

Evaluate the arguments for and against the use of gm crops in developing countries...



One of the major causes for debate in recent years has been the argument over whether or not genetically engineering or genetically 'modifying' crops is a just practice. Genetic engineering refers to the methods that make it possible to change the pattern in genetic material. Changing the pattern of the DNA molecules may make it possible to change countless characteristics in the living organism. This ability to modify an organism's genetic makeup has innumerable uses for researchers trying to understand the basic biology of plants and animals, including humans.

In applied plant science, the research is helping the development of agricultural crops that are better for the environment and for consumers. However, are they fulfilling this aim? Are GM products really safer for the consumer and for the surrounding environment? There are many apparent strengths and weaknesses to genetically modifying crops, all of which can be divided up into certain aspects. For example, what are the consequences of GM crops upon; health, the environment, society/culture and the economy. It is mainly within these areas that the essay will examine these strengths and weaknesses.

It is the opinion of this essay that although there are definitely potential advantages to genetically modifying crops, in general the use of GM crops is more of a disadvantage than an advantage to developing countries. Many people argue that genetically modified crops can be a good thing, particularly with regard to health. Genetically modified food has great potential as a relatively cheap source of human therapeutics, especially for the poorer countries. For example, ' In 1996 US researchers were genetically

engineering a banana to produce an antigen found in the outer coat of the hepatitis B virus.

If successful this banana could immunise children in developing countries for just a few cents per dose. Currently traditional hepatitis B vaccines cost between \$100 and \$200 per dose. ' 1 Researchers say that a banana or any fruit that is eaten raw could be genetically engineered to vaccinate against a wide range of diseases, providing a cheap source of protection. Food is also being modified to increase its nutritional value through altering the vitamin, mineral, carbohydrate, protein and fat profiles.

Genetically engineering could (potentially) help to provide better healthcare for those who before could not afford it, simply by modifying the genes of crops to make them more nutritious or contain antigens to specific viruses. In developing countries, particularly in parts of Africa and Asia, genetically modified crops could be advantages due to the fact they cannot afford or cannot obtain healthcare. However, it has been proven that this can have its disadvantages too. For example, researchers recently inserted a gene from a Brazil nut into soybean to try and improve its nutritional quality.

However, in their testing, they found that the protein produced was the one responsible for the allergenicity of Brazil nuts. This allergenicity was also transferred to the soybeans. As a consequence, this soybean has never been marketed. This definitely is evidence to suggest that genetic engineering could have hazardous effects on people's health and there is more. Because GM crops are so new, we have no idea of knowing what sort of long effects

that they could potentially have upon people's health, without knowing they could be a cause for diseases such as cancer.

GM products could produce new toxic substances and allergens inside people over long periods of time, this surely is a risk that must not be taken? When genes transfer from one species to another they could create new viruses and bacteria that present drugs cannot deal with, and in developing countries where the health service is practically non-existent to begin with, this could be disastrous. Aside from health benefits, people argue that genetic modification is a good thing simply because better products can be made, that food can be improved through making the process of producing them easier for the farmer or grower.

This improvement could come through providing the plant with pest and disease resistance or increasing crop tolerance to a wider range of climates, or making the food more attractive to the consumer. Crops are difficult to raise for many reasons, for example strawberries are not very frost hardy which makes them difficult to grow in certain climates. However ' a few years ago researchers discovered that the Arctic flounder produces an anti freeze to protect itself in arctic waters.

Research is now underway to introduce the anti freeze gene into fruits and vegetables like strawberries and Soya beans which can be damaged or destroyed by frost. 2 This could be beneficial to developing countries as they often have harsh climates with little rainfall and infertile soil. Genetic modification could encourage crops to grow where they would not grow before, providing these countries with more food. However, seeing as it has

not yet been proven that these crops are safe for consumption and the environment in the long-term, this no longer seems such a benefit. Some researchers also claim that GM crops can be better for the environment. Growing genetically modified crops resistant to pests or diseases could reduce the reliance of agriculture on chemical sprays.

While this makes the crop easier and cheaper to grow for the farmer, it also means that other indirect costs of spraying are eliminated as the crops no longer to be treated with expensive pesticides. Reducing the use of these pesticides would definitely be an advantage to any environment. Risk assessment looks at the benefits and risks of a proposal and the rate of progress of the proposal depends on the balance of these risks and benefits. Many critics argue that the risks are still unknown to the environment and the benefits are minimal or can be achieved by lower risk methods, therefore the GM crop proposal should not follow through.

There are other possible disadvantages to using GM crops in terms of harming the environment. For example, there would be a decreased biodiversity, meaning that the number of genetic variations in our environment would lower as genes from different species were being mutated together. All of the different varieties of crop would gradually become one. Another disadvantage is that there is the possibly not being able to reverse contamination should it occur through genetic engineering.

While GM animals are easy to control and contain when released onto a pasture, GM plants are quite different. GM plants produce seeds and pollen that can be very fine and travel large distances, transported by insects and

wind. The question is if a problem becomes obvious, can contamination from a released GM plant be reversed? The final area that is affected by the use of genetic engineering is the economy and business. Biotechnology is a big budget business with patent laws allowing private interests to develop and market unique products.

The potential monetary benefits are huge. ' The value of the global market for genetically modified crops is expected to be between 2 and 3 billion US dollars in the year 2000 increasing to 6 billion dollars in the year 2005. ' 3 Currently conventional breeding can take decades to produce the right characteristics in a crop whereas the same result can be matched in a matter of years using gene technology. For growers, genetic resistance to herbicides, pests and diseases will mean reduced management costs thus increasing profitability in a climate of decreasing margins of return.

But is this a good thing? Genetic engineering could produce monopolistic practices and would create a lot of competitiveness. Companies would try and out do each other by trying to create the cheapest kinds of crop. This could mean that the quality of the crop could decrease. In conclusion, it would be impossible to say that there are clear-cut answers to this question as there are both advantages and disadvantages of genetically modifying crops in developing countries.

For example, although GM crops could be easier to grow in the infertile soils of Africa and Asia, thus providing more food, there is no guarantee that these crops won't cause serious damage to people's health and to the environment. Scientists cannot yet say whether or not GM crops are safe,

simply because they don't know. It therefore seems clear that if people's health is at risk, that should be the most important factor, showing that GM crops are more of a disadvantage than an advantage. However, if it can be proven that Genetically modifying crops is safe to people and to the environment, this opinion would probably be reversed.