The Journal of Environment & Development

http://jed.sagepub.com

Unplanned Exposure to Genetically Modified Organisms: Divergent Responses in the Global South

Jennifer Clapp

The Journal of Environment Development 2006; 15; 3
DOI: 10.1177/1070496505285443

The online version of this article can be found at:
http://jed.sagepub.com/cgi/content/abstract/15/1/3

Published by:
SAGE
http://www.sagepublications.com

The Journal of Environment & Development
Volume 15 Number 1
March 2006 3-21

10.1177/1070496505285443
http://jed.sagepub.com
hosted at
http://online.sagepub.com

Unplanned Exposure to Genetically Modified Organisms

Divergent Responses in the Global South

Jennifer Clapp
University of Waterloo, Ontario, Canada

This article examines the divergent political responses to unplanned exposure to genetically modified organisms (GMOs) in the Global South. Although scientific and domestic political considerations have some relevance to explaining different positions among developing countries, trade considerations appear to be a principal driver of GMO policy. This consideration is strikingly clear when we compare the different responses to unplanned GMO imports in Mexico/Central America with that in Africa. When trade and environment interests converge, as was the case in Africa, the strong policy stance, in this case against the import of GMOs, was clear and swift. In the cases of Mexico and Central America, the trade and environment interests did not overlap, and this has resulted in a weak government response and incremental policy shifts, in this case toward a pro-GMO stance.

Keywords: *agricultural biotechnology; developing countries; Central America; genetically modified organisms; maize; Mexico; Southern Africa*

Biosafety concerns due to unplanned international transfers of genetically modified organisms (GMOs) have surfaced in a number of countries in recent years. This has occurred despite the negotiation, adoption, and implementation of the Cartagena Protocol on Biosafety (CPB), a mechanism designed to enable countries to regulate the import and release of GMOs within their borders, during the past decade. How have countries responded to this "unplanned exposure" to imported GMOs, and what factors have influenced their response? These questions are especially important in the case of developing countries, which are currently in the process of developing their own domestic biosafety laws and policies.

The political response to unplanned movements and exposure to GMOs has not yet been adequately addressed by the academic literature on the transnational politics of GMOs. The literature has tended to focus primarily on the transatlantic rift about

Author's Note: The author would like to thank the Social Science and Humanities Research Council of Canada for financial support for this research, and Jason May, Daniel Tubb, and Katherine Turner for research assistance. She would also like to thank Derek Hall, Eric Helleiner, Robert Falkner, and three anonymous reviewers for their comments on an earlier draft of this article.

approaches to GMO regulation in industrialized countries. The European Union (EU) has taken a "go slow" approach with respect to approving GMOs, whereas the United States and Canada have taken a much more relaxed stance toward them. This difference in approaches between North America and Europe became apparent during the negotiation of the CPB, where the EU aligned with most developing countries took a more precautionary approach, and North America aligned with other major agricultural exporters took a less precautionary approach (for details on the negotiations, see Falkner, 2000; Gupta, 2000).

The focus on the divergence in policy approaches to biosafety between North America and Europe has been further reinforced by the challenge of EU biosafety regulations as unfair trade barriers by the United States, Canada, and Argentina at the WTO (Brack, Falkner, & Goll, 2003; Rafferty, 2004). As a result of these developments, much of the academic work on international biosafety regulation has analyzed the way in which differences in the approach to biosafety regulation affect trade, particularly across the Atlantic. Differing positions in the scientific debate over risk and precaution associated with GMOs, which themselves are conditioned by differences in the domestic political economies of Europe and North America, have been a common explanation for policy divergence (Bernauer, 2003; Prakash & Kollman, 2003).

Although the development of biosafety regulation and the scientific and regulatory differences in agricultural biotech policy between North America and Europe are important, they do not address all of the global policy dilemmas in the area of biosafety. The role of developing countries in the debate about GMOs and the problem of unplanned international transfers of GMOs have received much less attention in the literature. The role of developing countries is of significance because these countries are primarily agricultural producers and tend to rely on agricultural trade either for export revenues or are importers of food. They are thus key players in the global trade in food products, and the debate about GMOs has significance both for their own biosafety and for that of other countries that trade with them. The problem of unplanned exposure to GMOs is of special concern to developing countries, where the scientific and regulatory capacity to handle these exposures is much more limited than it is in more industrialized countries. There is a growing literature analyzing the emergence of biosafety regulations in different countries in the developing world that has begun to fill the gap in the academic literature on this front (e.g., Cohen & Paarlberg, 2004; Falkner & Gupta, 2005; Paarlberg, 2001). But to date, there has been little academic work that analyzes the political and regulatory response to unplanned exposure to imported GMOs in developing countries.

Although many developing countries took a precautionary approach to GMOs in the negotiation of the CPB, developing country responses to unplanned exposure to GMOs have been varied and do not fit into a single "developing world" position. The varied responses in the Global South to this phenomenon are well illustrated by the vastly different positions on unplanned exposure to GMOs in Mexico/Central America on one hand, and in Southern and Central Africa on the other. Both regions have experienced unplanned exposure to genetically modified maize in the past 5 years. Whereas Southern and Central African countries reacted strongly to this exposure and

took extensive measures to reduce its effect, in Mexico and Central America the response has been extremely mild by comparison. This difference in response is striking, especially because Mexico and Central America's exposure included inadvertent planting of GMO maize in an area that is a center of origin for that crop, raising especially serious biosafety concerns.

How can these very different responses in different regions of the developing world be explained? In this article, I argue that the politics of GMOs and trade in the developing world is not a mirror image of the debate as it is occurring between the United States and the EU. The varying policies across the developing world cannot be fully explained by domestic regulatory styles or by scientific interpretations of risk and precaution as is commonly argued with respect to the EU-U.S. differences. Domestic regulations on biosafety in most cases were not yet established by the time unplanned GMOs appeared on the scene in developing countries, and scientific capacity has typically been weak in developing countries, although this varies depending on the country. In the North-South context, although scientific and domestic political considerations are not unimportant to the politics of GMOs, trade factors appear to be an increasingly important driver of GMO policy. These trade considerations become clear when we compare the different responses to unplanned GMO imports in Mexico/Central America with that in Africa. When trade interests overlap with environmental concerns about biosafety, as was the case in Africa, the strong policy stance, in this case against the import of GMOs, was clear and swift. In the case of Mexico and Central America, the trade and environmental concerns did not overlap, and this resulted in a weak government response and incremental policy shifts, in this case toward a pro-GMO stance.

Biosafety Regulation in the Global South

At the international level, the Cartagena Protocol on Biosafety was negotiated as a means by which to govern transboundary movements of GMOs. Negotiated from 1996 to 2000, the Protocol governs trade in GMOs (referred to as living modified organisms [LMOs] in the treaty). It covers trade in seeds for intentional release into the environment (seeds), as well as those LMOs that are intended for food, feed, and processing (FFP, which is typically commodity trade in genetically modified [GM] crops). The Protocol stipulates that exports of seeds must go through an advance informed agreement procedure, and countries can reject these imports if they are not approved domestically. LMOs shipped for FFP must be accompanied by documentation that states that they "may contain" GMOs. These shipments must be posted to the Biosafety Clearing House, an Internet database outlining which GMOs are approved in which countries. Importing countries must check the clearing house to check which LMOs may be contained in the shipment, and they can reject these shipments if there is a chance that they contain GMOs that are not approved in the country of import (see Falkner, 2000).

There was considerable delay in getting agreement on the Protocol, ostensibly due to debates between different groups of countries over the science of risk and precau-

tion with respect to GMOs as well as the question of whether, and how, to identify LMO content in commodity shipments. In the negotiations, the EU was a major negotiating group and held a similar position to most developing countries (including most of Africa), which were referred to as the "like-minded group," widely perceived to be defending the interests of agricultural-importing nations. The EU and the like-minded group argued that given the uncertainty around the science of GMOs, they should be handled with precaution until proven to be safe. The United States and Canada, aligned with other key agricultural exporting countries including Australia and Argentina, which came to be known as the Miami Group, took a very different approach. For these countries, GMOs are seen to have little risk attached to them, and precaution is not warranted until they are scientifically proven to be harmful. The negotiations were stalled over this basic rift. A compromise group made up of Mexico, Japan, Korea, Switzerland, and Norway was formed in 1999, fairly late in the negotiations, just before the talks collapsed at Cartagena. The compromise group advocated a precautionary approach that was less stringent than the like-minded group or the EU. Following efforts to kick-start the negotiations in late 1999, the protocol was finally adopted in January 2000, and it gained enough ratifications to bring it into force by September 2003. There are currently 129 parties to the agreement, although the United States, Canada, and Australia have not ratified the agreement and thus are not parties.

The final text of the Protocol was a mix of the two basic approaches to risk and precaution with respect to GMOs, but was widely seen to be vague and unclear in places, especially with respect to international trade rules and language over documentation to accompany LMOs (Falkner, 2000). Exporting countries were only required to list whether a shipment may contain LMOs for FFP and were not required to state which LMOs might be contained in the shipment. The treaty required parties to revisit this language and the documentation within 2 years of the Protocol coming into force. The parties to the Protocol were thus to address this issue in their May-June 2005 meeting. After a week of intense negotiation, however, the parties failed to reach any agreement on changes to the language or documentation. The rules on documentation will likely change after the issue is raised again at the third meeting of the parties in March 2006.

At the domestic level, biosafety legislation is largely underdeveloped in much of the Global South. Although biosafety legislation is now coming into place in a growing number of developing countries, it is very uneven and a number of countries do not yet have such policies in place (Baumüller, 2003; Center for Food Safety, 2005). For those developing countries that do have biosafety policies in place, there has been a wide divergence in terms of their stance toward GMOs. Zimbabwe has developed legislation that is very precautionary, whereas South African regulation is more open to GMOs and the country has approved a number of GM crops for cultivation and import (Keeley & Scoones, 2003). China initially approved a host of GM varieties for cultivation but then imposed a de facto moratorium in 1999 and has not approved any GMO varieties since that time (Falkner & Gupta, 2005; Newell, 2003). Argentina has embraced agricultural biotechnology, particularly GM soy. Although Brazil at first took a precautionary stance and attempted to keep its soy production GM-free, it

switched policies due to illegal imports of GM soy seed from Argentina (Cohen & Paarlberg, 2004, p. 1566).

Despite efforts to create international and domestic regulatory mechanisms to prevent the transnational movement of GMOs across borders to countries that have not approved them as FFP or for release into the environment, such movements of GMOs have not been all that uncommon. The fluid nature of the global trade system has been a facilitating factor in the spread of unapproved GMOs across borders. The United States, in particular, is a major exporter of both GM maize and soy, both as commercial exports as well as in the form of food aid. A number of countries have expressed concern about imports of food aid containing GMOs that were sent without notification or documentation that the shipments contained GMOs (Clapp, 2004; Zerbe, 2004). Imports of GM maize, in particular, have posed biosafety problems in developing countries in recent years because of the ease with which it can result in gene flow when planted, because it is an open-pollinating plant. This is especially problematic for importing countries that do not approve of any GM varieties for either consumption or planting. But even if a GM variety is approved for consumption in an importing country, but not approved for planting, it can easily make its way into farmers' fields. The smuggling of GM soy seed to Brazil from Argentina is another example of the transnational movement of GMOs into areas where they are not approved.

The problem of the movement of unplanned GMOs has been exacerbated by the fact that some GMOs that have not been approved in any jurisdiction—either for certain uses or for any use—have been accidentally released and exported. Two cases are worth mentioning. In 2000, StarLink corn, approved in the United States for animal feed only, made its way into food supplies, leading to recalls of a number of food items from grocery store shelves (Segarra & Rawson, 2001). StarLink corn has been found in imported corn and corn products in a number of countries, including Japan, Korea, Nicaragua, and Mexico. In early 2005, it was revealed that an experimental variety of GM maize, Bt10, which is not approved for release in any country, had accidentally been supplied as seed in the United States for 4 years without anyone being aware of it. The Bt10 maize ended up in shipments to Ireland and Japan and likely to many other countries as well (Macilwain, 2005). There may be more cases of this kind that we are simply not aware of, and international and domestic biosafety regulations can do little to stop this particular type of GMO movement across borders.

Unplanned Exposure to GMOs in Mexico and Central America

Mexico has not approved any varieties of GM maize for commercial cultivation. It has, however, authorized imports of six varieties of GM maize for FFP (Commission for Environmental Cooperation [CEC], 2004, p. 13). Because Mexico is a center of origin for maize and has vast genetic diversity for that crop within its borders (particularly in the southern part of the country), it has until recently been somewhat cautious about its approval of GM maize. Indigenous and nongovernmental groups have been particularly concerned about the possibility of transgenic genes crossing into local

maize varieties and into *teosinte*, a wild ancestor of maize. Such gene flow could have an irreversible effect on the genetic diversity of maize in the region. The Mexican government implemented a ban on experimental cultivation of GM maize in late 1998. This moratorium on GM maize cultivation is the direct result of concern about the potential effects of gene flow from GM varieties to local varieties (Herrera, 2004, p. 2). Environmental groups, however, have claimed that the ban was never fully enforced.

In 2001, an independent academic study revealed that DNA from GM varieties of maize was present in Mexico in locally planted maize in farmers' fields in two states. The initial study that highlighted this discovery, conducted by two scientists from the University of California at Berkeley, was highly controversial. It was published in the science journal *Nature*, but the study was challenged by pro-GM advocates who criticized the article for being based on what they considered to be a flawed methodology (Mann, 2002). The controversy led *Nature* to retract the article, despite the fact that it had originally gone through a peer review process. The criticism of the article, however, focused on the methodology and not the results, which showed genetically modified DNA in locally planted maize. In fact, 100 scientists from the pro-GM camp made it clear that it did not dispute this point, saying in a joint statement that the gene flow that occurred in Mexico was "inevitable and welcome" (cited in Pew Initiative, 2003, p. 5).

At the time that the *Nature* article was published, the Mexican National Institute of Ecology (INE) confirmed the original study's findings with regard to gene flow into local landraces. Furthermore, Mexican government sponsored studies in 2002 also investigated this question, and although the results of these studies have not all been released to the public, the one that has been released confirms GM gene flow to locally grown native maize varieties (Carpentier & Hermann, 2003). According to the director of the INE, Ezequiel Ezcurra, "the most important conclusion of the studies is that the transgenic traits move around much faster in the natural environmental than what we previously thought, which obliges us to reconsider biosecurity measures" (cited in Herrera, 2004, p. 5). In 2003, environmental groups working together launched their own study, sampling some 2,000 maize plants, and their results showed that genes from GM maize plants had spread to nine states in Mexico (ETC Group, 2003). In some cases, as many as four separate patented GM traits were found in a single plant—including the GM traits found in StarLink corn.

It is widely assumed that the GM maize made its way into the seed supply in Mexico, and hence into farmers' fields, via commercial imports. Some 30% of the maize Mexico imports from the United States is genetically modified ("From Corn Wars to Corn Laws," 2004). Mexico is currently the second largest recipient of U.S. maize exports, importing around 5.6 million tons, mainly for use as feed and for processing (U.S. Department of Agriculture [USDA], 2005). The maize shipped to Mexico from the United States is shipped in whole kernel form because it keeps longer, whereas milled maize has a much shorter shelf life. But because it is shipped in whole kernel form, there is little to stop those who obtain the GM maize for FFP from mixing it with local seed varieties and planting it, and little to stop it from growing if it falls off of a

transport truck and sprouts along the side of the road. Adding to the likelihood of this maize being planted, the Mexican public was not told that the incoming grain was not for cultivation. Some also have pointed to the problem of smuggling of maize seed from the United States to Mexico as another channel for the GM maize seed to make its way into Mexican cornfields.

Despite the government's awareness of the problem of gene flow, the response from the Mexican government did not include any extensive measures to stop it from occurring. In late 2002, there was a move on the part of some Mexican government agencies and officials to remove the ban on the cultivation of GM maize on the grounds that gene flow had already occurred and perhaps Mexico should try to benefit from it (Herrera, 2004, pp. 3-4). The International Maize and Wheat Improvement Centre (CIMMYT), an agricultural research center headquartered in Mexico that is part of the Consultative Group on International Agricultural Research (CGIAR) coordinated by the World Bank, claimed that it had conducted tests on its own seed banks and declared their samples to be free from GM contamination (CIMMYT, 2002). CIMMYT did not, however, enter into the discussion about GM contamination in Mexican fields, and although it did state that further studies on gene flow were warranted, it also declared its support for the commercialization of GM maize (Herrera, 2004, p. 4).

In 2003, under U.S. pressure, the Mexican government signed a trilateral agreement with its North American Free Trade Agreement (NAFTA) partners on labeling and documentation requirements for shipments of GM grains. Separate agreements between parties and nonparties to the CPB are allowed, provided the agreement is consistent with the Protocol's objectives and does not result in less protection than is provided by the Protocol. The trilateral agreement among the NAFTA partners considers non-LMO shipments to be those that are 95% non-GMO and does not require such shipments to be accompanied by documentation stating that the shipment may contain GMOs. This 5% threshold for GMO presence in non-GMO shipments is seen by many to be very high, considering that in Europe it is set at .9 percent (Rafferty, 2004). The agreement states that adventitious or accidental presence of GMOs should not be considered a trigger for documentation to indicate that the shipment may contain GMOs. The agreement was criticized by nongovernmental organizations (NGOs), who claimed that it preempted the Cartagena Protocol. But the United States promoted this agreement as a model for similar agreements with other Latin American countries (Nagel, 2004).

Frustrated with the Mexican government's lack of a strong stance on the problem of GM gene flow into domestic maize fields, 21 indigenous communities in Oaxaca, Mexico, made a request in 2002 to NAFTA's CEC to examine the potential effects of GM gene flow in the country. The CEC responded by naming a panel to investigate the problem and make recommendations to the NAFTA governments (CEC, 2004). The CEC process was controversial, with the United States, in particular, being concerned about the outcome. In mid-2004, Mexico lifted its moratorium on the release of GMO maize, although no new approvals have been made for field testing (Falkner & Gupta, 2005). Following some delay, the CEC report was finally released in November 2004.

It stated that although there was no scientific proof to date that GM gene flow has had either negative or positive effects on biodiversity or human health, the sociocultural effect of GMO gene flow in maize was something that must be taken into account. It recommended that Mexico maintain its ban on planting of GM maize, that more studies on effect of gene flow be conducted, and that GM corn shipped to Mexico be milled at the port of entry (CEC, 2004). The Mexican government response was to state that the report should have discussed the possible benefits of GM maize for agriculture in Mexico (CEC, 2004). The U.S. government claimed that the report was "flawed" and "unscientific" and did not take the benefits of biotechnology into account (Office of the U.S. Trade Representative & U.S. Environmental Protection Agency, 2004).

In 2005, a new study published by the National Academy of Sciences presented evidence that the problem of GM gene flow in Mexico in 2003 and 2004 was not as prevalent as the earlier studies had shown. This new study did not deny that gene flow likely had occurred in earlier years and did not dispute the earlier studies' findings. But it did present data showing that gene flow of GM DNA into locally planted corn had diminished greatly. This could have been due to public education campaigns encouraging farmers not to plant the maize imported from the United States (Ortiz-Garcia et al., 2005).

Throughout 2003 to 2005, a new biosafety law was under consideration by the Mexican government, drafted in large part by the Mexican Academy of Science. This new law, which sparked a heated debate within Mexico, came into force in the spring of 2005. The law establishes a regulatory framework for assessing the risks of GM seeds and allows their limited release, provided they are declared risk-free, and with both the agriculture and environment ministries playing a key role in the approval of GM crops (International Centre for Trade and Sustainable Development [ICTSD], 2004b). There are also labeling requirements, to be determined by the Ministry of Health, that GM products must meet (Peregrina & Cruz, 2005). Although GM proponents are not happy with the labeling requirements, overall they are pleased with the law, which they see as enabling Mexico to take advantage of the benefits of GM crops (Lewis, 2005). Opponents called it "the Monsanto Law" because it provides a framework for the introduction of GM crops into Mexico, rather than a strict ban against them. They are also concerned that the law does not provide a mechanism to inform local communities when GM seeds are released into the environment (Cevallos, 2005; Kastelein, 2005).

There have also been concerns over unplanned imports of GMOs and the potential for gene flow in Central America. In early 2005, a study sponsored by the Central American Biodiversity Protection Alliance confirmed gene flow and GM contamination of the food supply in Central America (Humboldt Centre, 2005). Food aid and commercially traded grain originating from the United States were seen to be the principal channels for this spread of GM DNA in the region. Like the commercially traded maize, food aid is typically shipped in whole grain form, which gives the grain longer shelf life. But it also means that it can be planted. Some 50 samples of maize and soy food aid in Nicaragua, Honduras, El Salvador, and Guatemala and commercial imports of maize and soy in Costa Rica and the Dominican Republic were sent to an

independent lab in the United States for testing. The results showed that 80% of the samples taken contained GM DNA, including the traits found in StarLink (Diaz, 2005). The Alliance, which included environmental, farmer, consumer, union, and human rights groups, held a simultaneous press release across the region, blaming the World Food Program (WFP) and the United States for allowing the spread of unwanted GMOs and calling for a recall of all food aid that contains GMOs (ENS Newswire, 2005). Whereas local NGOs issued a press release about the discovery, the governments in the region did not respond and have remained silent on this issue.

Unapproved GMO Food Aid in Southern and Central Africa

In the summer of 2002, there was a serious food shortage in Southern Africa, which many presumed would lead to a famine situation if food aid was not brought in to ameliorate the situation. The U.S. government responded to the crisis by sending 500,000 tons of food aid to the region in the form of whole kernel maize. Because the United States does not have a system for segregating GM from non-GM maize, it could not guarantee that the maize it sent was GMO-free, and there were estimates that about 75% of the aid did contain GMOs (WFP, 2003, pp. 4-5). Zambia, Zimbabwe, Malawi, Swaziland, Mozambique, and Lesotho all received shipments of the U.S. food aid containing GMOs, which was delivered via the WFP and NGOs.

The governments in the region expressed immediate concern about the safety of the aid. Because maize makes up a significant portion of a typical Southern African diet (up to 80% of caloric intake), there was concern about the potential health implications of consuming such large quantities of GM maize. This is a particular concern in a population where large numbers of people have suppressed immune systems due to HIV/AIDs. The recipient governments were also concerned about the environmental effect, especially the potential for gene flow should any of the aid be kept and planted as seed, which is not uncommon with food aid. This concern was strong even though the region is not a center of origin for maize.

The Zambian government declared that it would not accept the food aid and insisted that what was already delivered be returned and replaced with non-GM food aid. The Zambian president, Levy Mwanawasa, was firm when he said, "If it is safe, then we will give it to our people. But if it is not, then we would rather starve than get something toxic" (cited in Dynes, 2002, p. 12). The other countries in the region eventually accepted the food aid, provided that it was milled first. A coalition of 126 NGOs from around the world signed a statement of solidarity with the Southern African countries in late-August 2002.[1]

Following the initial reaction against the GM food aid, the Zambian government authorized a scientific delegation to study the implications of GM food aid. This delegation, sponsored by the U.S. government, traveled to South Africa, a number of European countries, and the United States to study biosafety policies and the state of scientific evidence with regard to the safety of GMOs. The final report of the delegation, released in the fall of 2002, recommended precaution with respect to GMOs

(Carroll, 2002). The WFP did eventually source non-GMO aid for Zambia, but it was only about half of the necessary 21,000 tons of maize required to feed the hungry in that country. The WFP also helped to arrange milling of the food aid in the other countries that received it, although this was costly.

The Southern African Development Community (SADC) established an Advisory Committee on Biotechnology and Biosafety in 2003 to make recommendations with respect to handling GMOs, including food aid. Its recommendations, approved as guidelines in 2004, call for prior notification and consent when food aid shipments contain GMOs, in accordance with the Cartagena Protocol (Kabalata, 2004). It also states that food aid that "may contain GMOs should be clearly identified and labelled in accordance with national legislation" and that "food aid consignments involving grain or any propoagative plant material should be milled prior to distribution to beneficiary populations" (SADC, 2003). In response to the African requests with respect to GM food aid, in 2003 the WFP established policy on GM food aid that stated that it would respect the wishes of the recipient countries (WFP, 2003).

The United States claimed that it could not mill the maize before sending it to the region, as this would make it too expensive and would reduce its shelf life. Although it initially refused to do so, it did eventually, under heavy international pressure, send some 30,000 tons of non-GM maize to the region (Mellen, 2003). Although the United States was defensive with respect to the issue of GM food aid, it did state that it would respect the wishes of the countries that did not want GM food aid sent to them. To date, no major scientific studies testing for gene flow of GM traits to local varieties of maize in Africa have been published.

In 2003 to 2004, other conflicts over GM food aid emerged in Africa, this time in Sudan and Angola, both countries with large numbers of refugees and internally displaced people who are dependent on food aid. In 2003, Sudan passed legislation requiring food aid to be certified GM-free. Environmental groups accused the United States of putting heavy pressure on the government of the Sudan to overturn the legislation (Africa Centre for Biosafety et al., 2004). In 2003, the Sudan issued a temporary 6-month waiver to this legislation to give the United States more time to source GM-free food aid. The United States indicated that it could not meet the requirements of the legislation, prompting the Sudan to extend the waiver (Institute for the Study of International Migration, 2004). In 2004, the government of Angola announced plans to ban GM food aid but eventually settled on a policy of accepting GM food aid on the condition that it was to be milled first. The WFP issued a statement saying that to mill the grain prior to delivery would be expensive and cause delays. The United States cut its funding to the WFP shortly after the Angolan announcement, and Angola's WFP aid was then halved days later (Africa Centre for Biosafety et al., 2004, pp. 9-10). In response to this treatment of Angola and Sudan over their GM food aid policy, more than 60 African and international NGOs teamed up and sent an open letter to WFP to respect restrictions on GM food aid and provide non-GM alternatives.[2] The WFP denied that it aimed to pressure Angola into accepting GM food aid (ICTSD, 2004a).

Interpreting Divergent Responses to Unplanned GMOs

The governments in these two regions—Mexico/Central America and Southern/Central Africa—have had very different reactions to unplanned exposure to GMOs. In Mexico and Central America, government responses have been very mild, and Mexico in particular has inched toward more of a pro-GMO stance. Mexico accepted a relatively high tolerance of GMOs in its imports by signing the trilateral deal with its NAFTA partners, and its response to the CEC report was lukewarm. The Central American governments have kept a very low profile about the recent revelation of GM contamination in food aid and commercial imports of grains. By contrast, governments in Southern and Central Africa have been extremely vocal in expressing their unhappiness about the arrival of unplanned GMOs in food aid. Their responses have ranged from outright rejection of the aid to insistence that the grain be milled before delivery to minimize the risk of gene flow.

Why do we see these different responses to the GMO question in different parts of the developing world? Although the conventional explanations of the transatlantic GMO politics that focus on scientific and domestic political factors have relevance, they do not give a complete explanation. Most developing countries did not develop their own domestic biosafety regulations in the same context as the United States and the EU did, in the early 1990s, in which regulations were developed before the use of GM crops was widespread. In that context, the United States and the EU developed different regulatory procedures and fought vociferously over how to interpret risks and operationalize a precautionary approach into international biosafety regulations (Bernauer, 2003; Prakash & Kollman, 2003). For those developing countries that have now begun to develop domestic biosafety regulations, this has been done in light of the past and ongoing disputes between the United States and the EU with respect to GMO regulation both in the development of the Cartagena Protocol and at the WTO (Paarlberg, 2001).

Most developing countries, including Mexico, Central America, and most of Sub-Saharan Africa, took a precautionary approach in the negotiations of the Cartagena Protocol, and most have now ratified the agreement. The CPB was, when negotiations first began in the mid-1990s, widely perceived as mainly an environmental treaty, and negotiators from environmental ministries played a key role. Most of the developing countries that formed the like-minded group are not major agricultural exporters, importing a significant portion of their food, and as such they have sought to protect themselves from unwanted imports. Mexico is also an agricultural importer and was part of the Compromise Group. It took a more precautionary approach than the United States in the negotiations and refused to join the Miami Group when invited to do so (Gálvez, 2002). Because most of the developing countries did not have a domestic biotech industry at the time, their scientific and regulatory capacity was weak in comparison to the industrialized countries. This made a precautionary approach to GMOs appealing, because it did not require extensive risk assessments in the face of uncertainty. Endorsing a precautionary stance also provided a further element of defense in a potential future trade conflict with a GMO-exporting country.

In this context, the African countries, when faced with unplanned exposure to GMOs, took the position that one would expect. They reiterated their desire for precaution and went even further to stress their outright rejection of the technology. But Mexico and Central America, when faced with GMO contamination, did not take the line one might expect. Instead, they have inched toward a pro-GMO position. Whereas Mexico does have stronger scientific capacity with respect to biotechnology and biosafety and this could be a contributing factor to its position on GMOs, Central America's capacity is more in line with that of the African countries.

Although scientific capacity may have some bearing on these countries' positions with respect to GMOs, their response to unplanned GMO exposure appears to be heavily shaped by global trade relationships. Global trade factors loom very large in developing countries whose economies are small and where trade accounts for a higher proportion of their economic activity. When developing countries were faced with actual exposure to unplanned GMOs, the policies of their largest trade partners weighed in heavily—as the issue quickly became a question of more than just environmental policy but also of trade policy (see also Zarilli, 2005, p. 6). Paarlberg has argued that trade concerns have slowed the acceptance of GMOs in developing countries, especially in those countries that have strong trade ties with the EU (Paarlberg, 2002). But the effect of the trade considerations can also accelerate acceptance of GMOs if the developing country has important trade ties with the pro-GMO countries. In the case of African countries, there was an alliance between the trade and environment arms of the government, as their interests overlapped significantly as anti-GMO. These countries have strong trade ties with the GMO-free countries such as the EU and with each other, and they have both biosafety and health concerns about GMOs. In the case of Mexico and Central America, the trade and environment interests did not line up so clearly. Although they have biosafety concerns about gene flow, which are particularly important given that they are centers of origin for maize, they have very strong trade ties with a major pro-GMO country. The fact that the trade and environment interests did not overlap has exacerbated domestic debates in these countries over the costs and benefits of GM crops, and in these cases there was a gradual shift in the governments' official stance with respect to biosafety, which was more pro-GMO than had been the case when they negotiated the CPB.

For Mexico and Central America, the close economic and political ties with the rest of North America appear to have been extremely important in shaping the response (and in some cases nonresponse) of these countries to the problem of unplanned GMO exposure. In Mexico's case, its membership in the North American Free Trade Agreement has been an important contextual factor. Since NAFTA came into place in 1994, Mexico has become very dependent on the United States as a source of maize, with the United States supplying about a third of Mexico's maize consumption. Mexico's imports of maize have tripled since 1994, to nearly 6 million tons annually (USDA, 2005). This increase was due to provisions in NAFTA that required Mexico to reduce trade barriers on imported maize, although Mexico sped up that process and chose not to impose tariffs that it was allowed to charge on some maize imports. This has been

extremely important to the United States, which normally exports 20% of its maize crop. These exports are worth some US $5 billion in sales per year (Nadal & Wise, 2004, p. 4). Since the United States lost the European market for its maize exports—due to the EU's refusal to buy GM maize after 1998—Mexico has become the second largest importer of U.S. maize, after Japan, absorbing 12% of U.S. exports of maize (USDA FAS Statistics, 2005). According to Ricardo Celma, a Mexican representative to the U.S. Grain Council, "Mexico is a very, very important market" for U.S. corn (cited in Dellios, 2004). Latin America, in general, is seen to be an important market, absorbing around 24% of U.S. maize exports (USDA FAS Statistics, 2005).

Part of the reason for the increased Mexican imports of maize is the fact that the U.S. maize exports are very inexpensive compared to the domestic price of maize in Mexico. The United States accounts for around 70% of the global maize market, and as such, its export price has a heavy influence on global prices. The low U.S. maize prices are conditioned by high agricultural subsidies in the United States, including some US $10 billion paid to U.S. maize producers alone (Oxfam, 2003, p. 10). The lower prices on maize exports from the United States have made Mexico less able to compete and are part of the reason that Mexico is no longer self-sufficient in maize. Both Oxfam and the Institute for Agriculture and Trade Policy independently calculate that the U.S. export price of maize was significantly lower than the cost of production (Murphy, Lilliston, & Lake, 2005; Oxfam, 2003). This translates into a subsidy of around US $105–145 million per year on exports to Mexico alone. Moreover, Mexico also buys U.S. maize via export credit schemes offered by the U.S. government. Easy credit terms lower prices even further and contribute an extra $15 million in export subsidy to Mexico (Oxfam, 2003, pp. 12-13). GM maize imports are important for the feed industry as well as edible oil and corn starch industries in Mexico. The cost of GM maize is around US $72 per ton, versus a cost of US $120 per ton for Mexican maize. Victor Villalobos, lead negotiator for Mexico at the Cartagena Protocol, put it bluntly when he said, "We cannot compete with the United States for these kinds of corn. If we tell them to send us GM-free corn, it will cost us in the order of 40 or 70 percent more" (cited in Chalmers, 2004). Mexico does not export significant amounts of maize outside of the Americas, so there is little pressure to follow the more precautionary approach to biosafety. More important to the country is maintaining cheap imports of maize.

The Mexican response to unplanned exposure to GMOs should be seen in this broader economic context. Mexico signed and ratified the biosafety protocol, is an agricultural importing country, and initially took a precautionary approach in its biosafety policies, at least in its official policies. But its policy began to shift when it became clear that the issue is not just an environmental one about biosafety but is also inextricably tied to its trade policies. In light of this, the Mexican government began to try to pursue a biosafety policy that would satisfy the trade concerns not only of its own commercial sector but also that of the United States, its largest trading partner. Once the Cartagena Protocol negotiations were completed, Mexico's environmental agencies, which have jurisdiction over biosafety issues, were seen to be allowing the

agricultural ministry, which has been more concerned about trade implications, more influence over the national discussion over biosafety policy (Moore, 2000). This may change with the new biosafety law, which gives more say to the environment ministry (Falkner & Gupta, 2005).

In the case of the Central American countries, it was significant that the Central American Free Trade Agreement (CAFTA-DR) was being debated before the U.S. Congress when the GMO exposure was revealed. The Central American governments were largely in favor of the CAFTA deal for a host of reasons, including—most important—the promise of increased foreign investment and freer access to the U.S. market for their exports. Because they wanted to see the deal approved by the U.S. government, which it was in mid-2005, the Central American governments appeared to be afraid to say anything about the GM issue that might have jeopardized the deal. The CAFTA agreement, in addition to opening up the U.S. market to Central American goods, will also require Central American governments to open up markets for maize imports from the United States, similar to what Mexico was required to do under NAFTA. The CAFTA countries are seen to be vital markets for U.S. exporters of maize. As Gerald Tumbleson of the U.S.-based National Corn Growers Association (NCGA) put it, "I cannot stress enough the importance of the CAFTA-DR free trade agreement to this nation's corn growers" (NCGA, 2005).

For Mexico and Central America, it was desire for cheap maize imports and to not upset free trade deals that caused those countries to distance themselves from the more precautionary approach to biosafety. But in Africa, there were many reasons to keep the strong stand against GMOs and to react in a highly vocal way against the unplanned exposure to GMOs. Although they are not large exporters of agricultural products, the African countries that refused GMO food aid still maintain some agricultural exports, and the EU is a significant market for them. They are thus fearful of losing their agricultural export markets if their products were found to contain GMOs. Zambia, for example, although it is not in the league with the large grain exporting countries, is still an exporter of food, which makes up more than 30% of its GDP (Geloo, 2005). These exports typically include maize in addition to other agricultural products. If its maize were to be contaminated with GMOs, Zambia could be excluded from this important source of foreign exchange. In 1999 to 2000, Zambia earned $62.2 million in agricultural exports to the EU (Shroyer, 2003). Zimbabwe also exports agricultural products for which Europe is a key market. Its exports of beans and peas, for example, made up 12% of Europe's imports of those crops in the mid-1990s (Michael, 2002). In the midst of the GM food aid incident, Zimbabwe also expressed concern that its beef exports to the EU could be harmed if their livestock were fed grain containing GMOs (ICTSD, 2002). Although the total value of agricultural exports from Southern African countries to the EU may appear small, it still forms a significant proportion of their exports and is an important source of foreign exchange.

Reinforcing their stance on GMOs is the fact that African countries historically have closer economic ties with the EU than they do with the United States. This relationship was solidified under the 1975 to 2000 Lomé Convention under which the EU gave African, Caribbean, and Pacific countries preferential access to its markets. These

trade preferences have been extremely important especially for the least-developed African Caribbean and Pacific (ACP) countries. These countries have had difficulties breaking into industrialized country markets due to tariff peaks on certain agricultural products, including grains such as maize. The Lomé Convention was replaced with the Cotonou Agreement in 2000 and the new agreement maintains these trade preferences until 2008. From that date, the trade preferences will gradually be replaced with economic partnership agreements between ACP countries and the EU, although the trade preferences will remain in place for the least-developed countries, many of which are ACP countries (see African, Caribbean and Pacific and the European Community, 2000). Because of this close relationship between the EU and the ACP countries, it has been important for African countries to preserve their preferential trade access to EU markets by staying GMO-free. If they were to approve of the import and planting of GMOs, they would risk losing important export markets that they could not easily gain elsewhere. Moreover, there are also regional trade ties among African countries that keep these countries wary of GM crops. Regional trade in grain is also important for these economies, and most have stuck together in terms of banning the planting of GMOs. An important exception to this is the position of South Africa, which has significant trade in both maize and soy with the United States and Argentina (both countries that endorse GMOs), whereas its trade with the EU is primarily in crops that are not genetically modified (Falkner & Gupta, 2005).

Conclusion

The academic literature on trade and GMOs has tended to focus on two aspects of the issue: the negotiation of domestic and international biosafety regulations and the WTO trade dispute over GMOs. In both cases, the literature has paid particular attention to differences between North America and Europe with respect to scientific interpretations of risk and precaution. Very little attention has been focused on the unplanned movements of GMOs across borders, particularly in the North-South context. Although the Cartagena Protocol in theory enables parties to regulate their trade in GMOs, it has not been successful in preventing the movement of these organisms across borders to countries that did not endorse their import or use. There have been a number of instances of GMOs appearing where they were not sanctioned by the recipient government.

This unplanned exposure to GMOs has produced very different reactions in different regions of the Global South. An analysis of Mexico/Central America and Africa, as presented here, suggests that trade concerns are a prominent factor behind developing country political responses to unplanned GMO exposure. What appears to be important in determining government reactions to unplanned GMOs is whether trade interests line up with environmental/biosafety interests within the country. Most developing countries took a precautionary approach to GMOs in the negotiation of the CPB. But when unplanned GMO exposure became evident, the reactions of the developing countries have varied widely.

In Mexico and Central America, the pressure of regional trade agreements, as well as concern about the need for cheap sources of maize imports, resulted in a weak response of these countries to the unplanned exposure to GMOs. Trade interests did not line up with the environmental/biosafety interests, resulting in domestic rifts on GM policies. Trade interests appear to have prevailed, and these countries seem to be gradually shifting their position to one that is less precautionary, despite the serious risk of gene flow in regions that are centers of origin for maize. In Africa, environmental interests and trade interests converged, producing a swift and strong reaction against GMO imports. African countries, concerned about the potential effect of possible GMO contamination with local varieties of crops, actively rejected GMO food aid imports, despite the serious risks associated with acute food shortages. In both cases, the developing country governments are drafting domestic policies on GMOs that converge with those of their major trade partners.

The analysis presented here suggests that whereas different domestic regulatory styles have dominated the politics of GMOs in industrialized countries, particularly in North America and Europe, trade interests appear to be equally, if not more, important in explaining the politics of GMOs in developing countries. It is important that analysts do not simply overlay the transatlantic debate over GMOs onto the developing world.

Notes

1. This statement is posted at Norfolk Genetic Information Network: http://ngin.tripod.com/230802c.htm.

2. This open letter is posted at http://www.earthlife-ct.org.za/filemgmt_data/files/WFP_letter_%20African_NGOs_May_2004.pdf.

References

African, Caribbean and Pacific and the European Community. (2000). *Cotonou Agreement*. Retrieved from http://europa.eu.int/comm/development/body/cotonou/pdf/agr01_en.pdf#zoom=100

Africa Centre for Biosafety, Earthlife Africa, Environmental Rights Action-Friends of the Earth Nigeria, Grain, & SafeAge. (2004). *GM food aid: Africa denied choice once again?* Dalbridge: Earthlife Africa. Retrieved from http://www.biosafetyafrica.net/_DOCS/Africa_GM_food_aid.pdf

Baumüller, H. (2003). *Domestic import regulations for genetically modified organisms and their compatibility with WTO rules*. Winnipeg: International Institute for Sustainable Development.

Bernauer, T. (2003). *Genes, trade and regulations: The seeds of conflict in food biotechnology.* Princeton: Princeton University Press.

Brack, D., Falkner, R., & Goll, J. (2003). *The next trade war? GM products, the Cartagena Protocol and the WTO* (Royal Institute of International Affairs [RIIA] Briefing Paper No. 8). London: RIIA.

Carpentier, C. L., & Hermann, H. (2003). *Maize and biodiversity: The effects of transgenic maize in Mexico: Issues summary.* Montreal: CEC Secretariat. Retrieved from http://www.cec.org/files/pdf/Issue_summary-e.pdf

Carroll, R. (2002, October 30). Zambia slams door shut on GM food relief. *The Guardian* (London). Retrieved December 9, 2005, from http://www.guardian.co.uk/gmdebate/Story/0,2763,822141,00.html

Center for Food Safety. (2005). *Genetically engineered crops and foods: Worldwide regulation and prohibition*. Washington, DC: Author. Retrieved from http://www.centerforfoodsafety.org/pubs/GE%20Map%20Final%20Charts.pdf

Cevallos, D. (2005, February 26). Law on the side of transgenics? *Tierramerica*. Retrieved December 9, 2005, from http://www.tierramerica.net/2005/0226/iarticulo.shtml

Chalmers, P. (2004, February 26). *Mexico's tortilla feeds debate on GM food safety.* Retrieved from http://foodhaccp.com/msgboard.mv?parm_func=showmsg+parm_msgnum=1013564

Clapp, J. (2004). WTO agricultural trade battles and food aid. *Third World Quarterly*, *25*(8), 1439-1452.

Cohen, J., & Paarlberg, R. (2004). Unlocking crop biotechnology in developing countries—A report from the field. *World Development*, *32*(9), 1563-1577.

Commission for Environmental Cooperation. (2004). *Maize and biodiversity: The effects of transgenic maize in Mexico*. Montreal: Author.

Dellios, H. (2004, September 29). Report could put a crimp in U.S. corn exports. *Chicago Tribune*. Retrieved from http://www.mindfully.org/GE/2004/CEC-Corn-Exports29sep04.htm

Diaz, M. G. (2005, February 25). Transgenic food found here. *The Tico Times*, p. 1.

Dynes, M. (2002, August 6). Africa torn between GM aid and starvation. *London Times*. Retrieved December 9, 2005, from http://www.organicconsumers.org/gefood/africa080802.cfm

ENS Newswire. (2005). *Banned as human food, StarLink corn found in food aid*. Retrieved from http://www.ens-newswire.com/ens/feb2005/2005-02-16-09.asp#anchor2

ETC Group. (2003, October 10). *Maize rage in Mexico: GM maize contamination in Mexico—2 years later.* Retrieved from www.etcgroup.org

Falkner, R. (2000). Regulating biotech trade: The Cartagena Protocol on Biosafety. *International Affairs*, *76*(2), 299-313.

Falkner, R., & Gupta, A. (2005, December). *The Cartagena Protocol on Biosafety and Domestic Implementation: Comparing Mexico, China and South Africa* (Briefing Paper; Energy, Environment and Development Programme). London: Chatham House.

From corn wars to corn laws; Farming in Mexico. (2004). *The Economist*, *372*(8394), p. 72.

Gálvez, A. (2002). Mexico. In C. Bail, R. Falkner, & H. Marquard (Eds.), *The Cartagena Protocol on Biosafety: Reconciling trade in biotechnology with environment and development?* London: Earthscan.

Geloo, Z. (2005, May 3). The rise and fall of the GM debate in Zambia. *Business in Africa*. Retrieved December 9, 2005, from http://www.businessinafrica.net/features/agriculture/437306.htm

Gupta, A. (2000). Governing trade in genetically modified organisms: The Cartagena Protocol on Biosafety. *Environment*, *42*(4), 22-33.

Herrera, R. V. (2004). In defense of maize (and the future). *Citizen Action in the Americas*, *13*. Retrieved December 9, 2005, from http://americas.irc-online.org/pdf/series/13.maiz.pdf#search='In%20defense%20of%20maize%20%28and%20the%20future%29'

Humboldt Centre. (2005). *World Food Programme and United States denounced for the distribution of genetically modified organisms in Central America and the Caribbean*. Managua: Author. Summary in English retrieved from http://www.humboldt.org.ni/transgenicos/denuncia_englishfeb16.htm

Institute for the Study of International Migration. (2004). *Genetically modified food in the Southern Africa food crisis of 2002-2003*. Washington, DC: Georgetown University School of Foreign Service.

International Centre for Trade and Sustainable Development. (2002, June 27). Zimbabwe concerned that GM food aid might jeopardise beef exports to EU. *Bridges Trade BioRes 2*(12). Retrieved December 9, 2005, from http://www.ictsd.org/biores/02-06-27/inbrief.htm

International Centre for Trade and Sustainable Development. (2004a, May 14). African NGOs voice concern to food aid donors. *Bridges Trade BioRes*, *4*(9). Retrieved December 9, 2005, from http://www.ictsd.org/biores/04-05-14/story3.htm

International Centre for Trade and Sustainable Development. (2004b, December 20). Mexico approves new GM law. *Bridges Trade BioRes*, *4*(23). Retrieved December 9, 2005, from http://www.ictsd.org/biores/04-12-20/story3.htm

International Maize and Wheat Improvement Centre (CIMMYT). (2002, February 7). *Press release: Further test at CYMMIT find no presence of promoter associated with transgenes in Mexican landraces in gene bank.*

Kabalata, M. (2004, May 12). SADC approves guidelines on handling GMO's. *Zambian News Agency*. Retrieved December 9, 2005, from http://infoserve.blogspot.com/2004_05_09_infoserve_archive.html

Kastelein, B. (2005). GMOs on the march. *Business Mexico*, *14*(4), 39.

Keeley, J., & Scoones, I. (2003). *Contexts for regulations: GMOs in Zimbabwe* (IDS Working Paper 190, Biotechnology Policy Series 9). Brighton, UK: Institute for Development Studies.

Lewis, S. (2005, January 3). Mexico's house passes biosafety bill with restrictions. *Food Chemical News*, *46*(47).

Macilwain, C. (2005, March 23). US launches probe into sales of unapproved transgenic corn. *Nature*. Retrieved from http://npg.nature.com/news/2005/050321/full/nature03570.html

Mann, R. (2002). Has GM corn "invaded" Mexico? *Science Magazine*, *295*(5560), 1617-1619.

Mellen, M. (2003, April). Who is getting fed? *Seedling*. Retrieved from http://www.grain.org/seedline/seed-03-04-3-en.cfm

Michael, M. T. (2002, September 26). Africa bites the bullet on genetically modified food aid. *Worldpress.org*. Retrieved from www.worldpress.org/print_article.cfm?article_id=845&dont=yes

Moore, L. (2000). Mexico: Legislation still months away, but GMO debate beginning to take form. *International Environment Reporter*, *23*(14), 527.

Murphy, S., Lilliston, B., & Lake, M. (2005). *WTO agreement on agriculture: A decade of dumping*. Minneapolis: IATP.

Nadal, A., & Wise, T. (2004). *The environmental costs of agricultural trade liberalization: Mexico-U.S. maize trade under NAFTA* (Working Group on Development and Environment in the Americas, Discussion Paper No. 4). Retrieved from http://ase.tufts.edu/gdae/Pubs/rp/DP04NadalWiseJuly04.pdf

Nagel, J. (2004). NAFTA pact limits reporting requirements for biotechnology; billed as global model. *International Environment Daily*, *12*.

National Corn Growers Association (NCGA). (2005, April 22). NCGA vice president joins ag leaders in CAFTA-DR event. *NCGA News*. Retrieved from http://www.ncga.com/news/notd/2005/april/042205.htm

Newell, P. (2003). *Domesticating global policy on GMOs: Comparing China and India* (IDS Working Paper 206, Biotechnology Policy Series 12). Brighton, UK: Institute for Development Studies.

Office of the U.S. Trade Representative & U.S. Environmental Protection Agency. (2004, November 8). U.S. says NAFTA report on genetically modified corn is "flawed" [Press release]. Retrieved from http://usinfo.state.gov/wh/Archive/2004/Nov/08-675425.html

Ortiz-Garcia, S., Ezcurra, E., Schoel, B., Acevedo, F., Soberon, J., & Snow, A. (2005). Absence of detectable transgenes in local landraces of maize in Oaxaca, Mexico (2003-2004). *PNAS*, *102*(35), 12338-12343.

Oxfam. (2003). *Dumping without borders: How US agricultural policies are destroying the livelihoods of Mexican corn farmers* (Oxfam Briefing Paper 50). Boston: Author.

Paarlberg, R. (2001). *The politics of precaution: Genetically modified crops in developing countries*. Baltimore, MD: Johns Hopkins.

Paarlberg, R. (2002). The real threat to GM crops in poor countries: Consumer and policy resistance to GM foods in rich countries. *Food Policy*, *27*, 247-250.

Peregrina, K., & Cruz, J. (2005, February 22). Mexico approves planting and sale of GM crops. *SciDev.Net*. Retrieved from http://www.sbpcpe.org/noticias/edicoes/23_02_05.htm

Pew Initiative on Food and Biotechnology. (2003). *Have transgenes—will travel: Issues raised by gene flow from genetically engineered crops*. Washington, DC: Pew Foundation.

Prakash, A., & Kollman, K. (2003). Biopolitics in the EU and the U.S.: A race to the bottom or convergence to the top? *International Studies Quarterly*, *47*, 617-641.

Rafferty, B. (2004). The door opens slightly: Recent European Union regulations on genetically modified products and the ongoing United States-European Union GM dispute. *Georgetown International Environmental Law Review*, *16*, 281-300.

Southern Africa Development Community. (2003). *Recommendations on GMO*. Retrieved from http://www.gene.ch.genet/2004/May/msg00065.html

Segarra, A. E., & Rawson, J. M. (2001). *StarLink™ corn controversy: Background, CRS report for Congress*. Retrieved from http://www.ncseonline.org/nle/crsreports/agriculture/ag-101.cfm

Shroyer, E. (2003, January 25). Food fight. *Harvard Political Review Online*. Retrieved from www.hpronline.org/news/2003/01/25/Cover/

U.S. Department of Agriculture. (2005, May). *United States-Central America-Dominican Republic Free Trade Agreement commodity fact sheet: What's at stake for feed grains?* Retrieved from http://www.fas.usda.gov/info/factsheets/CAFTA/feedgrains.html

U.S. Department of Agriculture FAS Statistics. (2005). Retrieved June 2005 from www.fas.usda.gov/export-sales/myfiaug.html

World Food Program. (2003). *Policy on donations of foods derived from biotechnology* (WFP/EB.A/2003/5-0B/Rev.1). Retrieved December 9, 2005, from http://www.wfp.org/eb

Zarilli, S. (2005). *International trade in GMOs and GM products: National and multilateral legal frameworks*. Geneva: UNCTAD.

Zerbe, N. (2004). Feeding the famine? American food aid and the GMO debate in Southern Africa. *Food Policy*, *29*, 593-608.

Jennifer Clapp is CIGI Chair in International Governance and an associate professor in the Faculty of Environmental Studies at the University of Waterloo. Her books include *Paths to a Green World: The Political Economy of the Global Environment* (coauthored with Peter Dauvergne, MIT Press, 2005); *Toxic Exports: The Transfer of Hazardous Wastes From Rich to Poor Countries* (Cornell, 2001); and *Adjustment and Agriculture in Africa: Farmers, the State and the World Bank in Guinea* (Macmillan, 1997).