The Contested Governance of GM Foods: Implications for U.S.-EU Trade and the Developing World

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ABSTRACT

Genetically modified (GM) foods are widely produced in the United States and in two other Western Hemisphere countries (Argentina and Canada) but almost nowhere else. In most other wealthy industrial countries, including Europe and Japan, it is legal for farmers to plant these crops, but they voluntarily refrain from doing so because consumers are averse to eating GM. In most developing countries it is not yet legal for farmers to grow GM foods, on biological safety grounds. Yet biosafety is not the real issue. Poor countries are now trying to stay "GM-free" so as to retain the option of exporting food to Europe and Japan. New regulations in the EU on the labeling and traceability of imported GM foods and feeds will only increase the potential cost to exporters of planting GM seeds. The United States has considered challenging EU regulations as illegal under the WTO, and a serious trade conflict now looms. The EU, not the United States, is better positioned to prevail in this conflict. In international food markets, safety and labeling standards tend to be set by big importers rather than big exporters.

Introduction

Agricultural crops that have been genetically improved through rDNA, rather than through conventional plant breeding, were first commercialized in 1994. These genetically modified (GM) crops are attractive to farmers because genes have been inserted to provide insect resistance (so farmers do not have to spray as many insecticides on their cotton or corn plants) or tolerance to glyphosate herbicides (so farmers can control weeds in their soybean fields with less tillage and fewer, less toxic, and less persistent herbicide sprays). A substantial acreage is now being planted to these GM crops, but it remains surprisingly confined to just a few countries. As of 2001, the total area planted to GM crops world-wide was 52.6 million hectares (130 million acres), or roughly 1.3 percent of total global cropland area, and 99 percent of this total GM crop acreage was confined to just the United States (68%), Argentina (22%), Canada (6%), and China (3%). Table 1 shows the estimated global area planted to GM crops in 2001, country by country[1]:

[1] Table 1 shows legal plantings only. As mentioned below there have been noticeable illegal plantings of GM crops both in Brazil and India, but these plantings were too small up through 2001 (perhaps one million ha of GM soybeans in Brazil, and only 10,000 ha of GM cotton in India) to alter in any significant way the percentages shown in Table 1.

Table 1. Global Area of GM Crops in 2001: by Country

	(million of hectares)	(global percentage of planted hectares)
USA	35.7	68%
Argentina	11.8	22%
Canada	3.2	6%
China	1.5	3%
South Africa	0.2	<1%
Australia	0.2	<1%
Mexico	<0.1	<1%
Bulgaria	<0.1	<1%
Uruguay	<0.1	<1%
Romania	<0.1	<1%
Spain	<0.1	<1%
Indonesia	<0.1	<1%
Germany	<0.1	<1 %

Source: Clive James, 2001, Table 3, p. 7

Why such a tightly restricted global uptake of GM crops? In most of the industrial world (outside of the U.S. and Canada), GM foods have become unpopular with consumers, so it is understandable that farmers have chosen voluntarily not to grow them. But in most of the developing world, local consumer opposition is not the problem. In developing countries, governments have not yet given farmers official permission to plant any GM food or feed crops. The sticking point has usually been biological safety approval, yet on closer examination biosafety is not the real issue. Increasingly it is a commercial fear — the possibility of lost commodity export sales to the industrial world — that has slowed the approval of GM crops for planting. Export sales can be lost not only because of adverse consumer opinion in rich countries, but now also because of the prejudicial trade and regulatory policies toward GM products being adopted by some rich countries — particularly within the European Union (EU).

These prejudicial EU trade and regulatory policies toward GM foods and feeds are now becoming a source of political conflict with the United States. The U.S., which produces GM crops for export[2] as well as for home consumption, wants scientific demonstration of risk to be a strict requirement for any import-blocking action or for any mandatory GM labeling. The European Union and wealthy importers in East Asia want permission to enact blocking or labeling policies on a "precautionary" basis, without having to provide scientific evidence of risk. The resolution of this difference will be problematic in part because the multiple international institutions that have been empowered to harmonize international trade rules for GMOs are either internally paralyzed or at odds with each other.

In the discussion that follows we first show why this looming U.S.-EU conflict over trade policy has come to be so critical to the future uptake of GM crop technologies in developing countries. Then we consider the limited capacity of existing international institutions to resolve the conflict. Then we examine why the EU is more likely than the United States to prevail in this conflict, and what an EU victory would mean for poor farmers in the developing world.

I. Explaining the Slow Spread of GM Crops

The international GM crop revolution has so far been led by private sector seed companies, developing and marketing their transgenic varieties of farm crops as proprietary technologies. By contrast the earlier "green revolution" of the 1960s and

[2]The U.S. currently exports 30 percent of all the soybeans it grows, 74 percent of which will be GM in 2002. The U.S. also exports 20 percent of its corn, 32 percent of which will be GM in 2002. Since GM and non-GM varieties of soybeans and corn are routinely co-mingled together for bulk shipment at the very

1970s was led by public sector research institutes and philanthropic foundations, and the improved wheat and rice seeds of this earlier farm technology revolution were given out to farmers by government extension agencies free of charge, or at cost. Relying on private companies to develop and transmit GM crop technologies to subsistence farmers in poor countries is a strategy with obvious limitations. Most of the GM technologies developed by private seed companies so far (e.g., herbicide tolerant soybeans, and insect resistant cotton or corn) have been designed for sale to prosperous commercial farmers in temperate zone regions. For poverty-reduction purposes it would have been better to use public sector resources to develop rDNA improved varieties of the crops grown by poor farmers in tropical countries, such as pest resistant cowpeas, disease resistant cassava, nitrogen-fixing sorghum, or drought resistant millet. Even so, the slow spread of GM crops to poor countries is not a problem of inappropriate technologies. The GM corn, soybean, and cotton varieties currently available on the commercial market are potentially usable by large numbers of commercial farmers in poor countries, yet to date they mostly remain unused.

The proprietary nature of most commercially available GM crops is another possible explanation for their slow spread to developing countries. Many of the essential technical and biological building blocks used in rDNA crop development have been patented by the companies (or universities) that originally developed them. A frenzy of private corporate patenting of GM crop technologies in the 1990s led some observers to fear that GM traits might never reach poor farmers, or even researchers, in the developing world (Conway 1999). These IPR constraints do present serious complications, but once

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start of the U.S. food-handling chain, virtually all U.S. exports of soybeans (and soybean products) and corn (and corn products) could now be viewed from abroad as “GM contaminated.”

again they are not the principal reason for the slow uptake of GM crops in poor countries to date. The IPR claims made by companies or researchers in rich countries do not extend to poor countries if local laws have not recognized such claims, and plant variety protection laws in most developing countries are still either weak or non-existent. Innovations lacking national legal protection inside developing countries are considered to be in the public domain, free to be exploited internally or even exported commercially to other developing countries, so long as those other countries also have weak IPR laws.

If poor countries fail to provide strong IPR guarantees will the private international companies that have developed valuable GM technologies decide to hold them away? This too is an exaggerated fear. Private companies have strong market incentives to share IPR with local seed company partners or national research systems. They often must do so to gain access to local plant breeders capable of backcrossing the desired rDNA trait into local varieties, or to the local germplasm itself, or to an in-country infrastructure for field trials and biosafety testing. IPR sharing may also be the only way to gain links to well established in-country seed production and distribution systems, or public relations cover in the face of local anti-corporate critics. A number of private biotech seed firms, led by the Monsanto Company, have been ready to extend their proprietary GM crop technologies into the developing world even where little or no IPR protection is provided. The Monsanto Company has exposed itself to significant local piracy of its Bt cotton seeds in China as a price to be paid for gaining access to that nation's large commercial seed market. In the case of Bt cotton in India, Monsanto again went in without local IPR protection, but hoped to protect itself by introducing a hybrid variety that farmers and competitors could not replicate locally. In non-commercial cases including the development of Golden Rice for Asia or the transfer of a virus resistant

sweet potato to Kenya, Monsanto has been willing to allow royalty-free use of its IPR within the developing world. All four of the private companies holding patents on the technologies used in Golden Rice agreed promptly to make the IPR available within poor countries on a royalty-free basis. IPR constraints are therefore real, but not the primary reason poor country farmers have been slow to plant GM seeds (Paarlberg 2001).

The greatest constraint to a rapid uptake of GM crops in poor countries today is not inappropriate technologies, IPR restrictions, or even high seed costs. The greatest constraint is regulatory blockage within the developing world itself. As of July 2002, it is still not yet legal in most of the developing world for farmers to grow any GM food or feed crops. In all of developing Asia, not a single national government has given its farmers official permission to plant GM corn, soybeans, or rice. The only significant approvals given in Asia so far (in China, Indonesia, and India) have been for Bt cotton, a GM industrial crop. In all of Africa, only the government of South Africa has yet approved the commercial growing of any GM crops (Bt cotton and Bt corn), while all the rest of Africa is still officially off limits for GM. Much of Sub-Saharan Africa is still officially off limits even for imports of GM commodities. In May 2002 the government of Zimbabwe actually turned away a donation of 10,000 tons of U.S. corn because it could not be certified as GM-free, despite the fact that the country was facing a severe food emergency. All of North Africa and the Middle East is still off limits to GM. And in South America, while the government of Argentina was quick to go ahead with several important GM food and feed crop approvals in the mid-1990s (soybeans, maize, and cotton), these same Argentine authorities after 1998 imposed an effective freeze on new approvals. In several other important agricultural states in this region — including Brazil and Chile — no official GM crop approvals have yet been granted.

Why are so many countries failing to approve the planting of GM food and feed crops? Regulatory screening of new GM crops for food safety and for biological safety (biosafety) by national authorities began in the industrial world in the early 1990s, and this practice is now spreading rapidly to the developing world. When GM crops were first subjected to this screening in the United States, Europe, and Japan approvals were readily granted. The current pattern of non-approval in developing countries is therefore curious, given the normal inclination of poor countries to embrace safety and environmental standards which are lower, not higher, than standards of rich countries. Upon closer examination, we can see that the non-approval of GM crops in most poor countries does not reflect a higher regard in those countries for food safety or biosafety. It is usually biosafety screening that holds GM crops back from farmers, but suspected or scientifically demonstrated biohazards are seldom the real issue. The slowdown has come instead from a variety of non-scientific factors, including political and legal opposition from domestic and international NGOs, plus a growing fear of lost export sales should GM food or feed crops be given a commercial release.

In Kenya regulators have moved slowly on approving a virus resistant GM sweet potato even though the scientifically grounded biosafety concerns have been minimal. The probability of unwanted gene flow in this case was minimal because the sweet potato will be propagated vegetatively; it hardly flowers, and when it does the pollen is usually infertile. Contamination of wild relative species is not an issue in Kenya, given the complete absence of wild relatives (sweet potato originated in South America). Regulators in Kenya have moved slowly because of their own weak bureaucratic and technical capacity leading to timidity and delay, and in part because they know that a commercial release decision on any GM food crop will attract critical attention in the

media, from environmental NGOs, and possibly from important European donors (Paarlberg 2001).

In Brazil as well, legal and political opposition from NGOs rather than evidence of any specific biohazard has held up the commercial release of GM soybeans. When Brazil's national technical committee on biosafety (CTNBio) gave approval to five varieties of GM soybeans in 1998, environmental and consumer protection NGOs filed a lawsuit claiming that on constitutional grounds technical approval had to come instead from an environmental impact assessment institute within the environment ministry. A federal court judge accepted the lawsuit, and GM soybeans have yet to be released in Brazil. Once again, specific biosafety worries about glyphosate tolerant GM soybeans have mostly been missing. Farmers that grow these soybeans are able to use fewer, less toxic, and less persistent herbicides, and geneflow to wild relative species was not an issue in Brazil since there are no wild relatives of the soybean anywhere in the Western Hemisphere.

More recently international marketing uncertainties have emerged as a larger worry in Brazil. Export-oriented Brazilian agricultural and trade officials were initially enthusiastic about GM crops, but they had to reassess when consumers in some big importing regions such as the EU and Japan began showing preferences for non-GM soybeans and corn. Following the 2000 StarLink GM corn scare, some importers in Spain and Japan turned away from GM corn (from the United States and Argentina) and began offering a $6-$7 per ton premium to suppliers from countries such as Brazil which had not yet officially released GM corn.[3] Brazil cannot market itself in Europe and Japan as

[3]See "Brazil GM-Free Corn Exports Seen At Record," Reese Ewing, Reuters News Service via Agbios, 20 December 2001.

a safe source of GM-free soybeans, given that Roundup Ready soybeans have been smuggled in from Argentina and planted illegally for several years now over wide areas in southern Brazil (illegal planting of GM soybeans has also been noted in Peru and Ecuador). For corn however, the growing international market resistance to GM foods and feeds is now helping to hold up a commercial release in Brazil.

In India, the long delay before biosafety approval of GM cotton in 2002 was another case where specific biohazards were not at the center of debate. The environmental gene flow risks were few, since there were no identified non-cotton plants sexually compatible with cultivated Bt cotton. The largest policy concern in India was international corporate control over national seed markets, and the debate centered for a time on an (erroneous) assertion that Monsanto's Bt cotton seeds contained a "terminator" gene intended to deprive Indian farmers of their traditional right to save and replant seeds from their own harvest. Taking up this anti-corporate (especially anti-Monsanto) line, Indian NGOs and international NGOs used media campaigns, public interest litigations, and direct actions against GM cotton test plots (uprooting and burning the cotton plants) to intimidate regulators into going slow with approvals.

India's approval of Bt cotton does not necessarily presage quick approval for other GM crops. When considering GM food and feed crops Indian regulators are likely to continue taking a more restrictive approach. India is an exporter of oilseed meal (soybean, sunflower, and rapeseed) to overseas markets in Asia and the Middle East, and officials have come to value the option of promoting such exports as "GM-free" in hopes of gaining a price premium, so India may decide not to approve any GM oilseeds for

domestic production, or import.[4] A transgenic hybrid mustard variety has been undergoing field trials in India since 1995 (longer than Bt cotton) and still has not been approved. For international commercial purposes, India may say yes to GM industrial crops, but continue holding back on GM food or feed crops. This is a regulatory pattern that has now emerged in China as well.

China is an important case to examine when trying to explain the slow uptake of GM food and feed crops in poor countries. China had an early history of moving ahead aggressively with GM crops, paying only token attention to biosafety. China planted GM tobacco over a wide area in the early 1990s some years before its Ministry of Science and Technology had even promulgated an official biosafety regulation for GMOs. Not until China's Agriculture Ministry finally issued its Implementation Regulation on Agricultural Biological Genetic Engineering in July 1996 did China have on paper a detailed set of standards for the biosafety screening of GM crops (MOA 1996). Tellingly, this new regulation gave institutional authority over biosafety screening directly to a Committee on Safety within the Ministry of Agriculture. Governments that locate some or all of their GM crop biosafety review process within the agricultural ministry (e.g., the United States, Argentina, Canada, and South Africa) are usually governments with a history of quick approvals.

Initially this Chinese system did produce a steady stream of biosafety approvals for GM crop field trials, environmental release, and commercial release. Between 1996 and 2000 the Committee on Safety approved 45 GM plant applications for field trials, 65 for environmental release and 31 for commercialization (Huang, Rozelle, Pray, and Wang

[4] Apart from possible export market benefits, some Indian food industries have also welcomed the GM-free approach to oilseed policy as a way to keep competing foreign products out of the country.

2002). The only major GM field crop approved for commercial production was cotton, but a number of minor food and horticultural crops (green peppers, tomato, petunia, and an herbicide-resistant rice hybrid potentially useful for hybrid seed production) were also given final approval (Paarlberg 2001). It appeared at this point that while other developing countries were holding back, China was going boldly ahead.

Then later in 2000 the approval process in China abruptly slowed. GM corn had been under field trials in China since 1998, but approval for commercial release was not given, and a three-year effort by Monsanto to gain approval for a proposed joint venture GM corn production facility in Jilin province fell through. By September 2000, there was a backlog of nearly 200 products for various kinds of release, not yet approved by the Committee on Safety (He 2000). Initially this slowdown seemed to have some legitimate biosafety foundation, as GM corn applicants were told more information would be needed on pest population resistance problems, a concern because some of the same insects that might attack Bt corn in northeast China could also attack Bt cotton. But following the StarLink corn crisis, which saw traces of a GM corn unapproved for food use leak into U.S. export channels, trade concerns emerged as dominant. During the StarLink crisis from November 2000-June 2001, Japanese and Korean imports of U.S. (GM-contaminated) corn for starch manufacturing fell by roughly 35 percent (Lin, Price, and Allen 2001-02). Learning the lesson, Chinese officials began in April 2001 to signal informally that new commercial releases, especially for GM food or feed crops such as rice or corn, would be put under a temporary freeze. They cited international consumer resistance to GM foods as one reason for the freeze. In March 2002 this decision appeared to pay off for China when Korea bought 105,000 tons of non-GM corn from

China for human consumption, as an alternative to GM-contaminated U.S. or Argentine corn.[5]

Chinese officials have also been moved by commercial considerations toward a GM-free posture on soybeans, and Korea's taste for non-GM imports is once again a leading factor. Late in 2001, Korea purchased 300,000 tons of Chinese soybeans for food use, as an alternative to GM-contaminated U.S., Argentine, or Brazilian beans.[6] Earlier, a shipment of soy sauce produced in Shanghai from U.S.-grown GM soybeans was turned back by skittish EU importers. China's Ministry of Foreign Trade and Economic Cooperation, seeing this international aversion to GM products, imposed a ban in March 2002 on all foreign investment in the local GM crop sector, while continuing to welcome non-GM crop investments from abroad (Kyne 2002).

In China's case the explanation for this technology approval slowdown is not a lack of technical or bureaucratic capacity (China has plenty) or confusion caused by divergent donor pressures (China's biotechnology sector is not donor dependent) or direct action campaigns by anti-GM NGOs (they are not permitted to operate in China). Nor can we blame opposition party resistance (there are no opposition parties) or lawsuits and federal court injunctions (no independent judiciary) or consumer fears brought on by adverse media publicity (no press freedom) or confusion over ministerial jurisdiction (the Ministry of Agriculture has always had the lead). By process of elimination, we can conclude that China's recent policy shift toward greater caution on new GM crops is a response to changes in the international commercial market place. China wants to hold

[5]Reuters, March 29, 2002.
[6]Despite its failure since 1998 to give formal approval to planting GM soybeans, Brazil is not considered a GM-free source of supply by the private trade. As noted above, GM soybean seeds smuggled in from neighboring Argentina have been planted widely by farmers in the southern Brazilian state of Rio Grande do Sul.

onto its GM-free status for all major food and feed crops until importer policies and consumer preference trends in world markets have clarified.

China is not the only export-oriented developing country in East Asia that has recently slowed GM crop biosafety approvals in response to commercial export uncertainties. Thailand, which like China has financed a substantial public sector GM crop research program, decided in 1999 not to release any GM food or feed crops for commercial production, and in April 2001 Thailand even banned all GM field experiments inside the country. Thailand has also been trying to remain GM-free by restricting imports. In February 2002, Thailand placed 37 more GM plants (in addition 40 already listed) in an import prohibition category. Malaysia also had originally viewed biotechnology as key to its agricultural future and invested heavily in the development of its own GM crops, but in response to NGO pressures and altered international market incentives Malaysia is now holding back on any commercial release.

Even some of the original pioneer countries to commercialize GM food crop production have now effectively frozen new GM crop approvals in response to changing international market conditions. Argentine officials, who were at first aggressive in their approval of planting GM soybeans and corn, began in July 1998 to hold back on the release of any new GM crop that had not already been approved in the EU (Burachik and Traynor 2002). This was done to avoid the risk of bulk commodity shipments from Argentina being kept out of Europe on biosafety grounds. For similar reasons the U.S. and Canada are now both going slow in approving GM wheat, which could cause lost export sales if mixed into bulk shipments going to Korea or Japan. The Chair of the Canadian Wheat Board has estimated that the first major exporting country to begin

planting GM wheat could immediately lose one third of its foreign customer base.[7] Under pressure from frightened U.S. wheat growers and exporters, Monsanto announced in February 2002 that it was pushing back the commercialization of its new GM wheat varieties in the United States until 2004 or 2005 at the earliest.

Fears of export loss are thus emerging as the single greatest constraint on additional plantings of GM crops around the world, in both rich and poor countries. Because of adverse consumer views toward GM products in two of the world's wealthiest and most prominent food importing regions — Europe, and Japan/South Korea — all nations with food or commodity export aspirations have begun to feel it might be safest to remain GM-free.

II. The Contested Governance of GMO Trade

When private importers decide voluntarily not to purchase GM products, or not to source their purchases from nations known to plant GM crops, this must be recognized as an unobjectionable free market outcome. But when national governments begin using their sovereign powers to block commercial GM imports or require mandatory labels on GM versions of crops that are substantially equivalent to non-GM crops, the legality of such measures under international trade rules must be addressed.

Three international institutions can claim rule-making authority in the area of GM food and feed trade. The World Trade Organization (WTO) claims authority because it has traditionally set the rules that govern international trade in all products, not just GM products. The Cartagena Biosafety Protocol (BP) claims authority because it is an international agreement specifically negotiated in 2000 to cover trans-boundary

[7] Michael Raine, "Seed Growers See Little Good in GM Wheat," *The Western Producer*, 17 January, 2002.

movements of living GMOs (LMOs). And the Codex Alimentarius Commission in Rome claims authority because it has been assigned responsibility for providing technical judgments on food safety issues to the WTO. Divergent U.S. and EU preferences have complicated rule making within each of these venues.

The SPS and TBT Agreements within the WTO

The WTO has a bias toward unrestricted trade, yet the Sanitary and Phytosanitary (SPS) Agreement within the WTO does permit governments to block imports in some cases, if the purpose is to protect human, animal or plant health. At the same time a Technical Barriers to Trade (TBT) agreement permits other trade restrictive actions such as packaging, marking, or labeling requirements, if the purpose is to maintain product quality or uniformity. These two agreements were negotiated in the 1980s and early 1990s, before any GM crops had yet been commercially released. In fact, the WTO still has no separate set of rules for GM products; much like the United States, it chooses to view rDNA as a production process rather than a product trait, and hence off limits for trade policy.

Under the SPS agreement nations are permitted to use import restrictions to pursue any level of health or environmental protection they wish, but these import restrictions must be appropriate to that standard, they must be consistent with internal policy so as not to discriminate against imports, and they must be based on a sound scientific assessment of risk (Roberts 1998). Article 2.2 of the SPS agreement states that measures taken by states must be "based on scientific principles" and may not be maintained "without sufficient scientific evidence." The SPS Agreement acknowledges that science may not be able to identify all relevant risks easily or quickly, so under Article 5.7 it does

allow states to employ import restrictions temporarily if conditions of scientific uncertainty prevail. Article 5.7 states, "In cases where relevant scientific evidence is insufficient, a Member may provisionally adopt sanitary or phytosanitary measures on the basis of available pertinent information…" Yet this article also states, " In such circumstances, Members shall seek to obtain the additional information necessary for a more objective assessment of risk and review the SPS measure accordingly within a reasonable period of time." (WTO 1994a). So, if scientific evidence of risk is absent, the WTO allows import restrictions on a *provisional* basis for a reasonable time pending further investigation, but it does not allow import restrictions on an open-ended "precautionary" basis.

European advocates of a more precautionary approach are now seeking leeway within the WTO to block or label GM imports on an open-ended basis for as long as necessary to prove that a GMO is safe for human health and the environment. According to recent WTO (and U.S.) regulatory culture, this approach asks too much from experimental science. Controlled scientific experimentation is good for demonstrating the presence of specifically hypothesized risks, but no amount of experimentation can demonstrate the absence of all risk.[8] Precautionary principle advocates have also demanded, at times, protection against risks that might arise from an unintended use of a new technology (e.g., use of rDNA by bioterrorists). If such unintended uses were admitted into the risk screening process, then almost all of the powerful technologies in

[8]There will always be an Nth hypothetical risk not yet tested for, or an Nth year of hypothetically risky exposure. Proof of safety is also impossible to establish against unexpected or "unknown" risks (e.g., risks that have not yet been hypothesized for testing, because the technology is so new). The only way to protect completely against unknown risks is never do anything for the first time.

our modern society (certainly including fuel-laden commercial jet aircraft) would have to be disapproved and taken off the market.

EU labeling preferences for GM foods are also increasingly at odds with WTO rules. The TBT (Article 2.1) does not permit technical regulations such as labels to be required on some products if "like products" remain unlabeled. Traditionally within the OECD, and also originally within the EU, approved GM varieties of corn and soybeans were considered for food safety and labeling purposes to be "substantially equivalent" to conventional varieties. More recently European critics have been asserting that GM varieties are *not* "like products" under Article 2.1 of the TBT. Article 2.2 of the TBT is also at odds with EU preferences, since it states that regulatory measures which have the effect of disrupting trade must be necessary to the fulfillment of a legitimate objective, and must not be more trade-restrictive than necessary (WTO 1994b). EU officials argue for labels based on the consumer's "right to know," but consumer desire for more information *per se* has not been viewed traditionally within the WTO as a legitimate objective under this provision of the TBT agreement.

The 2000 Cartagena Biosafety Protocol (BP)

Drafted within the Convention on Biological Diversity (CBD), the 2000 BP is nominally intended to protect biological diversity, yet it is an agreement that focuses almost entirely on international trade rules (on the "trans-boundary movement" of living GMOs, known as LMOs). The assumption behind the BP was that poor countries lacking biosafety capacity within their borders would need stronger means at the border to stop potentially dangerous LMOs from moving into their internal biosystems. The terms of the BP were originally drafted to resemble the Basel Convention on transboundary

movement of hazardous wastes (Gupta 2000), and under the BP — just as under the Basel Convention — importing countries were offered new options for blocking or requiring labels on trans-boundary product movements.[9]

Under the BP's Advance Informed Agreement (AIA) procedure, governments that import LMOs intended for "environmental release" for the first time (e.g., GM seeds or GM plant materials) are permitted to require prior notifications from exporters regarding biosafety. For LMO shipments intended for direct use as food or feed, or for processing, the AIA provision does not apply, but potential exporters are nonetheless obliged to provide timely information about such LMOs through a newly created international Biosafety Clearing-House. Labels are required on shipments identifying them as possibly containing LMOs and as "not intended for intentional introduction into the environment." The Conference of Parties of the CBD has been instructed to produce more precise identification requirements for such LMO shipments within two years after the BP comes into force.[10]

The BP endorses scientific risk assessment, but it also endorses "the precautionary approach" under circumstances of scientific uncertainty. In the body of the text it states repeatedly (in Articles 10 and 11) that "lack of scientific certainty due to insufficient relevant scientific information and knowledge" should not prevent states from taking precautionary import actions against LMOs (CoP CBD 2000). The difference between this precautionary approach and the evidence-driven SPS agreement was obvious to all at

[9] The CBD was negotiated primarily by representatives of national environment ministries, so the concerns of national trade ministries, science and technology ministries, and agriculture ministries were conspicuously marginalized in the final outcome. In part because of its emphasis on the natural environment, the BP also explicitly excludes governance of trade in rDNA pharmaceuticals for human use.
[10] The BP was opened for signature in May 2000, and will go into force after 50 countries have ratified. As of June 2002, 20 countries had ratified. UNEP is promoting ratification by offering biosafety training to developing countries on the condition that they ratify.

the time the BP was being negotiated, and the preamble to the BP sought to resolve these differences by stating that the BP "does not imply a change in the rights and obligations of a Party under any existing international agreement" (such as the SPS Agreement in WTO). But the preamble also asserts that the BP is not to be considered "subordinate" to those other agreements. Exporters of GM crops, led by the United States, fought hard to insert a so-called "savings clause" into the operational part of the BP upholding the authority of existing WTO rules, but these exporters were blocked from doing so by the EU and by most developing countries.[11] The capacity of the U.S. to influence these BP negotiations was weakened by the non-participation of the U.S. in the CBD, owing to a Senate failure to act when the CBD was submitted for ratification in 1993.

The Codex Alimentarius Commission

The Codex is an intergovernmental body established in 1962, responsible for managing a joint FAO/WHO Food Standards Programme. So far the Codex has developed more than 200 food standards for commodities and more than 40 codes of hygiene and technological practice. The Codex has a nearly universal membership of 163 member states (Borgen and Veggeland 2002). Prior to 1995 the Codex was neither a powerful nor a prominent instrument of global governance, since its standards had no force in international law. All this changes under the new SPS agreement in the WTO, which entered into force on January 1, 1995. In an annex to the SPS agreement the Codex is given responsibility for maintaining the international standards relevant to food safety

[11] *Inside U.S. Trade*, Vol. 18, February 4, 2000, p. 25.

that should be recognized by the WTO.[12] Henceforward, it would be standards setters in Codex that might determine whether an SPS barrier imposed by a state was sufficiently science-based to be legal under WTO rules.

Since taking on this important new responsibility the character of the Codex as an institution has changed dramatically. Winning a trade disputes in the WTO can now require that an argument first be won in the Codex. Accordingly, the activities of the Codex are now politicized along traditional trade interest lines. Whereas Codex meetings before 1995 were attended primarily by low level technocrats with backgrounds in food science and food safety, now these meetings are also attended by politically instructed delegates from ministries of trade and industry, finance, and foreign affairs (Borgen and Veggeland 2002). Debates within Codex over safety standards for growth hormones used in beef production became highly politicized in the 1990s, in the context of a U.S. challenge in the WTO to an EU hormone ban. Accusations of political arm-twisting (and actual vote buying) in that case have led the Codex now to seek ways of reaching decisions without open votes.

To date there are no agreed standards in Codex for any GM foods. A Codex food standard can be adopted only after eight stages of consultation have been completed, a slow process that can generate paralysis if the U.S. and the EU disagree. GM issues are currently being considered inside the Codex by a number of separate bodies, including a Committee on Food Labeling, a Committee on Food Import and Export Certification and Inspection Systems, a Committee on General Principles, and also by a special Task Force

[12] Annex A states: "For food safety, the relevant standards, guidelines and recommendations are those established by the Codex Alimentarius Commission relating to food additives, veterinary drug and presticide residues, contaminants, methods of analysis and sampling, and codes and guidelines of hygienic practice."

on Foods Derived from Biotechnology.[13] Within the Food Labeling Committee, the U.S. delegation has recently supported a Codex guideline for mandatory labeling only when the biotech-derived foods differ significantly from corresponding conventional foods in terms of composition, nutritional value, or intended use, while the EU supports draft language that would also permit mandatory labeling based on methods of production, including rDNA methods, even if there is no detectable presence of transformed DNA or protein in the end product (GAO 2001). As of May 2002, the Labeling committee review of GM food issues remained only at an early stage (at step 3) in the 8 step Codex approval process. Disagreements persisted over issues of purpose, scope, definition of terms, labeling provisions, threshold levels, exemptions, and label declarations.[14]

The Codex Task Force on Foods Derived from Biotechnology did reach agreement, in March 2002, on a final draft document on "Principles for risk analysis," a document that will eventually be submitted, with other work, to the full Commission for adoption probably in July 2003. The Principles in this document do not resolve the key disagreements that persist between the U.S. and the EU on risk assessment, as they were defined broadly enough to be acceptable to all.

Struggling over the Precautionary Principle

Within each of these intergovernmental settings, a struggle continues between two significantly divergent approaches to the problem of food safety and biosafety risk analysis for GM foods and crops. The traditional approach had been to require a scientific

[13] France recently proposed to the Committee on General Principles that yet another working group be formed, tasked to develop a definition of traceability for use by Codex. European delegations supported this French proposal but it failed to gain support from most non-European delegations.
[14] *Food Traceability Report*, May 13, 2002, Vol. 2, No. 19.

demonstration of risk to human health or the environment before imposing mandatory regulations or labels on GM products. This traditional approach was originally supported by the EU as well as by the United States, but the EU is now calling for a standard not requiring scientific demonstration of risk. Invoking their newly mandated "precautionary principle," EU officials since February 2000 have been asking all international institutions to relax the level of scientific certainty needed before treating products as dangerous, so as to take into account circumstances where the available data may be insufficient, imprecise, or inconclusive. Since December 2000 EU officials have also been to admit "multi-disciplinary" approaches and "civic" participation into the risk assessment process, considering in advance the "public acceptability" of final regulatory judgments (Vogel 2001, p. 29; Coleman 2002). EU officials are even asking organizations like WTO and Codex to begin considering risks to "social values" as legitimate grounds for regulation (Isaac 1999). In December 2001 the EU tabled a proposal to the WTO agricultural negotiations that would permit mandatory labeling for process and production methods (PPMs) in instances where "societal values or concerns" were at stake.[15]

By proposing to give formal weight to public acceptability and societal values when doing risk assessments, the EU is inviting still more politicization of this technical process. EU officials are doing this not so much to protect the public as to protect themselves from the public (Vogel 2001). Regulators in Europe have recently done such a poor job of noticing some serious food safety risks unrelated to GM, such as mad cow disease and dioxin in chicken, that they are responding to GM fears now by abdicating

[15] *Inside U.S. Trade*, "EU Paper Calls for WTO Approval for Process-Based Labeling Schemes," December 14, 2001, p. 13.

responsibility. It is safer to hand the decision process over to public opinion. Bringing the public into the approval process at the outset is not likely improve the technical quality of a regulation, but it certainly helps protect the regulators from accountability if anything later does go wrong. Mandatory labels on GM products also help European regulators escape their responsibilities for making technical judgments; once labels are in place, individual consumers will be fully implicated in their own decisions to eat GM, again diluting the responsibility of regulators.

Divergent U.S. and EU approaches to GM risk assessment have thus provoked indecision and crisis within all existing global governance structures. A single uniform international standard for regulating trade in GM products is not likely to emerge through these global institutions. A final decision is more likely to emerge now from a direct test of strength between the U.S. and the EU.

III. The Looming U.S.-EU GMO Trade Conflict

Prior to 1998, U.S. and EU regulatory standards regarding GM crops were not so highly divergent. GM food safety and biosafety crop approvals were almost as routine in the EU as in the United States. The EU approved fourteen different GM plant products prior to 1998, including 4 GM corn varieties, 3 GM canola (rapeseed) varieties, and 1 GM soybean variety.[16] Like U.S. regulators, EU regulators originally viewed GM corn and soybeans as "substantially equivalent" to conventional varieties of corn and soybeans, implying that they did not need a separate "GM" label.

[16] This record of approvals has continued at the technical level inside the EU. The EU Scientific Committee on Plants (SPC) has now issued opinions on 17 transgenic crops under EU Directive 90/220, with only one unfavorable opinion due to insufficient information (James 2001).

This original approach requiring scientific evidence of risk became politically unacceptable in the EU following the 1996 mad cow disease (BSE) crisis. It was an accident of bad timing that GM foods came onto the market in Europe just as this BSE crisis was undercutting the credibility of official food safety regulators, who had originally told consumers it was safe to eat meat from BSE diseased animals. Having learned not to trust EU authorities on the safety of BSE meat, consumers after 1996 began to mistrust authorities on GM products as well. Consumer confidence was further undermined when GM foods came under attack from a variety of anti-corporate and anti-globalization European NGO activist groups, led by Greenpeace, and by green party leaders that follow the lead of such groups. The fact that so many GM crops were being introduced by profit making U.S. multinational corporations also made them an easy target in Europe. Prompted by such factors to mistrust GM foods, EU consumers began shopping around for non-GM sources of supply. Retail food chains began competing for customers by pledging not to stock any GM products, and this in turn signaled to EU farmers that it might be a mistake to plant GM crops. Eventually these market reactions were followed by an official policy change. Pressured by member governments, the EU Commission in Brussels decided in 1998 to place a de facto moratorium on the approval of any new GM crops for commercial production and consumption, pending the development of a more “precautionary” regulatory environment.

The GM crop approval process in the EU has always been prone to politicization. Under EU rules it is the role of a council of member country ministers either to adopt or reject, by a qualified majority vote, any EU Commission proposal for a new GM crop release. By 1998, a temporary blocking minority of five EU member states — Denmark, France, Greece, Italy, and Luxembourg — had said they did not want any more GM crop

approvals until tighter regulations were in place. Three other countries — Austria, Belgium, and Germany — subsequently took a similar stance.[17] The EU Commission, sensing this strong political resistance from member states, decided in 1998 to stop submitting any new GM crop release proposals to a council vote. This informal 1998 moratorium on new GM crop approvals in the EU has continued to the present day. There are now a dozen or more new GM crop varieties stuck in the approval pipeline; all have been successfully screened by the EU Scientific Committee on Plants but they have not been approved for commercial release. The moratorium is now fueling two separate GMO trade conflicts between the EU and the United States.

First, the moratorium has directly blocked some U.S. farm commodity sales to the EU. Bulk shipments of corn from the U.S. are likely to contain GM varieties not yet approved in the EU (because of the approval moratorium) so since 1998 the EU has not been importing any corn from the U.S., at a commercial cost to U.S. exporters of roughly $200-300 million a year.

Second, in its efforts to get the moratorium lifted and restart the approval process, the EU Commission is now proposing new regulations that worsen the potential trade loss for exporters. Hoping that reluctant EU governments will consent to restart approvals if tighter labeling rules are in effect, the EU Commission in July 2001 proposed ambitious new regulations concerning "traceability and labeling of genetically modified organisms and traceability of food and feed products produced from GMOs" (Commission of the European Communities 2001). These new regulations, which will come into effect some time after October 17, 2002, following approval by both the EU

[17]A number of these governments also invoked a safeguard clause (Article 16) under Directive 90/220 to prohibit the marketing of already approved transgenic products within their borders, an action the EU

Parliament and the Council, are designed to enhance consumer confidence in GM foods by providing on labels more detailed and verifiable information about the GM content of foods and feeds, and also by facilitating an official withdrawal of products should an unforeseen risk to human health or the environment arise. The Regulations require labels for all foods and feeds that contain GMOs (above a 1% threshold) or are *derived* from GMOs, even if the transformed DNA or the associated proteins are no longer detectable through physical testing.[18] This means GM labels will be required for processed as well as unprocessed foods, for margarine and soybean oil as well as for soybeans or soybean meal.[19]

To help in the enforcement of this tighter labeling rule, the new EU regulations also call for procedures to ensure the "traceability" of all GM foods and food ingredients through the marketing system. This traceability requirement will oblige all individual "operators" in the food chain (seed salesmen, farmers, transporters, grain handlers, commodity refiners, food processors, wholesale dealers, retail chains) to maintain a documentary record for five years of all the individual GMOs that have passed through their hands, where they came from, and to whom they were sold or delivered. With such records available, potentially dangerous GMOs can be more quickly removed from the

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Commission viewed as scientifically unjustifiable.

[18] The EU has had rules on the labeling of GM foods ever since its January 1997 Novel Foods Regulation (258/97/EC), which required foods to be labeled GMO if the food contained materials not present in its non-GM counterpart, and if these materials were possibly consequential for the health of certain groups of people. This lax rule was tightened somewhat after 1998 to require that all foods containing detectable rDNA-derived materials above a level of 1 percent per ingredient must be labeled as containing "GM" ingredients. This EU labeling system, which is about to be overturned, imposed minimal disruptions on trade, since it did not apply to GM animal feeds, to meat products grown with GM animal feeds, or to GM foods that had been sufficiently processed to make the rDNA-derived materials no longer detectable through physical testing.

[19] Tellingly, this new EU labeling policy does not require GM labels on wines or cheeses made using GM enzymes, a process widely employed in Europe.

food supply in an emergency. The Commission hopes this proposal will satisfy consumer groups in Europe, such as the European Consumer Organization (BEUC) and the European Organization of Consumer Cooperatives (EuroCoop) that have demanded tightened labeling and traceability as a precondition for accepting a restart of the blocked GM crop approval process.

It is interesting that the EU Commission says it did not promulgate this new labeling and traceability (L&T) regulation because it feared any GM products currently on the market were unsafe. To the contrary, EU Commissioner for Health and Consumer Affairs David Byrne stated that the GM crop varieties currently approved by EU regulators for the market posed no greater food safety or environmental threat than the corresponding conventional varieties. Commissioner Byrne even described EU consumers who continue to fear GM foods as "irrational."[20] Hoping to restart the approval process, the EU Commission in the fall of 2001 released an official summary of the results of 81 separate scientific studies, funded by the EU and involving over 400 scientific teams from many parts of Europe, none of which found any evidence of new risks to human health or the environment from GM foods.[21] Thus the EU Commission admits that its new L&T regulation will not give EU consumers anything they *need* to know. The new labeling policy is designed instead for political reasons to give EU consumers something they *want* to know. A Europe-wide survey in December 2001 revealed that 95 percent of citizens now want to know whether they are eating GM foods

[20]"A European Approach to Food Safety and GMOs." Speech by Mr. David Byrne, EU Commissioner for Health and Consumer Protection, *Europa*, 12 October 2001.
[21] http://europa.eu.int/comm/research/quality-of-life/gmo/index.html

or not, so they can — if they wish — chose not to eat them.[22] The EU Commission hopes that if consumer choice is guaranteed through L&T, political space will be opened to re-start the new GM crop approval process.

This hope may be naïve. The proposed L&T regulation has not so far helped to restart the EU approval process. In October 2001, shortly after the regulation was promulgated, the EU Council of Environmental Ministers met and once again rejected lifting the moratorium. A majority of these Ministers said they would not consider acting until the new L&T rules were actually in place and operating. Other member governments have hinted that they will block a restart of approvals until strict environmental liability legislation is also in place. All this implies considerable further delay, since the L&T rules will not start working until they have been approved by the Council and the European Parliament and approved by member states, a process that could stretch out to several years.[23] In June 2002, the Environment Committee of the Parliament, dominated by Socialist and Green members, actually voted in favor of tightening the L&T regulation, lowering the threshold of acceptable contamination to 0.5%, requiring GM labels for meat and dairy products from animals fed with GM feed, and eliminating options to list multiple GMO varieties that a shipment "may contain" (requiring instead specific identification for the varieties in each shipment). The Commission and most Center-right politicians will now have to work hard to block such amendments, or the L&T rule will become even less friendly to GM technologies.

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[22] See www.checkbiotech.org, 19 December 2001, "Europeans Want Right to Choose on GMOs." Labeling does not have to be mandatory. If some consumers want the choice of avoiding certain unproven risks or some disliked production processes, those consumers should be asked to pay for the costly market segregation needed to ensure this avoidance. This is the approach currently used in the United States to give a minority of more demanding consumers the choice of purchasing organically grown foods, and it could be used equally well to provide the choice of purchasing "GM-free" foods.

[23] *Inside U.S. Trade,* April 5, 2002.

GM crop producers and exporters in countries such as the United States thus have something close to the worst of both worlds. An informal EU moratorium on new approvals will continue, and now a new regulation will go forward imposing strict L&T rules on all GMOs coming into the EU market. The trade costs of this outcome to the United States could be significant. So far, the commercial cost of the continuing moratorium has been estimated at $200-300 million per year in lost U.S. corn sales to the EU. This is irritating, but on balance not such a huge blow to U.S. grain and feed farmers, who can continue to export $14 billion dollars worth of grain and feed every year despite a loss of the relatively small EU corn market (USDA 2002).[24] While U.S. export losses from the moratorium have so far been quite small, potential trade damage from the EU Commission's L&T regulation could be quite large. U.S. agricultural trade sources in 2001 estimated informally that the new EU regulation could jeopardize $4 billion worth of U.S. food and farm exports every year. These sales could be lost either at the EU border if U.S. exporters are unwilling to document the segregation of all GM from non-GM foods, or sales could be lost within the EU market if consumers decided not to buy anything labeled "GM."

Should the U.S. consider embracing an L&T system of its own in hopes of retaining access to the EU market? The costs of imposing L&T on U.S. agriculture would be considerable. Instituting L&T in Europe will be mostly a paperwork exercise, because almost no GM crops are grown there, but within the U.S. a strict physical segregation of

[24] The EU corn market is small because under the protection of the Common Agricultural Policy bulk shipments of U.S. corn were never allowed freely into the EU in the first place. Also, the moratorium did not compromise either U.S. exports of processed corn products (like corn gluten) or soybean and soybean product sales. The U.S. has managed to continue its bulk shipments of soybeans to the EU, even those shipments contain GM varieties, in part because the U.S. has intentionally held back on approving any new GM varieties for planting in the U.S. if those varieties have not yet been approved in the EU.

all GM from all non-GM farm products would be needed to make an L&T system credible. U.S. farmers and food industries would have to invest in a costly parallel handling system with segregated bins, elevators, trucks, and processing lines. In countries such as the U.S. or Canada, moving to this kind of product segregation could increase commodity costs by 15-50 percent, and final retail food prices by 9-10 percent (GMA 2001). The economic welfare losses at home would exceed the value of the exports being defended abroad, and the defense might not work in any case since products entering Europe with a "GM" label would likely be shunned. In view of such anticipated costs, the Government of Canada has officially branded the new EU regulation as "discriminatory, very costly, unworkable, and unenforceable" (Government of Canada 2001).

Food industry and farm advocates in the United States see both the informal EU moratorium and the new L&T regulation as clear violations WTO trade rules. The L&T regulation seems to be a TBT agreement violation under both Article 2.1 ("like products") and Article 2.2 ("legitimate objective"). One 20 page comment brief submitted to the U.S. International Trade Commission by a law firm representing U.S. food industries has argued that mandatory GM labeling on processed foods, where no traces of novel DNA and/or protein are detectable, clearly violates the "like products" rule of the TBT (Keller and Heckman 2000). The government of Australia agrees (Government of Australia 2001), as do respected business and trade law experts in Canada (Isaac 1999). The informal moratorium seems even more clearly to be a violation of the SPS Agreement, because it restricts imports while preventing the operation of science-based risk assessment procedures, and because it violates the WTO guarantee against quantitative trade restrictions.

The United States has not yet brought a formal WTO case against either the moratorium or the L&T regulation. The L&T regulation cannot be challenged until it is actually in force, but U.S. officials have openly threatened a case against the moratorium. In December 2001 both U.S. Trade Representative Robert Zoellick and U.S. Under Secretary of State for Economic Affairs Alan Larson raised the possibility of a WTO challenge, and told reporters that U.S. patience was running out. In January 2002 Zoellick then directly warned his European counterpart, EU trade commissioner Pascal Lamy, that the Bush Administration in the next few months would seriously consider a possible challenge to the moratorium in the WTO. Lamy's response was to say that "[L]itigation in this field would be immensely counterproductive, in that it would be seen as a challenge to consumer fears and perceptions." Zoellick's response later in February was to assert (but with no deadline) that if there is not EU movement to restart the approval process, the U.S. "will take WTO action."[25]

Such threats not withstanding, a formal WTO challenge would probably not alter either the EU moratorium or the proposed L&T regulation. There are almost no political forces working inside the EU to support a policy change on these issues via the WTO. The EU Commission wants the moratorium lifted, but not in the context of a coercive WTO challenge initiated by the United States. If the U.S. were to challenge the moratorium in the WTO, the Commission might be forced to begin defending it, so as to avoid any appearance of yielding to American pressure. The powerful European biotechnology industry has been hurt by the moratorium, but most biotechnology firms in Europe are nonetheless opposed to a WTO case, fearing it would only inflame European public opinion against all GM products. Even U.S. biotechnology firms, including

[25] *Inside U.S. Trade*, February 1, 2002, p. 24 and March 22, 2002, p. 29.

Monsanto, have hesitated for this reason to call for a direct challenge to the moratorium through the WTO.[26]

A U.S. challenge to the L&T regulation in the WTO might be even less promising. When the new regulation comes into effect it will be a "Regulation of the European Parliament and of the Council." Under the EU's new co-decision procedure (established by the Treaty of the EU in 1993) the European Parliament shares legislative power with the Council in a number of areas including public health, consumer protection, and the environment (Vogel 2001, Davis 2002). Using the authority of the WTO to challenge the will of the European Parliament will be a difficult prospect. The WTO can perhaps constrain the EU Commission (a technocratic body) or even at times the Council (a political body), but the actions of a directly elected democratic body such as the European Parliament are far more difficult for the WTO to challenge.

The United States learned this lesson when it tried in 1996 to use WTO rules to challenge an EU ban on hormone treated beef (Davis 2002). This EU ban violated the WTO's SPS agreement because it was not supported by scientific evidence of risk — much like the current GM moratorium. At the insistence of the U.S. and Canada, a WTO dispute settlement panel was established to examine the beef hormone ban in 1996, and this panel concluded in 1997 that the ban was inconsistent with the SPS agreement. A WTO Appellate Body subsequently drew the same conclusion, and in February 1998 a formal WTO Dispute Settlement Body ruled conclusively against the EU ban. But the ban was popular in Europe and had been endorsed explicitly on several occasions by the European Parliament. In light of these political realities, the EU Council decided to fulfill its WTO obligations not by lifting the ban, but instead by allowing the United States and

[26] *Inside U.S. Trade,* February 15, 2002, p. 11.

other complaining exporters to retaliate against an equivalent value of EU exports. The outcome for the United States in this case was thus a legal victory in the WTO, but no favorable change in EU policy. A U.S. challenge to the L&T regulation through WTO could produce an equally empty victory.

Even if a WTO challenge did force the EU to accept a formal loosening of its L&T regulation, private European importers and retail food chains could still opt to shun food purchases from the United States voluntarily, knowing them by national origin to be "GM-contaminated." This would be a costly option for EU importers, particularly if the shunning extended to include animal feeds, since non-GM sources of high protein animal feed are currently in short supply on the world market. But with sufficient price premiums, GM-free sources of high-protein feed would in time emerge. Farmers within the EU itself might eventually be able to provide the non-GM supplies that European livestock industries could demand. An exclusion of imported GM corn and soybeans from the EU could prove politically convenient to Europe's Common Agricultural Policy (CAP), by giving the high-potential farms certain to emerge in central and eastern Europe an import-substituting production opportunity.

IV. The Uncertain Global Future for GM Crops

Two values are at risk in the looming U.S.-EU conflict over GMO regulation. Directly at risk is a mutually convenient flow of trans-Atlantic food and commodity trade. Indirectly at risk is the future opportunity for farmers in poor countries to adopt GM crop technologies.

Avoiding a major disruption of trans-Atlantic GMO food and feed trade will require some form of self-conscious regulatory cooperation between the U.S. and the EU. This might take one of three different forms in the abstract: mutual recognition of regulatory systems, explicit regulatory harmonization, or informal mutual regulatory adjustment (Lawrence, Bressand, and Ito 1996). The *mutual recognition* approach requires a formal international agreement in advance, not to place restrictions on product trade despite differing internal product regulations. This pro-trade and highly decentralized approach to regulatory cooperation can work for familiar products traded among similar countries enjoying high levels of political trust. Within the EU itself a mutual recognition agreement allows wine produced in any EU country to be sold in all 15, even where production standards differ between countries. Mutual recognition has even worked for some products between the U.S. and the EU. In 2001 this approach was adopted across the Atlantic for medical devices and telecommunications equipment, an arrangement that is expected to save industry and consumers as much as $1 billion a year (UNDP 2001). For GMO trade across the Atlantic, however, this mutual recognition approach has less promise. Within Europe GMOs are not a familiar or trusted product, and the U.S. approach to GMO regulation, because it does not embrace Europe's precautionary principle, is politically unacceptable.

A second possible approach to regulatory cooperation would be *explicit regulatory harmonization*. This would require agreement on a single international standard for the approval of GMOs, plus agreement on a single standard for the labeling of food and feed products containing or derived form GMOs. This approach has limited promise as well (Victor and Runge 2002). Agreement on a single international standard is unlikely in the case of GMOs, given the entrenched differences between the U.S. and the

EU, and also between the WTO and the BP. The Codex, because of its traditional weakness and increasing internal politicization, may not be able to bridge these differences.

A third possible approach, calling for formal or informal *mutual regulatory adjustments* short of formal harmonization is the most promising. In order to preserve a mutually convenient high volume of trans-Atlantic food and farm commodity trade (especially in animal feed) the U.S. and the EU might formally or informally agree to move their existing regulatory systems toward each other slightly. The EU might accept over-reporting of GMOs (the "may contain" approach) and agree to modify its L&T regulation to accept a threshold of GMO contamination above 1 percent, making the task of product segregation more affordable for the United States and other exporters. The United States could at the same time agree to impose at least some mandatory GM labeling using those higher thresholds, for at least some foods and feeds. The U.S. might agree to adopt mandatory GM labeling for packaged foods and food commodities and even feeds at a 5 percent threshold, if GM content is detectable through physical testing (e.g., not in processed foods).

Unfortunately, this mutual adjustment approach was never seriously tried by either the U.S. or the EU. In the summer of 2001, as the EU was moving toward formal promulgation of its proposed L&T regulation, several U.S. government officials did contact their EU counterparts to suggest the kinds of adjustments that might be needed to make the regulation compatible with undisrupted trans-Atlantic GM trade, but these suggested changes were nearly all rejected at the EU end.[27] And no offer of regulatory

[27] On June 1, 2001, the U.S. Undersecretary of State Alan Larson did telephone EU Commissioner for Health and Consumer Protection David Byrne to ask that the EU reconsider aspects of its proposed

adjustment (e.g., movement toward some form of mandatory labeling) was ever made at the U.S. end.

It may be too late now to secure the regulatory cooperation needed to avoid a major trade disruption. A significant disruption has already take place in the form of bulk shipment exclusions from the EU market, plus the numerous decisions by exporters to hold back on deployments of GM technologies not yet approved in the EU. The question now is whether a formal WTO challenge will be launched by the United States, enflaming these disruptions further. With or without such a challenge we may see a growing exclusion of GM-contaminated foods, and perhaps also animal feeds, from the EU market, and probably also from the Japanese and Korean markets. This exclusion will be both formal (due to the continuing approval moratorium, or the new L&T regulation) and informal (growing out of private consumer preferences).

Different exporting countries are likely to react in different ways to this kind of market exclusion in Europe and East Asia. The proposed L&T Regulation in Europe makes clear that products entering the EU from countries that plant GM will have to be segregated and identity-preserved according to the Regulation, and that imports from non-GM countries will have to be sampled and tested to certify the absence of GM content (Commission of the European Communities 2001). Facing such requirements, exporting countries that are not currently planting GM food and feed crops will find a new incentive to remain GM-free, imposing import restrictions of their own and keeping

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traceability regulations, but when a new version of the regulation was proposed by the Commission at the end of July, only a few adjustments had been made. As one small adjustment, the requirement that commodity handlers specify which GMO varieties were contained in shipments was relaxed to allow operators to specify only what varieties the shipments "may contain." This gives handlers an option to avoid strict market segregation among different GM varieties by over-reporting what their shipments might contain. Yet they will remain obliged to segregate GM from non-GM if they wish to avoid a GM label (*Inside U.S. Trade,* 8/3/01, p. 10).

new GM crop planting approvals on hold. The costs of implementing L&T will be too high for most poor countries.[28] Wealthier countries like Canada that now plant GM and are facing their own internal consumer pressures to segregate and label, may eventually opt to legislate an EU-style L&T system. This would be costly in the short run, and could in the long run lead farmers (as in Europe) to a voluntary retreat from planting GM food and feed crops.

It is more difficult to foresee the future actions of heavily committed GM producers and exporters such as the United States and Argentina. Suggestions in the United States to consider mandatory L&T are discouraged because consumers at home are not yet demanding labels, while consumers abroad would probably use the labels to shun U.S. products. United States officials are thus clinging to the (probably false) hope that EU policy can still be changed through the WTO. The U.S. may eventually bring a formal WTO challenge if the moratorium remains in place even after the L&T system has gone into effect. Assuming this challenge fails to bring a change in EU policy, or in EU consumer opinion, the United States might be forced to retreat from planting some GM crops. GM cotton production could continue to expand, but GM corn and soybean acreage might be cut back. The cut back process would be hard for individual farmers to coordinate, but it might eventually be facilitated through legislative restrictions on GM

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[28] The L&T Regulation permits only a 1 percent contamination threshold, even for GMOs that are approved, and the Government of Canada has described this low tolerance level as "costly and unworkable, particularly from a bulk commodity perspective. To determine the adventitious presence of GMOs, particularly at very low levels, such as 1%, will require time consuming and costly tests in modern state of the art labs, and may be particularly onerous for developing countries" (Government of Canada 2001). The Government of Australia also describes the L&T Regulation as "particularly burdensome for developing countries" (Government of Australia 2001). The Grocery Manufacturers of America likewise warn that "Companies in *developing* nations with potentially less infrastructure and resources would confront significantly more difficulties and costs in exporting to Europe as they develop biotech products in the future" (GMA 2001).

seeds at the state level, perhaps starting with some non-farm belt states where few GM crops had ever been grown.

If the long-term result of this U.S.-EU regulatory divergence is an effective halt to the spread of GM food and feed crop planting in both rich and poor countries, how can we square such an outcome with conventional views of "globalization"? We have come to expect that globalization will mean less market regulation and a more rapid spread of the powerful technologies developed by U.S.-based multinational firms, not greater regulation and a halt to technology spread. Globalization, according to one school of thought, is expected to be almost indistinguishable from "Americanization." Yet in the case of GM crops we see global market regulations increasing rather than decreasing, and products developed by U.S. companies facing resistance and perhaps even rejection abroad.

The GM case confirms that the modern forces of globalization are not necessarily biased toward American policy outcomes (Nye 2002). In the struggle over GM crops, European-based environmental NGOs like Greenpeace have proved a match for U.S.-based multinational biotech seed companies like Monsanto. And European influence within intergovernmental organizations such as UNEP or CBD has clearly been a match for U.S. influence. As for international market forces, here as well the Europeans are in a better position to dominate. The United States is sometimes viewed as a superpower in food and agricultural markets because of its unmatched prowess as an exporter. Yet in most competitive commodity markets it is the biggest importers, not the biggest exporters, that enjoy leverage, because of the relative ease with which they can seek alternative suppliers. The customer is always right, and in world food markets the biggest customers are the Europeans and the Japanese, not the Americans. In 2000, the EU 15 as

a group imported from the rest of the world $54.8 billion in agricultural products. The EU and Japan together imported $91.0 billion in agricultural products from the rest of the world in 2000. These two GM-averse importers offered to the rest of the world a commercial market more than twice as large as the import market offered by the leading GM-friendly country, the United States (FAOSTAT Database). It is this combined European and Japanese purchasing power in global markets, plus the fact that most countries are currently GM-free, that could pull international GMO trade standards in the direction of EU preferences.[29]

How much would be lost if the market power of the EU were to slow or halt the further planting of GM food and feed crops around the world? For the private biotech companies (and their shareholders) that are heavily invested in this new technology the stakes are high, but for U.S. farmers the cost of reverting to pre-GM seed technologies might not be too high. If U.S. farmers had to turn the clock back to 1995 and resume planting only non-GM crops, farm production costs would go up slightly and the spraying of herbicides and insecticides would increase, but this could be seen as a price worth paying to avoid export market losses and/or the huge infrastructure investments, paperwork requirements, and legal entanglements of mandatory L&T. Eliminating GM crops in the United States might imply a 3 percent reduction in annual net farm income, since the planting of GM crops in the United States so far has allowed farmers to increase their income by an estimated $1.5 billion, compared to an average net farm income total of $46 billion (NCFAP 2002).

[29]*The Wall Street Journal* recently acknowledged Europe's influence over global food safety standards, but mistook the reason for this influence. The *Journal* pointed out accurately that "Americans may not realize it, but the rules governing the food they eat…are increasingly set in Brussels." What this article failed to mention is the connection between this rule setting power and the greater size of European food import markets (Mitchener 2002).

In developing countries the option of growing no GM crops at all will carry a much higher price. A subsistence farmer in Kenya trying to produce corn to feed her family might need Bt corn in the future to control stem borer infestations. A woman in rural Niger trying to raise cowpeas to add protein to her children's diet might need a GM variety to help fight against pod borers or weevils. These farmers will pay a high price if GM food becomes internationally stigmatized. Looking farther into the future, it becomes legally or commercially unacceptable to invest in rDNA research to develop drought resistant or nitrogen fixing GM varieties of basic grains for dryland farmers in South Asia and Sub-Saharan Africa, a possible means to escape poverty might be taken away from tens of millions of poor families. If today's rich countries decide to turn back the clock and do without GM crops, they will still be rich and well fed. If the clock is stopped for farmers in the developing world, they will still be poor and hungry.

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