dr. Norman E. Borlaug, an American scientist who has quietly been working for years on new agriculture techniques in Mexico. Borlaug and his associates used ***Norin 10*, a semi dwarf wheat** variety from Japan with some Italian varieties, to develop the well-known Mexican varieties. High volume cross breeding and shuttle breeding created a perfect semi dwarf wheat which **was stronger with shorter stalk that could support the weight of the grain**. In **1956 Mexico** became auto sufficient in wheat production and by 1963 it **became a grain exporting country**. These seeds spread to Asia, shortly after new strains of rice and corn were developed as well. Pakistan and India were the first South Asian nations to use these varieties.

BENEFITS OF GREEN REVOLUTION

It **increased significantly the production**, to almost 2.5 times in wheat between 1960 and 2010. GR has been able to save the lives of millions of people and exponentially increase the yield of food crops. It improved the economic lot of farmers, and their standard of living greatly improved. It reduced the import of food grains.

ADVERSE CONSEQUENCES OF GREEN REVOLUTION (*NEGATIVE IMPACTS*)

The Green Revolution program, which began decades ago, had a noble goal -- increase the global food supply and reduce world hunger. To accomplish this, farmers started to cultivate land using new farming techniques. These methods worked, crop yields climbed and fewer people experienced hunger. However, Green Revolution farming methods also created a few unwanted side effects -- some of which are serious.

Inside the Green Revolution

One primary mission of the Green Revolution was to improve the production of wheat and rice -- two high-yield plants. The program required farmers to use pesticides to kill pests and fertilizers to give extra nutrients to the plants, to take advantage of efficient irrigation techniques, and to learn new management techniques. Not only did food production increase, but statistics show that the production of maize, wheat and rice almost doubled between the 60s and 90s.

Pesticides: Handle with Care

Many of the pesticides used during the heady days of the green revolution (60s to 90s) are very toxic to humans and other non-target organisms. Even pesticides advertised as "green," are not necessarily 100% safe. While many pesticides used in organic farming are safer than common chemicals we come into contact with every day, it is important to be careful. The Environmental Protection Agency does not allow companies to use terms such as "green" or "non-toxic" on pesticide labels.

Toxicity of the Green Revolution

Four decades after Indian farmers began increasing production using pesticides and fertilizers, they are starting to have second thoughts about the change. In 2008, Researchers at Punjabi University discovered DNA damage in 30 percent of Indian farmers who treated plants with herbicides and pesticides. An additional study found heavy metals and pesticide chemicals in drinking water. These substances are harmful and can cause serious health problems. Some of these problems may occur because some farmers may not know how to handle and dispose of toxic chemicals. They may also harm the environment by using too many of those products.

Loss of Genetic Diversity

In traditional farming, farmers plant a variety of crops that typically have a large supply of unique genotypes. People using Green Revolution farming methods plant fewer crop varieties in favor of those that produce high yields. This type of cultivation causes an undesirable loss in crop genetic diversity. You can

witness this problem in India, where about 75 percent of their rice fields contain only 10 varieties of plants. This is a significant drop compared to the 30,000 rice varieties that were planted 50 years ago. As a result, if climate change, disease, or a rise in pestilence attacked the crops, the system would be weakened. With **lower food grain prices in effect farmers** have become indebted and are now being found to **commit suicide because of it**. Traditional crops have the highest gene diversity and as they dwindle, those genes vanish. These genetic diversity losses can be seen all over the world in locations that implemented Green Revolution farming methods.

Impacts on Rice Production

Rice fields are a vital source of food for individuals around the world. Because these fields often have mineral-rich soil, they are resilient and people have farmed them successfully for centuries. However, after the Green Revolution changed the way people farm, rice field sustainability declined, even though rice yields increased. Causes for the decline include loss of biodiversity and fish deaths due to toxicity from pesticide use.

Other Side Effects

Because the Green Revolution required learning new water management skills, some farmers that didn't have these skills could not take full advantage of the new irrigation techniques. The Green Revolution's original mission was to focus on areas with significant rainfall or irrigation. This meant that in drier locations, wheat yield gains often fell below 10 percent, while yields in irrigated areas reached 40 percent. By the mid 80s, locations with high irrigation fully adopted high-yield crop production methods, while areas with little rainfall and a limited water supply experienced low adoption rates.

More sustainable and environmental friendly system of cultivation needs to be practiced and it should have been called Organic Farming. The **world is on the brink of a " Green Revolution 2.0"**, which promises to both feed a growing world population and to do so sustainably without compromising the needs of future generations to feed themselves.

NOTE: PLEASE ALSO GO THROUGH THE .PPT (POWER POINT PRESENTATION) FILE FOR MORE INFORMATION REGARDING GREEN REVOLUTION