

Expected Benefits in the 21st Century

New and Better Crops and New Crop Lands

Global population will increase to more than 8 billion people by 2025.⁹ Biotechnology can help avoid starvation in the next century as traditional breeding has in this century. These are some ways biotechnology can positively influence world food production, such as 1) improved quality of seed grains, 2) increased levels of proteins and other micronutrients in forage crops, and 3) enhanced tolerance of plants to drought/flood, salt/metals, and temperature extremes. Increased ability of crops to withstand environmental factors could allow farming in regions not currently suitable for food production. Along with additional food, this could provide greater productivity and self-reliance to economies of developing nations.

Reduced Fertilizer Use

Almost half of the 12 billion dollars American farmers spend each year on fertilizer is simply washed away.¹⁰ Some plants, such as corn, might be modified to draw nitrogen from the soil and air, thereby dramatically reducing the need for fertilizer- but not until the next century.

POTENTIAL HAZARDS OF GM CROPS

In spite of the benefits mentioned above, there is still a lot left to learn about gene technology although this technology has been researched, and vast progress have been made. Biotechnologists claim that the inserted foreign genes are well understood and controllable, thus, the effects are also predictable. However, this is only for the known part; they may also have inserted some unknown part, the results of which are unpredictable. Thus, we have to be more cautious before fully incorporating this technology into our daily lives. Also, the public has the right to know what they are eating. If GM crops can be proven to be absolutely safe to our health and environment, we should still be able to choose between those usual products and GM crops, not because of safety issues, but for the right to feel comfortable. Furthermore, communication between

scientists and the public needs to be improved because the public is not able to acquire critical information about this technology.¹¹ The uncertainty that most consumers currently feel about GM crops is affecting the marketing policy of many giant food companies and chain restaurants. McDonald's, Burger King, Frito-Lay, and Proctor & Gamble have decided to reject GM potatoes.¹² Although biotechnologists have been presenting their data to convince people that GM crops are safe, there is no doubt that this technology is still in the beginning stages even though it has been progressing rapidly for the past decade.

The acceptability of GM crops differs between the 2 sides of the Atlantic Ocean.¹³ In the US, the issue is more acceptable than it is in Europe.¹⁴ Generally speaking, people in the US show a better understanding in bio-engineering than those who in the Europe.¹⁴ However, it was also pointed out that the press, mostly going against GM crops in Europe, gives greater coverage to and has a greater influence on public perceptions of this issue. On the contrary, some have said that the safety tests in the US need to be more unbiased,¹⁵ as many tests were funded by large biotechnology companies. Recently, the FDA has admitted that the current reports are directed to favor the biotech industry.¹⁶

The potential hazards of GM products can be categorized into 3 types, economical-political, biological, and environmental.¹⁷ We discuss those topics in the following sections.

Biological

In traditional breeding practices that farmers have been using for millennia, unlike genetic modifications, only crops of similar kinds can be bred.¹⁸ By using genetic modification, living organisms that are not naturally correlated with each other now have the chance to hybridize together.¹⁶ We are not saying that genetic modified crops or foods will certainly result in hazardous consequences; however, the overall results of long-term studies on the safety of GM crops are still unavailable.^{19,20} Gene modification may result in the accumulation of new genes that previously did not exist naturally, which may interrupt the balance the nature. For example, when a fragment of novel DNA is introduced into the genome of a plant, it could have an