

Maryknoll Office for Global Concerns
Reflection paper on Genetically Modified Organisms (GMOs)
September 2003, updated October 2004

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I. Introduction

At recent major conferences of the United Nations, such as the 2002 World Food Summit+5 and the World Summit on Sustainable Development, United States government officials, often accompanied by agro-business company representatives, pushed a model of biotechnology which has been intensely questioned by farmers and others around the world. This model involves the use of genetically modified (GM) seeds. Even as questions about the production of genetically modified organisms (GMOs) continue to be raised, the U.S. has included GM seed in USAID programs and food relief donations. GM seed is farmed in such scale in North America that the risks of contamination to non-genetically modified crops are a concern to many involved in international food, agriculture and trade issues. The technology is being developed and rolled out at breath-taking speed with insufficient debate or testing. We may find that by the time we learn the consequences of using GM technology, it will be impossible to rein it back.

What are genetically modified organisms and why are they so controversial? What are the implications of these new technologies for planet Earth and the full community of life that shares this planet? What concerns do Maryknollers and the people they serve have about these new technologies? What position should Maryknoll take in regard to genetically engineered organisms? Because food is a basic human right and because GMOs have immense implications for the world's food supply, extremely important ethical and moral issues surface. Owning exclusive patents on life and leaving basic human needs to be met by markets alone can leave marginalized people without the means to sustain life itself. The Advisory Committee on the Integrity of Creation of the Maryknoll Office for Global Concerns offers this paper to engage Maryknoll missionaries in a reflection/dialogue about genetically modified organisms. In so doing, Maryknoll joins the on-going international discussion about these technologies and their impact on sustainable development.

II. Background

Genetically modified, or transgenic, organisms are created through high tech transfers of selected genetic material from one organism to another. The goal of this genetic engineering process is to create new varieties of plants and animals with chosen characteristics. While humans have intervened in the genetic development of plants and animals over the millennia, these new bio-engineered interventions are of a different order.

Historically, farmers have altered the genetic make-up of plant and animal species by selecting individuals that possess desirable traits for reproduction, cross-breeding, and cross-pollination. These interventions have taken place within the limits imposed by nature. For example, through careful

selection of seed for its qualities, Mexican farmers have created diverse varieties of corn, adapted to different micro-climates, exhibiting different colors, flavors, textures, etc. But attempts to interbreed members of different species have either failed or led to infertile off-spring. Modern technology, however, allows for the transcending of such natural barriers. Laboratory methods are now used to insert bits of genetic code from one species into another with which it would never, in the natural order, have the possibility of cross-fertilization or the development of a fertile offspring. Laboratory technology has enabled the transfer of genetic material not just from one species to another, but even from plants to animals and vice versa.

Proponents of the technology of transgenic modifications tout the technology as promising a revolution in the production of food and pharmaceuticals and even as heralding the end of world hunger. Products that are already on the market include: corn that produces its own insecticide, soy beans that are resistant to certain weed killers, and rice that is enriched with vitamin A. Fast growing fish, plants that produce vaccines for the animals (including humans) that consume them, corn with genetic material from hog's milk, are a few of the products currently in the experimental stage in U.S. laboratories.

These new technologies, however, raise profound questions that should be addressed before these technologies are routinely adopted.

III. Ecological concerns

A fundamental point that needs to be made is that the natural world—as expressed in plants, seeds, animals, etc.—has intrinsic value and exists in its own right. It is not dependent upon the value humans place upon it, but rather, by its very existence, each dimension of Earth life has a right to be. It also has the right to make its contribution to the maintenance and celebration of the larger Earth community. Therefore, human interaction with the natural world is not a relationship of control over or dominance of, but rather, as members and co-creators of one community of life, the shared task is to advance the total Earth community. To understand this relationship of community, of an essential oneness in the great unfolding story of the universe, is to situate the whole human project in a posture of deep respect for and interaction with the natural world.

The promoters of GMOs point to the benefits to human good these products will bring. A stance that holds that all of Earth's expressions have intrinsic value leads to deep ethical/moral questions about genetic modification of life forms even for the purpose of human good.

Genetically modified organisms may offer short term benefits to humans, but their long term consequences for humans and the rest of creation are unknown. The earth and its life forms are the product of millions of years of evolution and the web of ecological interactions is vast and complex. Genetic modification of organisms is predicated on a simplistic model that the expression of genes is mechanistic and predictable. This is not the case: the expression of genetic information is the result of complex interactions within the living organism and between the organism and its environment. No scientist can predict what will happen over time as a result of the introduction of genetically modified organisms into the environment. The National Catholic Rural Life Conference, in applying the "Precautionary Principle" ⁱ states the issue as follows: "Whereas every gene carries instructions for the production of a protein, and proteins combine with other proteins in an organism, science is not yet able to fathom the intricate web of life. In the fantastic complexity of nature, is science certain that artificially altering or moving a gene between species will produce the same intended results each time?" ⁱⁱ

Already the problems of containing the new genetically altered varieties are evident. Pollen from genetically modified plants is spread by the wind and has been found to have pollinated plants in fields where GMOs were not planted. Although the planting of genetically modified corn is prohibited in Mexico, it has been found in several parts of the country because small farmers experimentally planted corn that had been imported from the U.S. for food and animal feed. To the North, organic canola farmers in Canada complain that it is no longer possible to grow canola that can be certified as organic because of GMO contamination.

The effect of GMOs on biodiversity is another area of controversy. As scientists perfect genetically modified varieties and these varieties are used more and more, the natural genetic diversity of the organisms is likely to be lost. Genetic diversity is a form of “insurance” against unforeseen natural disasters. If a species becomes subject to disease, blight, or some other environmental challenge, species with no genetic diversity will be subject to catastrophic loss, but those with genetic diversity may have individuals with the genetic make-up to resist the challenge. So important is the insurance value of genetic diversity that seed banks have been created to house genetically diverse varieties of agricultural seeds.

IV. Food issues

At present, foodstuffs made from genetically modified plants, especially corn, soy, and canola, are commonly sold in the United States. Most processed foods in the U.S. contain genetically modified organisms. There is insufficient evidence at this point to say definitively whether these foods are safe or are health hazards. But many countries, including all the European countries, fear that GMOs are health hazards and importation of GMO foodstuffs is banned.

Certainly, food allergies comprise one kind of danger from GMOs. People with allergies may unknowingly eat foods containing transgenes from foods to which they are allergic. New allergies may occur as previously unknown combinations of proteins are engineered and marketed.

Of concern to people of many faith traditions is the importance of dietary laws that prohibit the mixture of certain foods and the use of others. Foods containing transferred genetic material could lead to a person’s unintentionally breaking customary dietary laws.

Much of the controversy about the use of GMOs in food revolves around labeling and choice. Consumers are demanding the right to know what they are eating. Producers of GMOs, on the other hand, resist labeling as prohibitively costly and out of fear that consumers might shun GMO products.

The use of food crops to create pharmaceutical products (pharm crops) presents a whole other level of hazard. In November 2002, a U.S. biotechnology company was fined for allowing experimental plants engineered to produce pharmaceuticals to treat diabetes and diarrhea to grow in fields along with non-engineered food plants. The extreme difficulties of containing the spread of plant seeds and pollen in the field and the possibilities for accidental mixture of pharm crops with other crops destined for human or animal consumption have led to calls for a ban on the use of food crops to create pharmaceutical products.

Proponents of GMOs claim that GMO technology promises to end world hunger. The U.S. policy on solving world hunger is based on a simple formula: increased productivity = reduced hunger. In an effort to increase productivity, the U.S. has promoted the model of large-scale, single crop farms with a large

number of inputs (tilling, sowing and reaping equipment, fertilizers and pesticides). GM technology has been developed to reduce the work load for these large-scale, capital intensive farmers, not to meet the needs of small-scale farmers or the diverse ecosystems within which they farm. With this model, the U.S. leads every conversation about hunger with the premise that if farmers in other countries adopted U.S. farming techniques, including GM seed technology, they would be more productive.

So for the U.S. large-scale production is an integral part of the solution to hunger. For years NGOs that focus on hunger and food security issues have shown that productivity is not the problem. There is enough food in the world to feed everyone: distribution and access to good, nutritious food is the problem. Nutrition and livelihoods are often left out of the picture.

V. Political/economic issues

Central to the political/economic issues are the questions of ownership and who benefits?

GMO plants and technologies are protected under law by patents and ownership laws. According to an article in *The Nation*ⁱⁱⁱ, five corporations (Dow, DuPont, Syngenta, Aventis, and Monsanto) control three quarters of the patents issued on GMO technology in the last decade. Monsanto owns or licenses 90 percent of the GMO seed planted globally. GMO technology is sold as a package and under patent protections.

For example, farmers can buy Round-up Ready soybeans from Monsanto. This variety of soy is resistant to Monsanto's weed-killer Round-up, hence the name Round-up Ready. The supposed advantage to farmers willing to use herbicides is that they can destroy the weeds in their fields by spraying Round-up, a relatively inexpensive alternative to more labor intensive forms of weeding. Beyond the ecological damage of chemically dependent farming, the disadvantage is farmers cannot save seeds from a harvest of Round-up Ready Soybeans for future planting, but are bound by law to purchase the seeds from Monsanto. It is clear that Monsanto benefits from the integration of its seed business with its chemical business and will benefit even more as its seeds come to dominate the market.

One of the most controversial developments seed companies have come up with is labeled "terminator" technology through which companies would create plants that produce sterile seed. Such technologies would protect corporate patents and profits by preventing farmers from saving seed for the following year's planting and forcing them to buy seeds from seed companies. Though several companies have patents for terminator technology, such was the outcry against it among farmers that companies have backed off from developing it, at least for now.

With an eye to future profits, corporations are busy searching the world for economically promising plants so they can patent their genes. In so doing, they are patenting the knowledge and the results of the labor of indigenous peoples who neither share in the ideology of ownership nor in the potential profits. What corporations call bio-prospecting, indigenous peoples and their advocates call bio-piracy.

In short, GMO technology raises the specter of a few corporations controlling the world's food supply and access to the seeds and technology of production. Farmers, who in the past have shared and saved seeds, will be forced to buy seeds along with the whole technological package.

Deeply troubling is the idea that genes, the very essence of life, are patentable. As people of faith, we believe that life is from God and not subject to human ownership and domination.

VI. Trade and economic issues

Currently over 60 percent of the corn and soy raised in the U.S. is genetically engineered. It is in the U.S.'s interest to have as wide a market as possible for these genetically modified products. Yet many countries refuse to allow the importation of genetically modified grains or products. Access to these restricted markets depends on the growers' ability to prove that their crops are not contaminated by GMO technology. What happened in Mexico shows how difficult it is to prevent contamination. We should not be surprised that some observers accuse the U.S. of sending relief food in the form of grain intentionally to spread GMO contamination. As fewer countries are then able to certify their crops are GMO free, these observers claim, the import barriers against GMO crops will of necessity be dropped. When that happens many small, local farmers will find themselves unable to compete with subsidized U.S. farm products.

The impact of U.S. subsidized imports is already evident in Mexico where U.S. subsidized corn is imported as food and animal feed under the North American Free Trade Agreement. Indigenous farmers, unable to compete with the low-priced imported corn, are being forced to look for other ways to make a living. The collapse of indigenous agriculture, so fundamental to their communities and cultures, radically alters the lives of indigenous peoples.

In early 2003, U.S. trade officials, backed by aggressive lobbying from agribusiness proponents, began discussing the possibility of challenging the European Union's right to ban genetically modified imports. Such a legal challenge would be heard by the World Trade Organization. Should the U.S. win, the impact on world markets would be immense.

VII. Faith-based justice groups

Many faith-based communities and organizations are studying GMOs; some have already formulated statements. The National Catholic Rural Life Conference and African Faith and Justice Network have called for a freeze on the proliferation of genetically engineered foods while the many questions around GMOs are studied. A powerful statement by the National Conference of Brazilian Bishops, accompanied by their Pastoral Land Commission, supports the international effort to have seeds declared the "common heritage of humanity" with the understanding that they would be preserved in their genetic integrity by farming communities.

VIII. What are Maryknoll missionaries saying?

Too often U.S. policy is set without knowledge of the livelihoods of small scale farmers in rural areas. Maryknollers living among such farmers have for years shared the joys and hardships of their lives. The life of subsistence farmers can be extremely harsh, but as new technologies (including GM technologies) emerge on the scale that the U.S. is promoting, small scale farmers who cannot compete find themselves forced to look for new work, often in urban areas, thus forfeiting their connection to the land and the traditions their families have carried on for years. Cultures and languages are being lost at an alarming rate.

To date, we have heard from Maryknoll missionaries in Mexico, the Philippines, Brazil and Venezuela. This information has been incorporated in this reflection paper. We invite Maryknoll missionaries around the world to reflect on these issues in the context of their own reality and to add their thoughts to the development of this reflection paper.

There may be appropriate ways to use new technologies if they address some of the key issues raised by people in the global South — widespread hunger, drought, water shortages, poor soil, limited access to land. Yet we believe that serious questions must be asked about whether the present technological direction addresses these problems, whether it creates new problems, and whether it is appropriate to the continuing evolution of the full community of life on Earth.

IX. Resources for further information

- [Africa Faith and Justice Network](#), Washington, D.C.
 - [Bread for the World](#), Washington, D.C.
 - [Catholic Relief Services](#), Baltimore, MD
 - [Institute for Agriculture and Trade Policy](#), Minneapolis, MN
 - [National Catholic Rural Life Conference](#), Des Moines, IA
 - [Union of Concerned Scientists](#), Cambridge, MA
 - [Vandana Shiva](#), Director, Research Foundation for Science, Technology, & Ecology, New Delhi, India
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Case # 1: GMOs in Mexico

High in the Sierra Madre Mountains of Oaxaca, Mexico, is the “hearth of domestication” of corn (maize). Here, teocinte, the wild ancestor of corn, grows alongside the many varieties of domesticated corn cultivated by indigenous farmers. Corn is the basis of life and security for these farmers, and their communities and cultures have been shaped over a long period of time by the annual cycle of corn production. It was a shock when scientists discovered signs that genetically engineered corn was growing in this remote part of the planet. This is the first case of genetically modified organisms growing in their “hearth of domestication.” How did it happen when Mexico has banned the commercial planting of genetically modified corn? Actually, it was an accident waiting to happen. Mexico, under the North American Free Trade Agreement (NAFTA), imports large quantities of corn from the U.S. where genetically altered varieties are commonly grown. Though this imported grain is destined for human and animal consumption, not for planting, there was no way to prevent local farmers who bought the corn from planting some out of curiosity as farmers are wont to do. Once planted, containment is almost impossible because corn plants are prolific in their production of pollen which rides the winds far beyond the fields where it is produced. Now local farmers worry about the possible health hazards of genetically modified corn on their families, the effects of contamination on their ability to sell corn on the open market, and possible impacts on their lives resulting from their interconnections with a world market that now includes genetically modified seeds.

Case # 2: Food aid in Africa

In 2002, Zambia and Zimbabwe, though facing famine, refused tons of corn sent by the United States as food relief. Their reason for refusing the corn was that it included genetically modified corn in the form of grain. It is more efficient to distribute relief in the form of grain since it can be stored for long periods and distributed for milling into flour as needed. Zambia and Zimbabwe feared that the desperate farmers receiving the grain would save some of it for planting and the countries’ crops would soon be widely contaminated with genetically modified corn. If this were to happen, the countries would lose important export markets in Europe where many countries reject imports of GMOs. To mill the corn

before distribution would have been a burden to the economies of Zambia and Zimbabwe. In addition to suspicions about the safety of genetically modified foods and the risk of export markets, farmers in Zambia and Zimbabwe feared their dependence on external inputs might increase. In Zambia the Kasisi Agricultural Training Center and Jesuit Center for Theological Reflection in Lusaka issued a joint statement on GMOs on July 29, 2002 saying:

“Among the major fears is that the donors could use the short-term advantages on the starving consumer to obscure a long-term economic disaster for the African farmer. Small-scale farmers could soon become perpetually dependent on such foreign donors for seed and herbicide, and with diminished yields.”

In the end, the U.S. offered milled corn which Zimbabwe did accept after much controversy. Zambia, not convinced of the safety of genetically modified foods, has thus far rejected the corn even in the form of flour.

Case # 3: Plants that produce their own pesticide

By transferring genes from a bacterium known as *Bacillus thuringiensis*, the biotech industry has developed plants that produce their own Bt pesticide. Organic farmers rely on this bacterium to rid their crops of pests without using chemical pesticides, so the short term environmental benefit of the Bt engineered plants is that farmers currently report using less chemical pesticides. At the same time, a number of organic farmers worry that a long term effect of massive use of Bt plants will be that pests develop resistance to Bt, leaving them without a natural pesticide while non-organic farmers revert to chemicals. Unknown, too, are the effects of Bt build-up in the soil and the effects of Bt on non-pest living forms, including animals fed a diet of Bt plants.

The possible contribution of poisoning from Bt plants to the decline of the monarch butterfly population is hotly debated. Laboratory studies have shown that Bt plants are fatal to monarch larvae. Studies are on-going to assess whether the effects observed in the laboratory occur in the wild. The heated debate on monarch butterflies underlines the need for rigorous research on the ecological impacts of the use of Bt plants.

ⁱ The Precautionary Principle was originally formulated at the Earth Summit in Rio de Janeiro in 1992. One recent statement of the Principle, developed by a group of scientists, government officials, environmentalists and others meeting at the Wingspread Conference Center, reads as follows: “...it is necessary to implement the Precautionary Principle: where an activity raises threats of harm to the environment or human health, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.”
<http://www.gdrc.org/u-gov/precaution-3.html>.

ⁱⁱ Agricultural biotechnology: A Catholic Rural Life Perspective, June 2002,
http://www.ncrlc.com/NCRLC_GE_webstatement.html.

ⁱⁱⁱ Mark Shapiro, “Sowing Disaster?”, *The Nation*, Oct 28, 2002, p 12.