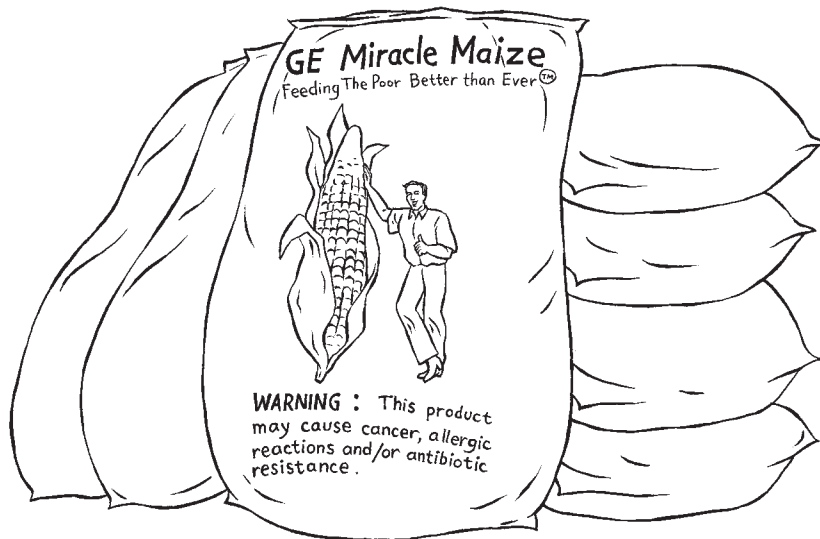


13 The False Promise of Genetically Engineered Foods

In this chapter:	page
Story: Farmers resist GE cotton	238
Traditional plant breeding	239
How are GE plants different from traditional plants?	240
The high cost of GE crops	240
GE foods and health	241
Story: Golden rice in Asia	242
Environmental problems from GE crops	243
Better safe than sorry	244
How do you know if seeds and food are genetically engineered?	244
Story: Mother seeds of resistance	245
GE food is dumped as food aid	245
Community seed savers	246
Story: Villagers organize a seed swap	246

The False Promise of Genetically Engineered Foods



Tomatoes that do not go bad after they are picked... wheat and soybeans and maize that can resist large amounts of pesticides... seeds that kill pests in the ground. None of these things are natural. And yet they exist.

These new kinds of plants are called genetically engineered (GE) foods or genetically modified (GM) foods. Not everyone agrees that these new crops are healthy. The corporations that make them say they will improve food security, help feed the world, and, in the case of biofuels (see page 533), end our dependence on oil. Other people say they are harmful for people and the environment. No matter what you believe, the present and future of farming, and food security for all of us, is being changed by these new crops.

Most GE crops do not provide greater crop yields, better nutrition, or any of the health benefits that their inventors claim. And so far, GE crops do not help the poor or solve the problem of hunger. Most GE crops have been invented to sell more of the pesticides and fertilizers made by the same companies that produce and sell GE seeds.

GE foods offer a technical solution — costly, man-made seeds — for a social problem: hunger. But as farmers come to depend on buying these seeds and the pesticides and fertilizers they need to produce these crops, hunger increases, not decreases. There is less food security and less food sovereignty.

Farmers resist GE cotton

Basanna is a cotton farmer in Karnataka state, in India. Several years ago, when GE crops were very new, he was approached by men from the Monsanto Corporation, who offered him a new variety of cotton seeds. They gave him the seeds free of cost, along with fertilizer to help them grow. They told him they would come every few weeks to inspect the crop and to spray his field. To Basanna, this seemed like a very good deal. He would have a cotton harvest at no cost, and the company would do most of the work.



Basanna did not know this was part of Monsanto's genetic engineering experiment. Men from Monsanto came to spray pesticides on the field regularly, but the crop still suffered from bollworm and other pests. Basanna wondered what kind of cotton would need so much pesticide, and still not grow well.

Basanna soon learned that other farmers were growing the new cotton too. He also learned that the Karnataka State Farmers' Association did not like the cotton, or the company promoting it. Basanna went to a meeting held by these farmers to learn more.

Basanna learned the new cotton needed more chemicals than he had used before, and that these chemicals would decrease the fertility of his soil. He also learned that this cotton might not yield any more than his old cotton did. Basanna heard that he would not be allowed to replant the cotton seeds because the company owned the rights to them. Worst of all, he learned that pollen from the plants could travel on the wind and affect his neighbor's crops. If the neighbor's crops pollinated this new cotton, they would not be allowed to replant their seeds the next year.

When Basanna realized the GE cotton was a threat to his farm and to his entire community, he joined the Karnataka State Farmers' Association. Together, thousands of farmers came up with a plan to tell the world what they thought of GE cotton. They planned an activity and then, the day before they gathered, they sent a letter to newspapers throughout the country that said:

Three fields in Karnataka will be reduced to ashes on Saturday. Activists have already contacted the owners of these fields to explain to them what action will be taken and for what reasons, and to let them know we will cover any losses they will suffer. Saturday at midday, thousands of farmers will occupy and burn down the fields in front of the cameras, in an open, announced action of civil disobedience.

The next day they did what they promised. The first field burned belonged to Basanna. He supported the burning because he was angry that the Monsanto Corporation had not been honest with him and that the GE cotton would do so much harm to his fields and his neighbors. With the money the Farmers' Association paid for his burned crop, he bought traditional cotton seeds, and went back to planting the variety that had served him well in the past.



Questions for discussion

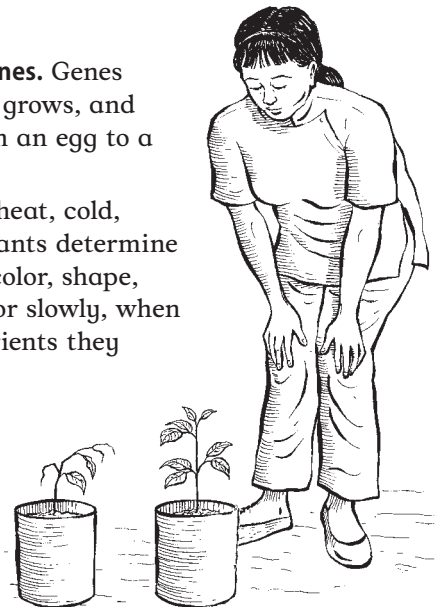
- Have you ever known a farmer to destroy his own crops? What would make a farmer, or you, do that?
- Can you think of any other ways the farmers of Karnataka could have shown how much they were against GE crops?
- What are the benefits of growing “improved” GE seeds?
- What are the “hidden” costs of using GE seeds?
- What else do you know about GE seeds?

Traditional plant breeding

All living things contain tiny parts called **genes**. Genes determine how each plant, animal or person grows, and what it becomes: from a seed to a plant, from an egg to a chicken, from a child to an adult.

As they interact with conditions such as heat, cold, wind, soil quality, and so on, the genes in plants determine how plants will grow. Qualities such as the color, shape, and size of plants, if they will grow quickly or slowly, when they produce flowers and fruit, or what nutrients they have are determined by each plant's genes.

When farmers select and save the biggest maize seeds after each harvest to plant the next year, the gene for large seeds is passed from one crop to the next over many years, and the gene for small seeds disappears. This is how **plant breeding** works. It is a slow process of selecting and favoring the development of the characteristics in a plant that a farmer wants.



By selecting the seeds of the healthier plant, you can help the next season's crops be stronger.

How are GE plants different from traditional plants?

Genetic engineering is different from plant breeding. Scientists use laboratory methods to change the genes of plants or animals in more extreme ways than traditional plant breeding does. To get the plant qualities they want, they can bring together genes from 2 completely different kinds of plants (such as rice and maize). They can also mix plant genes with animal genes. For this reason, it is called “genetic engineering.” Like an engineer, a plant scientist “builds” new kinds of plants and animals that would never develop naturally.

GE plants are not simply new varieties with better qualities. They are a new kind of plant that never existed before. Corporations spend billions of dollars every year to invent new combinations, such as trees that grow quickly and have soft wood for making paper, tomatoes that stay fresh when they are stored for a long time, soybeans, wheat, and cotton that can survive large doses of pesticides, and animals such as fish and pigs that grow much larger than normal.

The high cost of GE crops

Growing GE crops is more expensive than growing traditional crops in a sustainable way. Instead of saving the seeds from the previous crop, farmers must usually buy GE seeds each year along with costly fertilizers and pesticides. GE crops also have many other hidden costs. They can be poor in nutrition and can damage the environment (see page 243). Before planting GE crops, consider these other, often “hidden,” costs.



GE Foods and Health

Some of the health effects of GE foods are known because people have become sick from eating them. Other health problems are suspected but not yet proven.

Government agencies in the United States and other countries that develop GE crops have refused to test their possible health effects. Corporations that develop these crops do everything possible so their crops will not be tested. GE crops and the foods made from them are often not labeled, and are mixed with ordinary crops and foods. All this makes it difficult to know if a GE food is dangerous or if someone has become sick from eating GE crops.



Health problems from GE crops

To know for certain what the health effects of GE crops are will require many years of study. Scientists have already done some studies that show GE crops probably do cause health problems:

Allergies

Foods made from GE crops contain things that have never been eaten before. This may cause people's bodies to have bad reactions to these foods. Because we cannot know in advance what substances in GE crops will cause **allergies**, people may become allergic to many of the foods they commonly eat.

Increased pesticide poisoning

Most GE crops grow well only when large amounts of chemicals are added. Some GE seeds have even been designed to contain pesticides. Limited use of some pesticides may benefit farmers. But using too much leads to more pesticide poisonings of both people and the environment (see Chapter 14).

Cancer and organ damage

Animals fed GE potatoes and tomatoes had changes in their stomachs that could lead to cancer, damage to the kidneys and other organs, and poor brain development. But when GE foods are not tested or labeled, it is almost impossible for doctors to know if a person's cancer or organ damage is caused by GE foods.

Resistance to antibiotics

Some GE foods include genes resistant to **antibiotics** as a result of genetic engineering. Some scientists believe when people eat foods containing these genes, **antibiotic resistance** in bacteria will be created in the stomach. Then, if that person needs to take antibiotic medicine to solve a health problem, the medicine may no longer work.

Golden rice in Asia

Around the world, millions of people suffer from blindness caused by a lack of Vitamin A in their diets. As a solution to this problem, a new kind of GE rice containing Vitamin A was developed and named Golden Rice. The company that makes Golden Rice plans to sell it to farmers all over Asia where rice is the main food, and where blindness from a lack of Vitamin A is a serious problem. The company hopes farmers will grow Golden Rice instead of traditional varieties of rice.

However, Golden Rice will not prevent people from going blind. The blindness Golden Rice is trying to cure is not caused only by a lack of Vitamin A. It is caused by the lack of a sufficient variety of healthy foods that naturally contain Vitamin A. Even if a person eats Golden Rice, the Vitamin A will not nourish them unless there are enough nutrients from other foods eaten at the same time.



A healthy diet includes vegetables and fruits as well.

Instead of trying technical solutions like GE rice to prevent blindness and other problems of widespread hunger, it would be better to improve food security. Because the inventors of Golden Rice did not challenge the real problems of poverty and malnutrition, they will not prevent people from going blind.

A better way to end problems from poor nutrition

Golden Rice is an example of trying to solve a social problem — blindness due to poverty and malnutrition — with a technical solution: genetically engineered crops. But there is another solution.

There are large amounts of Vitamin A in fresh fruits, dark green leafy vegetables, and other foods. (See a general health book such as *Where There Is No Doctor* for information on good nutrition.) Green vegetables used to grow wild in rice paddies and farmer's fields until the increased use of herbicides killed them.

In the country of Bangladesh, people organized to plant home gardens to make sure that children have enough nutritious food. With the help of an organization called Helen Keller International, people planted 600,000 home gardens to help prevent blindness and other health problems from malnutrition. Home gardens are one way to improve nutrition and food security without looking for expensive technical solutions such as GE food, which may not work anyway.

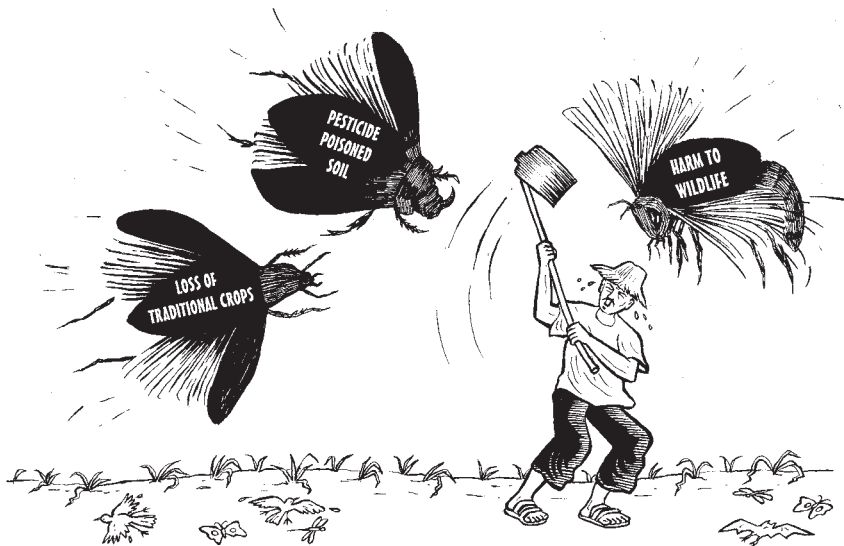
Environmental Problems from GE Crops

When large corporations make and sell only a few kinds of seed, and then convince farmers worldwide to use only these seeds, many different types of plants may be lost and food security is harmed. But the most harmful effect of GE crops on the environment is the loss of biodiversity (see page 27) essential for a healthy environment.

Loss of natural pest controls. Some GE crops are made with pesticides inside them. When pesticides are used without careful controls, the pests they are meant to kill can become resistant to them (see page 273).

Harm to wildlife and soil. Pesticides in GE crops kill helpful insects and bacteria that live in the soil. They may also harm birds, bats, and other animals that help pollinate plants and control pests.

Effects on nearby plants. Pollen from GE crops blows in the wind and spreads to other plants that are similar to them. But because GE plants are new, nobody knows for sure what long-term effects this may have.



Farmers suffer when GE crops harm the environment.

Better safe than sorry

An African proverb says, “If you have to test the depth of a river, put one leg in the water first. This way you do not risk drowning.” This is another way to say it is wise to act with precaution, and to follow the **precautionary principle** (see page 32). When we are thinking about using new inventions and substances, it is best to know they are safe, rather than risk being harmed unnecessarily.

But corporations and governments are testing GE foods on us every day by having us plant and eat them without knowing what harm they may cause. They are forcing us to “test the depth of the river” with 2 legs, instead of one!



How do you know if seeds and food are genetically engineered?

Most genetically engineered seeds do not look, feel, smell, or taste any different than ordinary seeds, so they may be planted by farmers who do not know what they are. Monsanto, the company that makes most GE products, has refused to label them as GE foods, so the people who eat them cannot know if they are GE foods. The only way to know if seeds and food are GE is to test their genetic structure. Testing kits are available, but expensive, in the United States and Europe.

Mother Seeds of Resistance

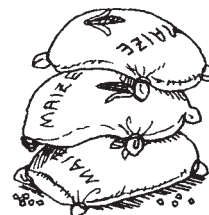
In Chiapas, Mexico, farmers are concerned that pollen from GE crops may affect their maize crops. With the help of international supporters, they found a way to test their crops to know if they are affected in any way. The project is called “Mother Seeds of Resistance.”

Seeds are tested with testing kits bought from companies in Europe or the United States. By finding out if their crops have been contaminated by GE maize, they can tell their communities and their government about the problem, and work to prevent it from spreading further. Because they are testing the seeds themselves, farmers gain control over the process — a kind of control that is lost by not knowing what is in the crops they are growing.

By taking back control of their crops, farmers in Chiapas are protecting their food security while practicing long-term food sovereignty.

GE Food is Dumped as Food Aid

Many countries do not allow GE foods to be grown or brought into the country. But even in these countries, GE foods may find their way into the food supply. In poor countries, one way GE foods get into the markets and fields is through food aid.



When countries face severe hunger, they often receive aid in the form of grain from the United Nations or from individual countries. Countries where GE grain is produced often give it as food aid. This forces farmers, hungry people, and their governments to choose between GE foods and starvation.

But sometimes, even in the face of disaster, governments take a stand. For example, Zambia and Zimbabwe were offered GE maize as food aid in the winter of 2002, a time of severe famine. Zambia refused the GE food aid. After their decision, foreign donors supplied Zambia with cash to buy food from other countries in Africa that had produced extra food. Some European countries, where GE food is illegal, responded by offering food aid free of GE grains.

The government of Zimbabwe also felt the pressure of many hungry people. Zimbabwe accepted the GE food aid, but only after making an agreement that the maize be milled so it could not be planted later and cause future problems.

Community seed savers

Around the world, communities are responding to the threat of GE crops. Some people demand that governments label GE foods so they can avoid buying or eating them. Others refuse to allow GE crops to be planted in their regions. Many communities have returned to the ancient practices of seed saving and **community seed stewardship**.

Community seed stewardship is when communities take control of the seeds they have, save a variety of seeds to plant in the future, and keep careful records of these seeds. In this way, communities keep important seed resources alive and protect biodiversity. Also, they can prevent outsiders from claiming ownership over their traditional seeds.

Governments can and should maintain national seed banks to make sure there are plenty of different crops, and to prevent varieties of each plant from growing scarce or disappearing. Keeping control over the seed supply is essential to food security and food sovereignty.



Villagers organize a seed swap

The people in the Mexican village of Vicente Guerrero were worried about losing their traditional seeds. Older people in the village remembered when there were many different kinds of maize and even more kinds of beans. Now there were only 2 kinds of maize and 4 kinds of beans. They knew that seed companies were making new kinds of seeds that could be used for only 1 year, or needed expensive chemicals to grow. So the villagers decided to do something.

The villagers invited people from the region to a big party, and asked everyone to bring food to cook and their favorite kinds of seeds. People would trade seeds with each other, cook meals with their favorite crops, and tell stories about where these crops came from and how they grew. The meeting was called a seed swap.

Some farmers arrived with varieties of maize and beans that others had not seen in many years. They gave away seeds for others to plant. That year there were 5 kinds of maize and 8 kinds of beans at the seed swap. By the next year, news of the seed swap had spread throughout the region, and farmers brought seeds even the grandparents had not seen since they were children.



After a few years, the village had collected over 20 kinds of maize and over 40 kinds of beans. The variety of plants makes sure that some maize and beans will grow every year, because some kinds grow best on dry hillsides, others in wet valleys, and others grow well on flat land, and so on. Many people in Vicente Guerrero started planting these crops, and now the villagers do not fear losing control over their seeds. By eating a variety of plants, they have also improved their diets.

Now other villages in the region are having seed swaps, and many old crops are coming back. The farmers in Vicente Guerrero say planting the old crops not only improves their food security, it also gives them a great reason to have a big party!