

## **Genetically Modified Foods-Solution for Food Security**

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### **Abstract**

As the world's population continues to increase there is an increase demand for food. Since the total area for planting is not increasing we need to find another solution for food security that will meet the growing population demand. There are number of ways by which we can increase productivity in a sustainable way, but the question is that will such means meet the demand for growing population. In the 21<sup>st</sup> century Biotechnology has been applied as one of the eco-techno-political technology. Many developed countries have opted to incorporate the technology to improve their productivity. One such way to meet the demand is by using Genetically Modified food (GM food). GM foods are produced from organisms that have had specific changes introduced into their DNA using the methods of genetic engineering. By using GM foods there are many advantages such as-disease resistance, cold resistance, drought tolerance, herbicide resistant, nutrition availability. And by having such advantages we can meet the growing demand of the population

Whereas Organic foods are the foods produced using methods of organic farming-with limited modern synthetic inputs like pesticides and chemical fertilizers. But the real question is that will Organic farming meet the entire requirement regarding food security in the world.

Thus due to the possibilities offered by GM technology in this new century, we have got the solution that is unmatched and that will give the world food security in the coming years. By the application of GM foods we will meet the shortcomings in the productivity of the present time so that the future world is secure and safe regarding food.

**Keywords:** GM foods, organic foods, food security

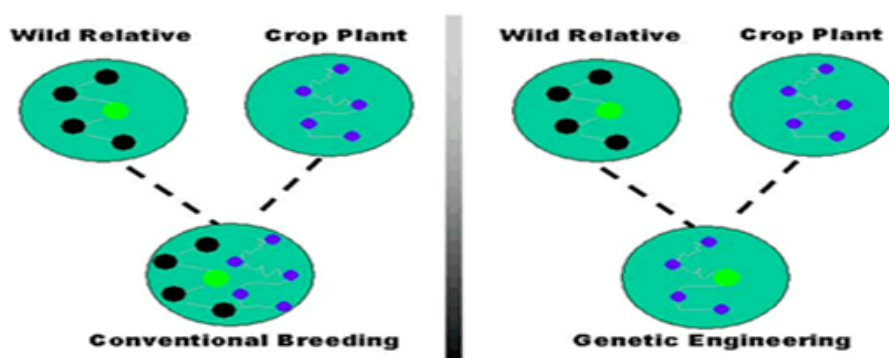
## 1. Introduction

The world's population has reached six billion and the growth rate is increasing at an alarming note, indicating that it will reach 8.1 billion by 2030(UN, 1999). Even though the world's productivity has improved significantly by providing food security to developed countries but there are still developing countries that have not received the recognition of having food security because their population is growing at an increasing rate, and thus making them difficult to achieve self-sufficiency in food production. According to FAO figures, there are 815 million undernourished people in the world (FAO, 2011). Among them, 777 million live in developing countries. There is a heavy burden on the world to provide food security to all the countries but the question arises that by which technology we can provide food security.

The main aim of plant breeders is to develop varieties that express good agronomic characteristics. With the conventional breeding, however there is little or no guarantee of obtaining any particular gene combination from million of crosses generated. Undesirable genes can be transferred along with desirable genes; or, while one desirable gene is gained, another is lost because the genes of both parents are mixed together and re-assorted more or less randomly in the offspring. These problems limit the improvements that breeders can achieve.

In contrast, genetic engineering allows the direct transfer of one or just a few genes of interest between either closely or distantly related organisms to obtain the desired agronomic traits.

**Figure 1:** Comparing conventional breeding and genetic engineering (The dots represent genes, with white representing the gene of interest)

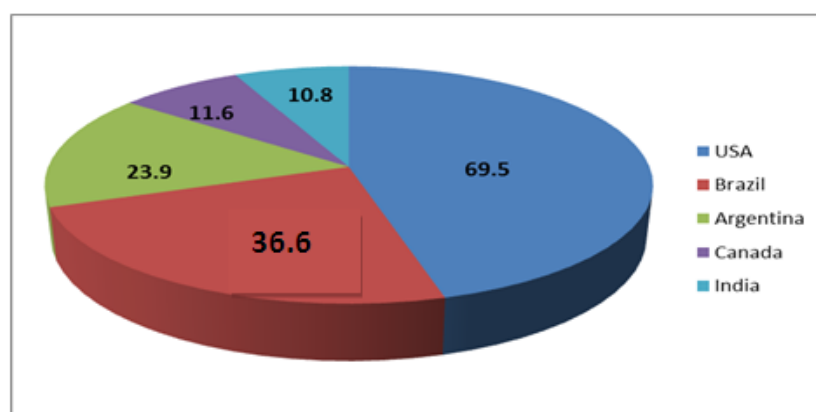


Source: ISAAA Mentor's Kit, 2003

Developed countries have achieved food security by applying technology in their agriculture because they have strong technology and infrastructure. But when we talk about developing countries there is a different scenario present here. They have weak infrastructure and technology that make them difficult to apply technology in their agriculture. But with the application of biotechnology, it will provide potential contribution to sustainable agriculture productivity and new inputs for resource-poor and small scale farmers (Huang et al., 2002, Morris and Hoisington, 2000; OECD,

2003; Thirtle et al., 2003; Cohen and Paarlberg, 2004). One such tool of biotechnology is Genetically Modified Foods (GM foods). GM foods were first put on the market in the early 1990s. The first commercially grown genetically modified whole food crop was the tomato puree (Called FlavrSavr), which was made more resistant to rotting by Californian Company Calgene. Between 1996 and 2011, the total surface area of land cultivated with GM crops had increased by a factor of 94, from 17000 square kilometers (4,200,000 acres) to 1,600,000 km<sup>2</sup> (395 million acres). 10% of the world's crop lands were planted with GM crops in 2010. In 2012, GM crops were planted in 28 countries; 20 were developing countries and 8 were developed countries, 2012 was the first year in which developing countries grew a majority (52%) of the total GM harvest. 17.3 million farmers grew GM crops; around 90% were small holding farmers in developing countries (ISAAA, 2012).

**Fig:-2:** These are the countries that make 90% of the world GM growing areas.



## 2. Genetically Modified Food

### 2. What are GM foods?

Genetically modified foods also known as biotech foods that are developed from genetically modified organisms. GM crops are the crops whose DNA has been modified by using genetic engineering techniques, with the aim to introduce a new trait to the plant which does not occur naturally in the species. Specific changes are made in the DNA of these crops by genetic engineering techniques that encourage extra nutrients to be produced, faster growth and ability to resist diseases and other purposes. Almost in every area in the food production market is using genetic modification to produce foods that taste better, grow faster, resist disease and improve the amount of nutrients found in the world.

#### 2.1 Examples of different GM foods being used in the world

Corn has got the gene which is insect resistance and due to this, the farmers do not have to spray pesticides that are harmful to the soil as well as the crop.

Soybean on the other hand which is very much used in every altered form is also being produced genetically, so that the farmers do not have to spray insecticides or pesticides. They have been genetically modified to offer improved oil profiles for

processing or for healthier edible oils.

Tomatoes have been modified in order to increase their shelf life. It was genetically modified to prevent it from rotting.

Canola oil has been genetically altered for resistance against pesticides.

## 2.2 List of some of the Genetically Modified Food

Genetically Modified foods	Description
Rapeseed	Rapeseed has been made to be more resistant to pesticides and also free from erucic acid.
Cotton	Because the oil can be consumed, cotton is considered as a food. It has been altered to produce a chemical that kills many pests.
Canola	Canola oil was altered to be resistant to pesticides and may be in oil products, baked goods and snacks.
Flax	Altered to resist herbicides, flax is in many products that contain flax oil and seed.
Papaya	Papayas have been modified to be more virus resistant.
Cotton Seed Oil	Cotton seed oil can be in vegetable oils, fried foods, and oil products that can be consumed.
Tobacco	A tobacco has been altered that contains very little nicotine.

## 2.3 Advantages of Genetically Modified Food:

- We do not have to use pesticides as the crop will be pest resistance.
- More environment friendly as we will be insect resistance, so there is no use of insecticides.
- Higher crop yield.
- More nutrition availability (Golden rice).
- Rigorous testing of all GM foods and products. Thus if there is a slight chance of health hazards, then it will not be allowed to enter the market.
- Higher resistance to bacterial and fungal disease.
- Drought tolerance
- GM foods can last for a longer period of time, and thus improves the shelf life of the crop.

## 3. Conclusion

After seeing the advantages of using GM foods, we can assume that if we want to secure food security in every nation, then we need to encourage GM foods. GM foods do play a major role in enhancing the productivity of the crop by providing resistance

to the crop and reducing chemical inputs. It has also benefited the environment e.g- by genetically implanting the gene from grey mangrove to the tobacco plant the tobacco plant has become tolerant to soil stress. As a result genetic engineering might be considered as the logical way of feeding and medicating an overpopulated world (Lesney, 1999).

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