

UNEDITED DRAFT – DO NOT CITE WITHOUT AUTHOR’S PERMISSION

LET THEM EAT PRECAUTION:
WHY GM CROPS ARE BEING OVER-REGULATED IN THE
DEVELOPING WORLD

Robert L. Paarlberg¹

June 17, 2003

Abstract

Genetically modified (GM) food and feed crops are scarcely being planted anywhere in the developing world. The reason is superficially straightforward: in most cases national food safety and biosafety regulators have not yet made it legal for farmers to plant these crops. Yet explaining this high degree of regulatory caution in the developing world is not so simple, given the ordinarily lax health and environmental regulations found in so many developing countries, and given the lack of any scientific evidence to date of risks to human health or the environment from GM crops. This over-regulation of GM crops in poor countries is best understood as an extension in to the developing world of European consumer tastes and regulatory preferences. Europe projects its highly precautionary regulatory approach toward GM crops into the developing world through four distinct channels of influence: intergovernmental organizations, bilateral foreign assistance, NGOs, and food and commodity markets. We often think of globalization as the same thing as Americanization, but in the case of GM crops it is European rather than American tastes and regulatory preferences that are now spreading in the developing world.

¹ Robert Paarlberg (rpaarlberg@wellesley.edu) is Professor of Political Science at Wellesley College, and Associate at the Weatherhead Center for International Affairs at Harvard University.

On May 13, 2003, the United States Government initiated a formal challenge to European Union (EU) regulatory policies concerning genetically modified (GM) agricultural crops. U.S. Trade Representative Robert Zoellick explained that the United States was initiating “consultations” to challenge a five year EU moratorium on new GM crop approvals, the first step in a formal dispute settlement process in the World Trade Organization (WTO). Zoellick explained that the informal EU moratorium was not only getting in the way of U.S. shipments of GM corn to the EU; it was also effectively blocking the spread of GM crop technologies to farmers in the developing world. Zoellick, perhaps the most pro-European member of the Bush Cabinet, earlier had referred to the over-regulation of GM crops as “the European disease.”²

The surprising power and reach of Europe’s influence over GM regulatory policies in the developing world came to light in the summer of 2002, when a number of states in southern Africa, all facing possible famine, nonetheless began rejecting GM corn from the United States as food aid. They did so partly in response to European officials who had taught them to follow the “precautionary principle” toward GM technologies, and partly in response to European-based NGOs who had told them GM crops were unsafe for human health and the environment. But they also had a commercial motive in mind; they feared that if some of the GM corn kernels were planted, African exporters might be denied sales in the EU market, just as exporters of GM corn from the U.S. already had lost sales. The food aid being offered in 2002 was the same GM corn Americans had been consuming since 1996, and the same corn that the United Nations World Food Programme (WFP) had been distributing in Africa over the previous six years, but now Zambia rejected the corn completely, and three other countries – Zimbabwe, Mozambique, and Malawi – accepted only if it was milled first to prevent planting.

These events persuaded trade officials in the United States that the highly precautionary policies toward GM foods that had taken hold in Europe after 1996 were now spreading to the developing world and becoming a threat not just to U.S. farm commodity exports, but also to agricultural development in poor countries and to the efficient international movement of food aid for famine relief. In 2002 the WFP was able to

² “U.S. Attacks EU for its protection of agricultural sector,” www.checkbiotech.org, 06 May 2003.

replace most U.S. corn shipments to Zambia with non-GM corn from Tanzania and South Africa, but not before hardships in the country increased. In January 2003, a mob of 6000 hungry villagers in one rural town in Zambia overpowered an armed policeman to loot a storehouse filled with U.S. corn, in the knowledge that the government was soon going to insist it be taken out of the country.

U.S. frustration was deepened by the knowledge that officials in Europe and European scientists shared the view that GM foods were safe. In 2001, the Research Directorate General of the EU released a summary of 81 separate scientific studies, all financed by the EU rather than private industry, conducted over a 15-year period and aimed at determining whether genetically modified products were unsafe, insufficiently tested, or under-regulated. None of these studies found any scientific evidence of added harm to humans or the environment from any approved GM crops or foods.³ In December 2002 even the French Academies of Sciences and Medicine drew a similar conclusion. The Academies issued a report which said, “there has not been a health problem...or damage to the environment” from GM crops. This report blamed the rejection and over-regulation of GM technologies in Europe on what it called a “propagation of erroneous information.” In May 2003, the Royal Society in London presented to a government-sponsored review in the UK two submissions which found no credible evidence that GM foods were more harmful than non-GM foods.

The United States may have a sound scientific and legal case against the EU moratorium, but we shall argue here that the political and commercial foundation for challenging the EU on GM crops and foods is quite weak. In the global fight over GM crop regulations, the political and commercial influence of the EU exceeds that of the United States. Despite U.S. challenges in the WTO, it is likely that highly precautionary EU-style regulations on GM foods and crops will continue to spread to the developing world. If this proves to be the case, the big losers will not be commercial farmers or GM crop exporters in the United States. The big losers will be poor farmers in developing countries, who will be denied new GM options to overcome serious farm productivity constraints.

³ Charles Kessler and Ioannis Economidis, eds., *EC-sponsored Research on Genetically Modified Organisms: A Review of Results*. Brussels: Research Directorate-General, European Commission, 2001.

Reasons for the Restricted Planting of GM Crops

GM seeds have been commercially available since 1995, yet ninety-nine percent of all the world's plantings of GM-food and feed crops are still restricted to just four countries in the Western Hemisphere—the United States, Canada, Argentina, and (illegally) Brazil.⁴ This restricted planting of GM-food and GM-feed crops reflects, more than anything else, a globalization of Europe's highly precautionary regulatory approach toward this technology. Globalization is often depicted, by its critics, as tantamount Americanization, as the global spread of U.S. tastes, U.S. regulatory preferences, and U.S. technologies. So why, in this case, we are seeing European tastes and regulatory preferences triumph? Consider the four different channels of influence through which this Europeanization of regulatory standards is now taking place: Intergovernmental organizations, development assistance, non-governmental organizations, and international food and commodity markets.

Intergovernmental Organizations

It is unsurprising that European influence dominates within most of the Intergovernmental Organizations (IGOs) that currently deal with GM foods and crops. European governments work hard to maintain and develop their influence within IGOs, while the U.S. government too often ignores or disrespects IGOs - by failing to ratify conventions, failing to send high-ranking delegations to IGO meetings, or failing to pay dues on time. This U.S. history of disregarding or disrespecting IGOs has now led to adverse consequences in the area of international regulation of GM crops. The IGOs that should be promoting GM-crops are not doing so, and the IGOs that are regulating GM-crops are doing so in a precautionary manner that Europeans prefer.

International agricultural organizations and development organizations such as UN Food and Agriculture Organization, CGIAR, and the World Bank should be promoting GM crops, because these organizations have traditionally been production-oriented and pro-technology. But U.S.

⁴If an important industrial crop, GM cotton, is added to this calculation, 99 percent of global production is still contained in just four countries, but these four countries now become the United States, Argentina, Canada, and China. Clive James, "Preview: Global Status of Commercialized Transgenic Crops: 2002," ISAAA Brief 27- 2002, International Service for the Acquisition of Agri-Biotech Applications: Ithaca, NY.

financial support and diplomatic attention to these organizations has weakened in the past decade, and in the current climate of European misgivings toward GM-crops, these organizations have all backed away from promoting GM crops. The FAO now mostly provides developing countries with advice on how to regulate GM technologies, not how to shape their development or promote their use. The director general of FAO has even stated publicly that GMOs are not needed to meet the objective of alleviating world hunger by 2015. The United States government, which has been delinquent in paying its dues to FAO, has lost influence within the organization. At an FAO summit in 2002 the U.S. pressed FAO for an endorsement of GM crops, but the best the organization could come up with was an endorsement of what it called “new technologies including biotechnology”. By using the word biotechnology instead of GMOs or GM, the FAO signaled its discomfort with GM crops.

Nor is the CGIAR system promoting GM-crops. It is true that the International Rice Research Institute (IRRI) in the Philippines is supposed to be developing “golden rice.” But that will be difficult since they have decided not to conduct any GM-crop field trials in the Philippines, lest they stir up the anger of local anti-GM NGOs. Only two out of IRRI’s 800 scientists are working on “golden rice” at the moment.⁵ IRRI is in a position to go ahead with several other GM rice innovations, including iron enriched “dream rice” good for iron deficient women and children and “aerobic rice” that requires less water, but the IRRI scientists working on these innovations face extensive critical scrutiny from anti-GM NGOs and from European donors.⁶

Elsewhere in the CG system, Mexico-based CIMMYT is participating in an insect resistant maize project for Africa, but the major funding comes not from CIMMYT but from the Syngenta Foundation. CIMMYT has also been testing wheat plants genetically engineered to withstand drought, but resistance in Mexico from environmental groups has induced caution.⁷ Following the discovery in 2001 that some GM corn had been planted in Mexico, the Mexican government placed tight constraints on all GM crop research in the country.

⁵“Golden Rice,” Letter to the Editor, *Business Week*, from Duncan Macintosh, Spokesperson, IRRI, February 26, 2001.

⁶ <http://www.agbioworld.org>

⁷ <http://www.scidev.net/frame3.asp?id=3001200316082330&t>

In the 2001 CGIAR annual report, there was only one reference to genetically modified crops, in the ISNAR section, and this reference was to the regulation of possible biosafety threats from GM crops, not possible benefits.⁸ So the CG system is hardly championing this new technology. This reticence is again no surprise, given that European contributions to the CG budget are now twice as large as contributions from North America. Those who pay the piper call the tune.

Fear of diminished European financial support, and fear of criticism from European NGOs, has also paralyzed the World Bank on GM crops. In 1999, the World Bank attempted to draft a strategy document on GM crops, but because of political opposition at the top this strategy paper, as bland as it was, never gained official approval. The draft strategy was never even presented to the Board for approval inside the Bank. Now the World Bank's strategy on GM-crops is not to promote them, but to study them. In late summer 2002, the Bank announced a three-year global consultation process designed to examine the "possible benefits" of this new technology, and also the alleged drawbacks. No danger of running into any criticism from the EU with this approach. On GM crops, the Bank now spends more time worrying about and responding to NGO criticisms than it spends imagining how to advance this technology for the benefit of poor farmers in the developing world.

While most of the IGOs that should be promoting GM crops are not doing so, a number of equally powerful IGOs are taking a distinctly European approach toward regulating this new technology. For example, the United Nations Environment Program (UNEP) is now using funds from the Global Environment Facility (GEF) to help developing countries draft precautionary biosafety regulations for GM-crops. UNEP wants such regulations be in place before these countries begin any planting of GM-crops, whatever the delay or administrative cost this might imply. Also under the auspices of UNEP, within the Convention on Biological Diversity (CBD), governments with European encouragement negotiated in 2000 a new Cartagena Biosafety Protocol.⁹ This protocol explicitly endorses "the precautionary approach," imposes informational obligations on exporters of

⁸ CGIAR Annual Report 2001, "Global Knowledge for Local Impact: Agricultural Science and Technology in Sustainable Development," CGIAR Secretariat, Washington, D.C.: The World Bank.

⁹ The agreement has been signed by 103 countries and so far ratified by 48. It will come into effect when ratified by 50.

living GM plants and seeds (LMOs), and allows governments to limit imports even without scientific demonstration of a specific risk to the environment. It states that under conditions of scientific uncertainty no government should be prevented from blocking imports of GM plants or seeds. From a scientific standpoint, of course, there will always be uncertainty. Testing for the Nth hypothetical risk and then for the Nth year of exposure to that Nth risk is not a requirement we impose on any other product, because it can become a formula for endless delay.

The terms of the Cartagena Protocol were modeled after an earlier convention, the Basel convention on trans-boundary movement of hazardous wastes, so a bias against GM technology was part of this new agreement from the start. U.S. influence over the negotiations was undercut because the United States Senate had never ratified the original Convention on Biological Diversity (CBD). Since the United States was not party to the convention, it had to participate in the Protocol negotiations as an “observer,” not a good way to control the outcome.

Development Assistance

Development Assistance is a second channel through which European influence over GM crop regulations is now being extended internationally. During the cold war, the United States financed development assistance generously, hoping to influence policies in poor countries. Since the end of the cold war U.S. assistance programs have withered. This is particularly true in the area of agriculture. Between 1992 and 1999, USAID support for agricultural development assistance fell by more than 50 percent. In Africa, the U.S. largely withdrew from agricultural development assistance work. Agricultural specialists were no longer sent to the field, AID missions were closed down, and people and money were both brought home. Meanwhile, European donors remained very much on the scene, ready to advise African governments on how to regulate GM-crops. The Dutch, Danes, and the Germans remained active, consistently advocating ratification of the new Cartagena Protocol and formal adoption of a Europe-style precautionary principle.

Developing countries are warned not to plant GM-crops until highly precautionary biosafety screening procedures are in place. The implications of this advice can be seen in the case of Zambia, where the absence of

adequate GM biosafety regulations was one reason given by government officials for the rejection of GM food aid from the United States in 2002-03. This regulatory deficit will soon be corrected, at a dubious price. In April 2003 Zambia's Ministry of Science and Technology announced a five year \$40 million National Biosafety and Biotechnology Strategy Plan, a plan designed not so much to develop useful GM crop technologies for Zambia's struggling farmers as to regulate those technologies, so as to protect the biodiversity of the country.¹⁰ The government of Zambia knows that European donors will pay for this expensive plan. Instead of exporting useful GM technologies, the European donor community is exporting GM regulations.

The practical result in many countries has been regulatory paralysis. Once demanding biosafety screening requirements are written into the laws, cautious politicians and bureaucrats discover that the safest thing, politically, is to give no GM crop approvals at all. Approving nothing is the best way to conceal a weak technical capacity to screen GM technologies on a case by case basis, and also a good way to avoid criticism from NGOs and avoid difficult questions from the media.

This is one reason so few biosafety approvals for GM crops have been given by developing countries. Not a single country on the African continent, other than South Africa, has yet approved any GM-crops for commercial planting. In all of developing Asia, not a single country, other than the Philippines, has given a single biosafety approval for the planting of any major GM-food or feed crop—no corn, soybeans, no rice. In a few Asian countries, only Bt cotton, an industrial crop, has been approved. We sometimes hear the question, "If this technology is so good, why aren't more poor farmers in the developing world planting GM-crops?" The reason is, their own government regulators have not yet made it legal for them to do so.¹¹

European NGOs

¹⁰ Singy Hanyona, "Zambia Develops Biosafety Strategy," <http://ens-news.com/ens/apr2003/2003-04-29-01.asp>

¹¹ To understand the history of this precaution in the developing world, see Robert L. Paarlberg, *The Politics of Precaution: Genetically Modified Crops in Developing Countries*, Baltimore: Johns Hopkins Press, 2001.

European-based NGOs are another source of external influence over GM crop regulations in poor countries. Environmental and anti-globalization NGOs have invested heavily in an effort to block this new technology. These NGOs have been instrumental in forcing the EU to impose a moratorium on new GM crop approvals since 1998, and now they are working to prevent approvals in the developing world. Greenpeace, which has an annual budget of more than \$100 million, has invested heavily in a global campaign to stop genetic engineering, focusing particularly on developing countries that have not yet approved any GM crops.¹²

Of course, private biotech companies like Monsanto spend a lot more money to promote the spread of GM-crops, but NGOs go beyond paid media campaigns; they also employ direct actions, street protests, and lawsuits to generate free media attention. NGO lawsuits have emerged as a proven method for delay in poor countries. In 1998, Monsanto thought it had won official approval in Brazil for five varieties for Roundup Ready soybeans. A local consumer NGO and the Brazilian office of Greenpeace filed a lawsuit and found a sympathetic federal court judge to issue an injunction that stopped the approval. This case has been caught up in the Brazilian court system ever since, so it remains illegal to plant any GM seeds in Brazil, even though farmers there have been eager to do so – and, indeed, are smuggling in GM seeds from Argentina illegally. A U.S. based NGO, the Institute for Agriculture and Trade Policy (IATP) is pressuring the Brazilian government to keep the GM crop ban in place, despite widespread illicit plantings.¹³

In India, when a local partner of Monsanto began conducting field trials to attain biosafety approval for Bt cotton, NGOs with European links invaded the trials, uprooted the cotton plants, and burned them. The Indian government had been told by the NGOs that the plants contained a so-called “terminator” gene; this was not true, but headlines were made, public interest litigations were filed, and the approval of GM-cotton was

¹² Greenpeace is active even in China, having extended its presence from a headquarters in Hong Kong to an office in Beijing. Greenpeace has close contacts with the Nanjing Institute of Environmental Sciences, which even co-sponsors its newsletter. This institute falls under the authority of the State Environmental Protection Administration, which would like to be able to exercise greater control over GM crops inside China, where the Agricultural and Science ministries have traditionally had the lead role.

¹³ Soy traders in Brazil estimate that roughly 50-60 percent of the nation's crop is now GM. The new Lula da Silva government in Brazil continues to struggle with this issue of illegal GM soy planting. GM producers have been given an amnesty to sell their soy, so long as labels are attached, until the spring of 2004. After that date all GM crops supposedly will be subject to destruction.

delayed for two years. In 2002 India went ahead with GM cotton in the southern part of the country only, but it held back from approving GM mustard or any other food or feed crops. The NGO grip on Indian GM crop approvals tightened in April 2003 when the government's Genetic Engineering Approval Committee (GEAC) rejected an Indian seed company's request to extend the sale and planting of GM cotton seeds into the northern part of the country. GEAC denied this request despite the success of GM cotton in the south¹⁴ and despite a lack of evidence of any particular biosafety risk linked to GM cotton in the north. Environmental groups in India, led by Greenpeace India and by RFSTE hailed this as a major victory for their anti-GM campaign.

European-based NGOs are also working hard to GM varieties out of food aid shipments to the developing world. UK based Oxfam International has joined Greenpeace in urging the governments and the FAO to develop and implement standards that prevent the distribution of GMOs in food aid.¹⁵ NGO campaigns against GM foods and crops played a visible role in the slowing of food aid deliveries to southern Africa in 2002-03, where roughly 15 million people in six drought-stricken countries faced a severe hunger crisis. International aid deliveries were slowed because governments in the region did not want to accept GM corn from the U.S. as food aid. Political leaders in this region had been frightened away in part by NGO campaigns conducted by groups such as Action Aid from the United Kingdom and Friends of the Earth from the Netherlands.

Zambia refused to take even milled corn from the United States, indicating that food safety concerns as well as biosafety and trade concerns were driving its policies. The government of Zambia reaffirmed this import ban on GM food aid in November 2002, after a team of government experts traveled to Europe and North America to seek advice on the issue. Among the experts they consulted in London, Brussels, and Amsterdam were NGO leaders from Greenpeace, Friends of the Earth, and other organizations deeply opposed to GM technologies. They were also influenced by the views of the British Medical Association, which had no evidence of any added health risks from GM foods but was clinging to a position it had taken

¹⁴ In 2002, Indian cotton farmers in Andhra Pradesh bought enough seed to plant 8,300 acres with GM cotton. By 2003, farmers had booked enough seed purchases to plant 60,000 acres to GM cotton. *Economic Times*, May 15, 2003, p. 16.

¹⁵ Ashok Sharma, "NGOs Oppose GM Food Dumping in Iraq, Favour UN Role," www.checkbiotech.org, 15 April 2003.

in 1999 that the technology had not yet been sufficiently tested for all hypothetical risks.¹⁶

Frustrated with this crisis, United States officials at one point late in 2002 asked the EU and the WHO to reassure officials in southern Africa that there was no scientific evidence of risk from the corn being offered, and to remind the Zambians that even EU regulators had given food safety approvals to some varieties of GM corn and soybeans. The first response from the EU was to say this was a matter between the United States and Zambia. WHO Director General Gro Brundtland then disappointed the United States by saying to a group of health ministers from southern Africa that the GM corn was “not likely” to present a risk. Again, a key IGO was not ready to confront European opinion and endorse the technology. In the fall of 2002 the Government of India also began to refuse imports of GM corn and soya from the United States as food aid, when food relief agencies could not promise they were GM free.

International Markets

International markets are a fourth and final channel through which European attitudes toward GM-foods and feeds are now spreading beyond Europe. It was originally assumed that once the United States began growing GM-food and feed products, the technology would quickly become pervasive. The United States is the world’s biggest exporter of agricultural goods, so these products would have to be accepted worldwide. That was the wrong way to look at the matter. In international commodity markets, it is the big importers, not the big exporters, who usually set standards. In any competitive market, the customer is always right. Even when the customer is wrong, the customer is right.

In commodity markets the big customers are not the exporters but the importers, led by Europe and Japan. The EU and Japan together take in \$90 billion worth of agricultural imports every year. From developing countries,

¹⁶This early BMA position was taken in reaction to a controversial and subsequently discounted research experiment from the Rowett Institute that suggested rats could be harmed from eating GM potatoes. In the spring of 2003 the head of BMA’s Science and Ethics committee, Dr. Vivienne Nathanson, indicated that it was perhaps time for the BMA to update its evidence and admit there were no direct health risks, but too late to reassure the Zambians. “No Risk I GM Food, Say Doctors.” *The Observer*, May 25, 2003.

specifically, the EU is the big importer. Europe alone imports 75 percent more farm products from developing countries every year than the United States. The EU imports more food and farm products from developing countries than the United States, Japan, Canada, and Australia combined. Accordingly, developing countries that aspire to export farm products must pay close attention to European consumer preferences and European import regulations.

If it were only consumer opinion in Europe now weighted against GM foods, nobody could really complain, since that would be a free market outcome. The customer is always right. Increasingly in Europe, however, consumer opinion alone is not the block to GM-product imports. Imports are now being blocked as well by a variety of official EU regulations and policy actions, some of which derive from dogmatic political views rather than from the preferences of consumers. European consumers have shown they are willing to pay small premiums in the market for GM-free food, but only small premiums, yet politicians and regulatory bureaucrats in Europe are now setting in place rules that could effectively remove GM products from the shelf completely. It seems that European food safety regulators, having under-regulated BSE, dioxin, and hoof and mouth disease, are hoping to restore their credibility in part by over-regulating GM foods. Without any scientific evidence or risk, the EU is going ahead with a system for the tracing and labeling of GM products that could drive them out of the EU market completely.

These new regulations go beyond the informal EU moratorium on new GM biosafety approvals, a policy which has required, since 1998, an import ban on any bulk commodity shipments from the U.S. possibly containing unapproved GM-varieties. This import ban has cost U.S. exporters roughly \$300 million a year in lost corn sales, but that is a relatively small export loss compared to the volume of sales that will be at risk once Europe's new traceability and labeling regulations are set into place later this year by the EU Parliament and Council. The EU claims it must enact these new regulations to facilitate a final lifting of the moratorium, to ease the concerns of EU consumers, green party leaders, and anti-GM activists. But under these new rules developing countries hoping to export farm products to Europe may have no choice but to remain GM free.

These new traceability and labeling regulations will impose costly new product segregation requirements on any exporters of GM products to Europe. Mandatory GM labeling will be extended to animal feed as well as to human food, and even to processed products where there is no longer any physically detectable GM content. Fraudulent claims of GM-free content for such processed products will be almost impossible to prosecute. If enforced strictly, the traceability regulation could drive labeled GM products out of the market completely in Europe. This regulation will oblige every operator in the food chain to maintain a legal audit trail for all GM products, recording where they came from all the way back to the farmer that planted the seed. Purportedly, this will facilitate enforcement of the new labeling rule, and also make possible a quick removal from the food chain of any GM product that might prove to be unsafe.¹⁷

This new traceability requirement will not require much added physical segregation of products in Europe, because farmers there are not growing any GM crops to speak of. It will be a legal tangle and a burdensome paperwork requirement, but perhaps nothing more. Not so in the United States, or in other countries where GM crops are grown and exported to Europe. Such countries will now have to present documentary audit trails for any GM product they wish to sell in Europe, which means they will have to start segregating GM from non-GM products physically at home, and tracing GM products through the market with legal records as well. Segregating GM from non-GM bulk commodities at a low threshold of permitted contamination can imply having two of everything – two sets of grain elevators in every county, two categories of railroad cars and river barges, separated drying and processing facilities, and segregated export elevators. At the very low threshold of contamination likely to be permitted under the new EU regulation (shipments will probably have to be 99.1 percent free of any GM content to escape the label and traceability requirement), this segregation process will be costly enough to raise the export price of the commodity shipments in question. Fearing either loss of price competitiveness, or loss of customers in Europe once GM products are labeled as such, farmers in the U.S. might eventually have to retreat from planting GM seeds. Developing countries lacking the legal and

¹⁷Commission of the European Communities, Brussels, "Proposal for a Regulation of the European Parliament and of the Council Concerning Traceability and Labelling of Genetically Modified Organisms and Traceability of Food and Feed Products Produced from Genetically Modified Organisms and Amending Directive 2001/18/EC," Brussels, July 25, 2001.

infrastructural capacity to segregate GM from non-GM will face an even greater incentive to remain GM-free.

Both the EU moratorium and the new labeling and traceability regulations appear to violate key agreements in the WTO. The moratorium on new approvals clearly violates the Sanitary and Phytosanitary (SPS) agreement because it is not based on any scientific evidence of risk. Even EU Commission officials such as Health Commissioner David Byrne and Environment Commissioner Margo Wallstrom, have admitted there was no scientific evidence available to justify the moratorium. The EU Commission sought for years to get the moratorium lifted on the grounds that it violated even EU law. In July 2000, Commissioner Wallstrom said, “We have already waited too long to act. The moratorium is illegal and not justified...”¹⁸ In response to the U.S. WTO challenge, the best legal case available to the EU may be a (dubious) claim that the informal moratorium either never existed or has now ended, since scientific evidence to justify the moratorium is lacking.

The new Traceability and Labeling Regulation, when it comes into force sometime later this year, will probably violate the TBT agreement of the WTO, under both article 2.1 (“like products”) and also Article 2.2 (“legitimate objective”). In the case of the Traceability and Labeling Regulations, the U.S. government worked hard in 2001-02 to influence the drafting of these regulations, hoping to weaken their likely impact on U.S. exports. The U.S. asked that the threshold of permitted contamination to be raised; the U.S. wanted labels to be required only if some GM content is physically detectable; and the U.S. wanted to be able, when labeling exports, to say that products or shipments “may contain” certain GMOs, rather than having to say exactly which GMOs are contained in the product. But these U.S. requests found little support when the EU Councils of Agricultural and Environmental Ministers approved the new regulations late in 2002. Only the UK appeared ready to call for any weakening of the regulation, while the French, at the other extreme, wanted GM labels not only on all processed GM foods but also on meat from animals that have been fed GM crops, and even on GM pet foods.

¹⁸Cited in United States Trade Representative Press Release, “U.S. and Cooperating Countries File WTO Case Against the EU Moratorium on Biotech Foods and Crops.” May 13, 2003.

The U.S. can hope to win its new WTO suit against the moratorium, but even with the best case outcome from this suit (an actual granting of new approvals in the EU, honored by all member governments, sooner than would have been possible otherwise¹⁹) the U.S. will still be left facing the new traceability and labeling rules, which are likely to be in place before the end of 2003. These new rules are both more damaging to GM exporters than the moratorium and more difficult to challenge in the WTO. They will be legislated as joint regulations of the EU Council and Parliament, under the co-decision procedure of the 1993 EU Treaty. Such rules, which come into law at the national level automatically, will be more difficult to reverse than a simple informal moratorium on new approvals. A three-person dispute panel inside the WTO will carry little political weight with the European Council and Parliament; the WTO is not a food safety organization, it does not embrace Europe's precautionary principle, and can be attacked as non-democratic.

The United States learned the limits of WTO dispute settlement powers in the food safety area with the recent beef hormone case, where the U.S. won (twice) in the WTO's dispute settlement body, but still failed to open the EU market to hormone treated beef. The hormone ban was popular with consumers in Europe and had been endorsed by the EP, so the Council decided to comply with WTO rules by paying the U.S. a fine rather than lift the ban.²⁰

Even if the U.S. were to win a case in the WTO against the traceability and labeling regulations, there is thus little guarantee that U.S. food sales to Europe would increase, either because the EU would decide to pay a fine or accept retaliation rather than comply, or because the spectacle and publicity surrounding the challenge would drive European consumers, and private importers, even farther away from GM products, or perhaps other U.S. products. Challenging the EU moratorium in the WTO could backfire as

¹⁹ Even before the U.S. decision in May 2003 to initiate consultations on the moratorium, the EU Commission had been working to restart the approval process, by pressing member governments to implement the new Directive (2001/18/EC) governing approvals that came into effect in October 2002. But as of April 2003, only three member governments (UK, Sweden, Denmark) had adopted that Directive as legislation at the national level. The rest were waiting for the new traceability and labeling rules to come into place, at least. All the same, the October Directive was enough to reinvigorate the approval process within the Commission, which began reviewing backlogged applications.

²⁰ Donna Roberts, "Preliminary Assessment of the Effects of the WTO Agreement on Sanitary and Phytosanitary Trade Regulations." *Journal of International Economic Law* 1:377-405.

well, by hastening a retaliatory EU imposition of up to \$4 billion in trade sanctions against the United States, as permitted under the WTO to punish the U.S. for illegal foreign sales corporation tax breaks given to U.S. exporters. Currently, the EU has given the U.S. until autumn of 2003 to change its tax laws or face these sanctions beginning January 1, 2004. A U.S. challenge to EU GMO regulations could bring these sanctions much sooner, and U.S. agricultural exports to Europe will be prominently targeted if these sanctions are imposed.

The regulatory movement in Europe toward tighter restrictions on GM-imports is thus almost certain to continue. This has been noticed by agricultural exporters world-wide, and it is now the single greatest inducement for so many governments around the world to remain GM-free. If governments can keep their farm sectors GM-free, they won't have to worry about losing access to the EU markets. The minute they start planting GM food or feed crops, they will have to set in place the costly product segregation systems required to comply with Europe's new traceability and labeling regulations, or they will lose access to Europe. This was one reason for the GM food rejections in Africa. Several years ago private importers in Europe said no to purchasing beef from Namibia, because that beef was partly raised on GM corn grown in South Africa. When Zambia officially reaffirmed its GM food aid ban in November 2002, it included fear of lost export sales to Europe as one of its reasons.

Fear of such export losses in Europe is now slowing down the technology even in some strongly pro-GM countries, such as Argentina. Since 1998, Argentina has made it a policy not to approve any new GM-varieties until those varieties have been approved for import into the EU (where there have not been any approvals since 1998). China, another early GM enthusiast, has similarly decided to hold back on the commercial approval of the planting of GM maize or soybeans or rice. China began its slowdown on GM crops after a shipment of soy sauce made in Shanghai from U.S. soybeans was turned away at the EU border because there might be a GM origin to the soy sauce. China, once a leader in GM crop development, is now hedging its bets by reserving the north east of the country as a GM-free zone for the production of high oil soybeans, hoping to cater to the growing world taste for non-GM soy.²¹

²¹ *AgraFoodBiosafety*, No. 99, March 4, 2003, p. 5.

Even the United States and Canada are slowing down some new GM crop technologies, such as GM wheat, for fear of losing export sales of wheat or flour in Europe, or in Japan. In May 2003, South Korean wheat millers warned U.S. wheat producers and government officials that consumers in Korea would boycott all U.S. wheat if GM varieties were introduced. Korean brewers and corn syrup manufacturers had earlier turned away from purchasing U.S. corn, which is known to be GM, switching to Brazilian and Chinese supplies instead. In Canada, the Wheat Board has estimated that 82 percent of its foreign customers do not want to buy GM wheat, and has asked regulators to take these market realities into account when deciding whether to approve GM wheat for commercial use.

In the extreme, as noted earlier, countries such as Canada and the United States could even decide that the only affordable way to retain its access to the EU and Japanese markets in the future will be to pull back from planting any GM varieties of soybeans, corn, or canola. GM cotton production can continue to spread in the U.S. and elsewhere, but GM food and feed crop production might go into decline.²²

Who Will Lose if the EU Wins?

The damaging trends described here will not have to be a calamity for most farmers in the United States. In the extreme, even if U.S. producers have to retreat from planting GM corn and GM soy, this would not prevent cotton farmers from continuing to plant GM seeds, and it would not require producers of other crops to make any changes at all. U.S. farm income would dip by several percentage points, because corn and soybean production costs would increase, and the spraying of insecticides and herbicides would also increase, perhaps with adverse environmental and occupational safety effects.²³ But accepting such costs might be seen, even by corn and soybean farmers, as preferable to embracing an expensive EU-style product segregation procedure to comply with traceability and labeling

²² This has not happened yet. A USDA National Agricultural Statistics Service survey of initial planting intentions has indicated that the share of U.S. corn acres planted to GM varieties could increase to 38 percent in 2003, up from 34 percent in 2002. The share of soybean acreage planted to GM varieties could be 80 percent, up from 75 percent the previous year. "Planting Predictions Show U.S. GM on the Up," *AgraFoodBiotech*, No. 102, April 15, 2003, p. 2.

²³ By one estimate, eliminating GM crops in the United States might imply a 3 percent reduction in annual net farm income. National Center for Food and Agricultural Policy (NCFAP), "Plant Biotechnology: Current and Potential Impact for Improving Pest Management in U.S. Agriculture," www.ncfap.org, 2002.

regulations. Paying the price to segregate, trace, and label would be a risky gamble for farmers who wanted to keep planting GM varieties, because products going to Europe with a GM label might still be rejected by private importers and never make it to the supermarket shelf. If the U.S. were to back away from planting GM corn or GM soybeans, the biggest commercial losers would be the companies that originally developed these crops, not the farmers currently growing them.

By a somewhat larger calculus, the biggest losers from a continued spread of European-style GM crop regulations will be poor farmers in the developing world, who will miss the opportunity to enjoy the future productivity gains that might otherwise come from this technology were it to be developed in a less stifling regulatory environment. If this new technology is killed in the cradle by over-regulation, farmers in poor countries in serious need of new crop options could miss a chance to escape poverty. They are in poverty today because of the low productivity of their own labor in farming, and GM crops provide one promising path for raising that productivity.

Poor farmers in tropical countries are facing unsolved problems from crop pests, crop disease, low soil fertility, and drought. GM crop critics try to claim that production constraints are not the cause of hunger in Africa (they try to point to everything else), but food production in Africa, on a per capita basis, has been declining for the last 30 years. And partly as a consequence, since 1975, the number of malnourished children in Africa has more than doubled to reach 30 million. Fifty million Africans suffer from vitamin A deficiency, and 65 percent of African women of childbearing age are anemic. Two-thirds of these poor and poorly fed Africans are farmers, so for them increased farm productivity would be the best escape from poverty and hunger. GM technologies hold out some promise for helping these poor farmers. Maize farmers in Kenya who lose as much as 45 percent of their crop to stem borers could be helped if given the chance to plant Bt maize. Cowpea farmers in Cameroon who lose more than half of their crop to pod borers and weevils could be helped if given a chance to grow Bt cowpeas. It might soon be possible to use rDNA techniques to provide these farmers with even more desperately needed drought-resistant or nitrogen-fixing food crop varieties.

Africa is a continent with large and growing problems of chronic malnutrition linked to low agricultural productivity. It can scarcely afford to see this technology abandoned because of the precautionary preferences of prosperous and well-fed people in rich countries. But that is the direction we are now moving. If we turn back the clock on GM technologies in rich countries, farmers there will still be prosperous and consumers will still be well fed. But if we turn back the clock on this technology in Africa, farmers there will still be impoverished and consumers are still hungry.

Options for the United States

U.S. officials are struggling to find useful short-term options for slowing a spread of EU-style regulations to the developing world. As the new WTO case against the moratorium goes forward, a longer-term policy vision needs to be set in place. For those who believe in the promise of this powerful new technology, one component of this longer-term strategy should be to invest more public money in the development of GM technologies specifically tailored to the needs of poor farmers in tropical countries. The United States Government made a mistake in the 1980s, when it skimmed on public investments in GM and entrusted the development of these crops almost entirely to the profit-making private sector. The private companies responded by developing a first generation of GM crops designed mostly to please their favorite customers: commercial farmers in Temperate Zone countries. This approach left the technology open to political attack, because it offered little or nothing to the most powerful final customers (risk-averse consumers in rich countries, who were being asked to accept something novel yet substantially equivalent to non-GM) and it also offered little at first to poor farmers producing subsistence food crops in tropical countries. And by relying so heavily on private international companies, this strategy attracted strong ideological criticism from dogmatic critics of corporate globalization.

In the growing late 1990s backlash against globalization in Europe, it was relatively easy for anti-GM activists (many of whom are also anti-corporate activists and anti-American) to oppose the United States-based Monsanto Company's first generation products such as herbicide-tolerant GM soybeans. The environmental benefits were hard to explain in a single sentence, part of the corporate motive (to facilitate sales of Monsanto's

Roundup herbicide) was transparent; and few poor farmers in the semi-arid tropics could grow soybeans. It would have been far more difficult for activists in Europe and elsewhere to build a political consensus against GM if the first applications had included an insect-resistant or disease resistant varieties of cassava, sorghum, cowpea, or something else of immediate value to the poor. Since private companies have few incentives to produce such varieties for poor farmers, this job must be done through public sector research institutions and international assistance agencies. Public sector leadership had been key to the earlier “green revolution,” which brought high yielding wheat and rice varieties to poor farmers throughout Asia in the 1960s and 1970s. To hope that a comparably successful “gene revolution” could be launched in poor countries without stronger public sector leadership was a mistake.

At this point the best hope for starting a GM crop revolution in the developing world may be to accept some short term blockage for GM food and feed crops, and work in the meantime for the continued spread of a key industrial crop – GM cotton. A number of important developing countries have been willing to approve Bt cotton for commercial planting in part because food safety fears (in Europe or elsewhere) are not a factor for this industrial crop. Farmers in South Africa, China, Indonesia, and India have all been allowed by national biosafety regulators to plant Bt cotton, and all report satisfying results in terms of lowered production costs, less bollworm damage, and reduced occupational exposure to hazardous insecticide sprays.²⁴

With luck, the continued success of Bt cotton in these major developing countries will whet the appetite of policy makers there for comparable GM gains in the food and feed crop sectors. Perhaps feed crops first, then food crops later. It will not be so large a step from Bt cotton to Bt corn, especially in Asia where corn is mostly used as animal feed. And at this point national biosafety regulators may feel more confident in their ability to approve GM soybeans and rice as well.

²⁴ Small-hold GM cotton farmers in the Natal region in South Africa are experiencing average yield increases of 25 percent, and a 80 percent decrease in the use of insecticide sprays. GM cotton is also being grown by 4 million small-hold farmers in China, where 5-10 percent yield increases are reported, together with a 50 percent decrease in insecticide sprays. See references listed in <http://www.cropgen.org/databases/cropgen2.nsf/?open>

Approval will be even more likely if by then the GM corn, soy, and rice varieties under consideration have emerged from publicly funded national or international scientific institutes, rather than from foreign corporations. National research institutes in China, India, and Brazil are currently at work developing precisely such technologies.²⁵ At some point, especially for large countries such as China or India, the potential domestic farm productivity gains from approving GM food and feed crops may come to outweigh the possible loss of future export sales for such crops. If one or two large developing countries – such as a China or an India – do go ahead with commercial approvals for major staple GM food or feed crops, and if they then see rapid increases in farm productivity as a result, the regulatory tide might begin to turn. This is likely to happen first in Asia rather than Africa, especially in countries such as China and India which are less dependent upon export sales to the EU, less dependent on EU development assistance, more independent of IGO initiatives, and less influenced by EU-based NGOs.

In the meantime, what practical steps might the U.S. government take to preserve space for a future GM crop revolution in the developing world? A first step is to restore the level of U.S. assistance to international agricultural research and development organizations. Governments in the developing world will pay more attention to the U.S. position on GM crops if this position is presented in the context of a more generous overall development assistance posture. In March 2002, President Bush provisionally announced a 50 percent increase (a \$5 billion increase) in annual U.S. core assistance to developing countries, to be administered through a Millennium Challenge Account, and later in 2002 the U.S. Agency for International Development listed “getting agriculture moving” as one of the key components of its new development strategy. USAID stated plainly that “U.S. leadership can help in restoring budgets of the agricultural research system.” At the 2002 World Summit for Sustainable Development (WSSD) USAID Administrator Andrew Natsios announced an Initiative to End Hunger in Africa that included a planned increase in U.S. science and technology funding in Africa from \$30.5 million up to \$53 million in FY 2003.²⁶ If Congress heeds this message and if U.S. contributions to international agricultural development and research are indeed restored, U.S.

²⁵ Robert Paarlberg, *The Politics of Precaution: Genetically Modified Crops in Developing Countries*, Baltimore: Johns Hopkins University Press, 2001.

²⁶ “Fact Sheet: USAID’s Natsios on plan to end hunger in Africa,” U.S. Department of State, 30 August 2002.

influence over the range of technological choices open to developing countries can perhaps be restored as well.