1. What Should We Do with Genetically Modified Foods in the Twenty-First Century? By Swaminathan, M. S

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Genetic engineering of food is the science which involves deliberate modification of the genetic material of plants or animals. It is an old agricultural practice carried on by farmers since early historical times, but recently it has been improved by technology. Many foods consumed today are either genetically modified (GM) whole foods, or contain ingredients derived from geneticaly modification technology. Billions of dollars in U.S. food exports are realized from sales of GM seeds and crops. [Read preview](https://www.questia.com/read/1G1-57604135/what-should-we-do-with-genetically-modified-foods)

Indians will strongly resist efforts to replace numerous local crop varieties with a few genetically modified organisms, unless these efforts follow principles of bioethics, biosafety, biodiversity conservation, and biopartnerships.

As one who started his research in plant genetics 50 years ago, I must confess that I never dreamed that we could gain so much control over the very blueprints of life. Although we have made tremendous advances so far, it may take several decades more to understand fully the benefits and risks associated with genetically modified (GM) foods. Thus, it will be prudent to apply the precautionary principle in considering potential applications of genetic modification to areas relating to human health and environmental safety.

In the past 10 years we have seen dramatic advances in our understanding of how biological organisms function at the molecular level, as well as in our ability to analyze, understand, and manipulate DNA molecules, the biological material from which the genes in all organisms are made. The entire process has been accelerated by the Human Genome Project, which has poured substantial resources into developing new technologies for working with human genes. The same technologies are directly applicable to all other organisms, including plants. Thus, a new scientific discipline of genomics, the molecular characterization of species, has arisen. This discipline has contributed to powerful new approaches in agriculture and medicine and has helped promote the biotechnology industry.

Several large corporations in Europe and the United States have made major investments in adapting these technologies to produce new plant varieties of agricultural importance for large-scale commercial agriculture. The same technologies have equally important potential applications for addressing food security in the developing world.

The twenty-first century may well witness changes in temperature, precipitation, and sea level as a result of global warming, and these changes could have a strong negative impact on coastal agriculture. This led us to initiate an anticipatory research program to breed salt-tolerant varieties of rice and other crop plants in coastal areas, to be prepared for seawater intrusion into farmland as a result of a rise in sea level. Transferring genes for tolerance to salinity from a mangrove to rice or tobacco is an impossible task without recourse to recombinant DNA experiments. Thus, the immense benefits that can accrue from genomics and molecular breeding are clear.

What then are the principal concerns? In industrialized countries, the major concerns relate to how GM organisms affect human health and the environment. These food and environmental safety concerns have been well documented and are widely known. Indian food and environmental scientists are equally concerned about the food and environmental safety aspects of GM organisms. The viewpoints of industrialized countries on the ethical and social issues relating to GM crops have been dealt with in detail in a report published by the Nuffield Council on Bioethics in May 1999. What additional issues agitate the minds of the public and professionals in India?

The first issue relates to bio-safety. Why are large biotechnology companies averse to the labeling of GM foods? Despite over three years of intensive discussion in meetings sponsored by the Secretariat of the Convention on Biological Diversity, the negotiations broke down at Cartagena, Colombia, in February 1999, and there is as yet no internationally agreed bio-safety protocol. …