

GREENPEACE THE WITNESS

For private circulation only

March, 2005

Genetic Engineering - FAQs



Basic issues

Q. What is Genetic Engineering?

Genetic engineering also called as genetic modification is a branch of science where new varieties of plants/animals are created by "engineering" genes. Genes are the basic building blocks of life and they carry the basic blueprint of an organism. An engineered plant or animal is called a genetically engineered organism (GMO).

Q. Why is GE done?

Scientists believe that by injecting foreign genes into organisms will allow them to design 'new' life-forms that are equipped to perform certain specific functions. For example, scientists claim that GM crops can produce chemicals which will kill pests that would otherwise require heavy dosages of pesticides. Sometimes, GE is used to endow the organisms with qualities such as longer shelf-life, saline resistance abilities, higher vitamin content and so on.

Q Who makes GM foods?

Just five companies control the global GM crop market. Monsanto (80%), Aventis (7%), Syngenta (5%), BASF (5%) and DuPont (3%).

Q. Are there any GM crops in the market in India?

Yes and No. While, no food crops are available in the market yet, the disastrous Bt Cotton, a GMO, is widely available across the country. Moreover, numerous Indian agricultural institutions are conducting research and field trials on crops like rice, cabbage, cauliflower, chickpea, citrus, brinjal, mung beans, corn, muskmelon, mustard/rapeseed, potatoes and tomatoes. The biggest threat is that this information and the impact of the GM crops on people and environment is hardly accessible to the common citizen.

Consumer issues

Q. What is wrong about companies that promote GE?

Everything! With decreasing demand for pesticides in the developed world, agrochemical giants have re-oriented their business to focus on GM seeds. As all GE seeds are patented by companies, these seeds come with a heavy price both in short term and long term. Over-the-counter, these seeds are generally three to four times market price of ordinary organic seeds. And in the longer term, as these seeds come with heavy royalty fees, poor farmers and agriculturalists, fall in the vicious cycle of shelling out money every crop cycle year.

Q. Is GE food safe to eat?

Even Monsanto isn't sure! In 1999, the caterers at Monsanto UK's main offices banned GE food at the staff restaurant in response to "concern raised by our customers". The customers in this case being Monsanto staff themselves!

Invariably, the GM crops are not tested properly. For example, in the US, GE corn was tested on chickens for just 45 days and declared fit for human consumption!

The health effects of GE food remain unpredictable, irreversible and could be potentially dangerous.

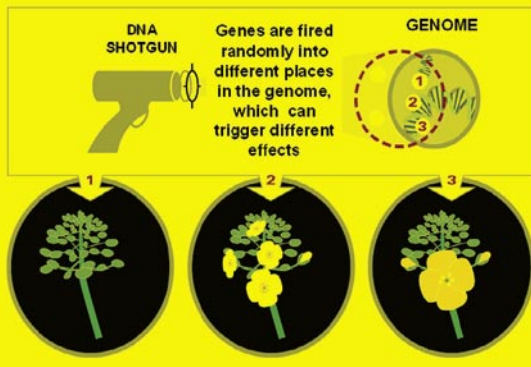
Q. Is GM food more nutritious?

Definitely not! While scientists claim to have increased the protein content in GM potato, the reality is that one would have to eat about 10 kgs of genetically modified potato per day to meet daily minimum protein requirement. 10 Kgs! Golden rice - another GM variant is equally bad - which needs to be consumed in similar unimaginable high quantity to get your basic dietary needs.

Q. Are GM foods cheaper than ordinary foods for consumers?

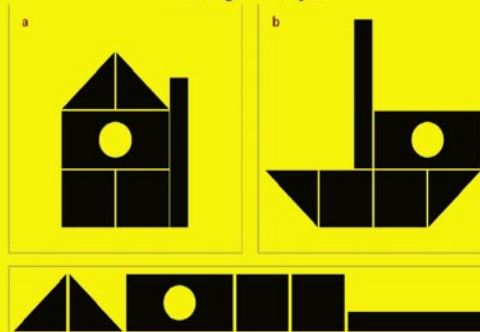
No! Simple, back-of-the-envelope calculation reveal that GM crops are thrice more expensive in short term and much more in the longer term. Apart from these direct costs to the farmers, the health risk to the community remains unpredictable and high.

Gene transfer in shotgun process



Why genetic engineering is bad science

Genes are not code as we used to think they were. They are more like alphabets. Who can predict what happens when the elements are combined in strange new ways?



green revolution



gene revolution

Regulatory issues

Q. I feel that opposing genetic engineering will mean that many people in India will continue to be hungry.

This is not correct at all. There is absolutely no connection between GE food and the problem of hunger in India. This is an example of how companies promoting GMOs make people feel guilty about their opposition to the GM foods.

The true picture is that there is food rotting in our godowns across the country. The real problem is ineffective distribution, lack of purchasing power among the very poor and outdated policies. The solutions for these problems are totally unconnected with GE. So GE food is not the answer to hunger.

Q. So what can we do about GM technology?

Globally, a common sense approach called the Precautionary Principle is being adopted towards GM foods. The precautionary principle enables people to take action in situations where there is potential for serious or irreversible threats to health and environment. In other words, one does not have to wait to be actually harmed to reject a technology. This principle can be easily applied to GM foods and has been built into the Cartagena Protocol on Biosafety (1) which came into force in 2003 when 50 countries including India ratified it.

Q. Should GM food be given out as part of food aid?

No. It is morally and ethically incorrect to give out untested, unreliable food aid as 'help' to the survivors of a tragedy. Companies use the opportunity of human made and natural disasters to promote GE food with the help of corrupt bureaucrats, and uninformed NGOs. They hope to gain legitimacy by gaining entry in markets where they are viewed with suspicion and would otherwise never be allowed market access at all.

Technical issues

Q. What is the "pesticide problem" in reference with Indian farming?

To increase yields, Indian farmers have been excessively using a wide variety of pesticides on their relatively small land holdings. Over a period of time, most of the pests have developed resistance to these pesticides. The problem occurs when farmers use heavier dosages and mix of pesticides, which enter the lowest level of the food-cycle and the food-web.

Q. What is the issue about Bt cotton?

Despite public outcry and adverse scientific studies, Bt cotton was introduced in India in March 2003. While the Bt-cotton is effective against bollworm, a common cotton pest, numerous secondary pests have ruined the cotton harvest over the last few years. Shockingly, Monsanto, instead of admitting the problem and withdrawing the seeds from the market, started bundling free packets of pesticides with Bt-cotton seeds. This burst the bubble of Monsanto's claim of Bt-cotton, that it reduces pest incidence and reduces pesticide usage.

Q. What kind of change is made to crops through genetic modification?

Here are some examples:

1. The company creates an insect resistant Bt corn plant by This is done by inserting a gene from *Bacillus thuringiensis* (Bt), a soil bacterium into the plant to make it produce it's own toxins that can kill the corn borer pest. The Bt corn plant thus produces its own bio-pesticide. It is a pesticide factory of sorts!!
2. The company creates herbicide tolerant plants like GM mustard and GM soya. A "bar" gene from a bacterium is inserted into the mustard plant. This allows the plant to deactivate the herbicide. When the herbicide is sprayed all the weeds perish while the mustard plant survives.
3. The company creates "enhanced" nutrition crops like Golden rice, a rice grain that produces pro-Vitamin A which when eaten. A second example is a protein enhanced potato called protato.

Q. What is the solution to this issue?

Any solution to the current crisis in agriculture needs to be met by an alternative that is local, safe and sustainable. From organic farming to traditional techniques used by farming communities, solutions do exist.

Q. Won't opposition to GE food slow down scientific progress?

No. Not at all. Some people think that the precautionary principle is being unscientific but what it actually requires is greater scientific rigor. Greenpeace says that GM technology is poor science with money-grabbing motives. Too little is known, companies are too much in a hurry and too little information is given to the public for assessment. Government regulations on GE technology are too weak and we must be alert and cautious to this dangerous situation. Better safe than sorry.



Visit www.greenpeaceindia.org

(1) A multilateral agreement that gives signatory countries the right to reject GMOs to safeguard the interest of farmers and consumers.