Trade and Tribulations

An Evaluation of Trade Barriers to the Adoption of Genetically Modified Crops in the East African Community

Authors JOHN KOMEN DAVID WAFULA

A Report of the CSIS Global Food Security Project

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Contents

Executive Summary

Agricultural biotechnology holds great promise in contributing to Africa's socioeconomic development. This is confirmed by a growing body of literature analyzing the positive economic effects at the farm level, and also for a growing number of farmers in Africa. However, with the exception of Burkina Faso, Egypt, South Africa, and Sudan, the African countries have been slow adopters of biotechnology crops for cultivation. Trade concerns are often cited in Sub-Saharan Africa as a reason for taking a precautionary approach to genetically modified (GM) crop adoption, which may result in forgone benefits for farmers and society at large and have a negative impact on a country's food security situation. The present report aims to evaluate the barriers that the adoption of GM crops by the East African countries poses for their trade with neighboring countries, with their other trade partners in Africa, and with their international trade partners. It is based on a literature review of recent studies analyzing the actual and potential trade implications of adopting GM crops, with a particular focus on the East African countries. This literature review is complemented by an analysis of recent agricultural trade statistics. In addition, we have included, where possible, the perspectives of key stakeholders and policymakers in East Africa vis-à-vis the trade implications of adopting GM crops.

The report's analysis points to four key policy challenges. First, the disconnect between national biotechnology policies and biosafety laws and regulations is a crucial agenda item that needs to be addressed as a matter of urgency. The national biotechnology policies of the East African countries generally contain policy statements that recognize the potential contribution of modern biotechnology for meeting socioeconomic development goals. In contrast, their biosafety regulations sometimes have stringent provisions that will undermine efforts to meet broader developmental and food security goals.

Second, the East African countries generally have a limited capacity in agricultural biotechnology, and their national biosafety institutions and procedures for genetically modified organism (GMO) decisionmaking are still evolving. Government measures that are sometimes taken regarding GMOs contradict national policies and laws, such as import bans on GM commodities. And those decisions contribute to price hikes for imported cereals, and have a negative impact on the provision of emergency food aid.

Third, the degree of trade risks associated with the commercial adoption of GM crops is first and foremost an intraregional issue. An analysis of trade statistics confirms that the adoption of GM varieties of maize, cotton, and cassava, which are currently being tested in East Africa, is unlikely to have adverse effects on trade with potentially GM-sensitive

destinations such as Europe. Because the lion's share of agricultural exports goes to other countries in the region, a common approach to and, ideally, harmonized policies toward imports and exports of GM commodities will be essential.

Fourth, simply dismissing the perceived trade risks vis-à-vis GM-sensitive destinations as irrational fears would be naive, as recent studies have confirmed the strong influence of those international agri-food retailers and supermarket chains that have adopted their own "GM-free" standards. While not directly influencing any countries' decisions, the major food companies are indirectly influential because they set their own policies on GMOs and are therefore a factor that policymakers in Africa need to consider.

The report concludes with a set of policy recommendations.

1 Introduction and Rationale

This report aims to evaluate the barriers that the adoption of genetically modified (GM) crops by the countries that belong to the East African Community (EAC)—Kenya, Tanzania, Uganda, Rwanda, and Burundi—pose for trade with their neighboring countries, with their other trade partners in Africa, and with their international trade partners. Trade concerns are often cited in Sub-Saharan Africa as a reason for taking a precautionary approach to GM crop adoption, which may result in forgone benefits for farmers and society at large and have a negative impact on a country's food security situation. In some countries, this is exacerbated by trade restrictions on GM commodity imports, thereby negatively affecting food security in times of production shortfalls or famine.

The report is part of a broader CSIS project—"Pathways to Productivity? Assessment of the GMO Debate in Kenya, Tanzania, and Uganda"—which examines the debate on GM food crops in Kenya, Tanzania, and Uganda. The project reviews the regulatory structures, the scientific debate, and the current state of opinion on the use of GM crops in each country.

The report is based on a literature review of recent studies analyzing the actual and potential trade implications of adopting GM crops, with a particular focus on the East African countries. Our literature review is complemented by an analysis of recent agricultural trade statistics. In addition, we have included, where possible, the perspectives of key stakeholders and policymakers in East Africa vis-à-vis the trade implications of adopting GM crops, in order to illustrate the general findings from the literature review.

The report includes a detailed analysis of trade implications for each focus country—Burundi, Kenya, Rwanda, Tanzania, and Uganda—should they choose to grow and trade GMOs. The five EAC countries are in the nascent phase of GM crop cultivation, but cite concerns of the implications of crop cultivation for subregional (within East Africa), regional (Africa), and international trade. The report explores if and to what extent the adoption of GM crops would have an impact on trade. The following topics are analyzed in detail:

- International agreements and standards related to biotechnology and trade, including the Cartagena Protocol on Biosafety and the relevant World Trade Organization (WTO) agreements;
- The current pipeline of GM crops under development in Kenya, Tanzania, and Uganda, and prospects for adoption;

- The average annual production, trade volumes, and value of potential GM commodities;
- Current trade patterns for potential GM commodities, within the region, continent, and international trade with "GM-sensitive" partners;
- Export concerns related to private standards developed by multinational retailers;
- The implications of trade-related provisions in the national biosafety frameworks of the East African countries; and
- Opportunities and challenges, and current initiatives toward regional collaboration and harmonization in East Africa.

It is safe to acknowledge that agricultural biotechnology holds great promise in contributing to Africa's socioeconomic development. This is confirmed by a growing body of literature analyzing the positive economic effects at the farm level, and also for a growing number of farmers in Africa. However—with the exception of Burkina Faso, Egypt, South Africa, and Sudan—the African countries have been slow adopters of biotechnology crops for cultivation. According to the International Service for the Acquisition of Agri-Biotech Applications, Africa can be considered as the "final frontier" for agricultural biotechnology.[1]

Trade concerns are often cited in Sub-Saharan Africa as a reason for taking a precautionary approach to biotechnology crop adoption, which may result in forgone benefits for farmers and society at large and have a negative impact on a country's food security situation. In some countries, this is exacerbated by trade restrictions on GM commodity imports, thereby having a negative impact on food security in times of production shortfalls or famine.[2]

Sometimes this wariness can take an extreme form, as when some governments refused in 2002, in the midst of a severe food emergency, to accept GM maize as food aid. Other states did accept GM maize as food aid, but only if the kernels were first milled, so they could not be planted by farmers. One important reason behind this unusual demand was not related to food safety, or even environmental safety, but instead a commercial fear: a fear that if GM maize kernels imported as food aid were possibly planted by African farmers, then Africa's maize crop might become "GM-contaminated," making it more difficult to export maize—or meat from animals fed with maize—to markets in Europe where consumers are averse to GMOs.

Trade-related effects and access to export markets are increasingly emerging as a concern. Destinations such as the European Union, where the level of caution and consumer skepticism is still high, have attracted a lot of attention. More specifically, several African countries have been preoccupied with the notion that the adoption of GM crops would attract a wholesale a rejection of agricultural exports by importing countries in the Western world, especially by European countries. The dilemma within policymaking circles has been how to harness the potential benefits of GM crops while preserving trade interests and niche markets.

1. M. Karembu, F. Nguthi, and H. Ismail, *Biotech Crops in Africa: The Final Frontier* (Nairobi: International Service for the Acquisition of Agri-Biotech Applications AfriCenter, 2009).

2. Jane Morris, "Modern Biotechnology: Potential Contribution and Challenges for Sustainable Food Production in Sub-Saharan Africa," *Sustainability* 3, issue 6 (2011): 809–22.

Against this backdrop, the main objective of this paper is to evaluate barriers that the adoption of GM crops may pose for trade at the national, subregional, regional, and international levels. The overall context for this paper is provided by the current economic integration agenda of the EAC, whose focus is to widen and deepen the region's economic, political, social, and cultural integration in order to improve the quality of life of the people of East Africa through increased competitiveness, value-added production, trade, and investments. Minimizing and dismantling trade barriers is one of the policy measures aimed at achieving the goals of the integration agenda. This makes the adoption of GMOs and their potential effects on trade a relevant policy issue that needs to be addressed irrespective of the divergent national biosafety regulatory regimes.

2 The Current Status of Agricultural Biotechnology and Biosafety Regulation in East Africa

Kenya and Uganda are the leading countries in East Africa in terms of embracing agricultural biotechnology. The two countries have also put in place key components of a functional biosafety system. Tanzania has formulated a policy, biosafety legislation, and regulations governing modern biotechnology but has been slow translating policy into practice. In Rwanda and Burundi, biotechnology research-and-development activities are mainly confined to conventional techniques and traditional biotechnology applications. Inadequate capacity and a lack of biotechnology policies and biosafety legislation are some of the major constraints attributed to the low level of development.[3] A summary overview of the current status of agricultural biotechnology in East Africa, and the resultant pipeline of GM products, is presented in table 1 and discussed in this section.

Kenya

The key pillars of Kenya's biosafety system include the national biotechnology development policy endorsed by the Cabinet in 2006 and the Biosafety Act enacted in 2009. The policy articulates Kenya's goals and priorities in modern biotechnology. It states that "the government will adopt productivity-enhancing agricultural biotechnologies that can substantially reverse the fast deteriorating food security and nutrition farm incomes, spawn the agro-industry and reduce environmental degradation."[4]

Kenya is currently engaged in the testing of GM crops at various stages. These include maize (drought tolerant and insect resistant), cassava (biofortified and virus resistant), sorghum (biofortified), and cotton (insect resistant).

Uganda

Uganda has emerged as a regional leader in Eastern Africa and a role model in conducting confined field trials (CFTs) using existing legislation. This has been facilitated by enabling political will and a commitment to spearhead biotechnology to greater heights across all

3. Godliving Mtui, "Biosafety Systems in Eastern and Central Africa," *African Journal of Environmental Science and Technology* 6, no. 2 (February 2012): 80–93.

4. Republic of Kenya, *National Biotechnology Development Policy* (Nairobi: Government Printers, 2006).

sectors of the economy.[5] This is underscored in Uganda's national biotechnology and biosafety policy.[6] The National Biosafety Committee has so far approved trials of genetically modified cotton (insect-resistant and herbicide-tolerant), cassava (virus resistant), maize (insect resistant and drought tolerant), and bananas (biofortified, disease resistant). In October 2012, Uganda's Cabinet approved the biosafety bill for publication and subsequent presentation in Parliament. It is expected that the passage of the biosafety bill would enable general releases of GM crops currently planted in field trials.

Table 1. Overview of GM Crops Developed and Tested in East Africa

Country	Crop	Trait	Institutions Involved	Stage as in 2012
Kenya	Maize	Drought tolerance (WEMA)	AATF, CIMMYT, KARI, Monsanto	CFT, 2nd season
	Cotton	Insect resistance	KARI, Monsanto	CFT, 5th season
	Cassava	Viral resistance	KARI, DDPSC	CFT, 1st season
		Enhanced micronutrient levels	KARI, DDPSC, IITA, CIAT	CFT, 1st season
	Sweet potatoes	Viral diseases	KARI, Monsanto	CFT, 1st season
		Weevil resistance	CIP, Kenyatta University	Lab and GH transformation approved by NBA
	Sorghum	Enhanced micronutrient levels	Africa Harvest, Pioneer Hi-bred, DuPont business, KARI	Approved for contained greenhouse trial by NBA
	Pigeon peas	Insect resistance	Kenyatta University	Lab and GH transformation approved by NBA
Uganda	Maize	Drought tolerance	NARO, AATF, Monsanto	CFT, 2nd season
	Bananas	Bacterial wilt resistance	NARO, AATF, IITA	CFT, 1st season
		Enhanced micronutrients	NARO, Queensland University of Technology	CFT, 1st season
	Cassava	Viral resistance	NARO, DDPSC, IITA	CFT, 2nd season
	Cotton	Insect resistance and herbicide tolerance	NARO, Monsanto	CFT, 3rd season
	Sweet potatoes	Weevil resistance	NARO, CIP	Contained GH trials

Note: AATF = African Agricultural Technology Foundation; CIMMYT = Centro Internacional de Mejoramiento de Maíz y Trigo, or International Maize and Wheat Improvement Center; KARI = Kenya Agricultural Research Institute; DDPSC = Donald Danforth Plant Science Center; IITA = International Institute of Tropical Agriculture; CIAT = Centro Internacional de Agricultura Tropical, or International Center for Tropical Agriculture; CIP = Centro Internacional de la Papa, or International Potato Center; NARO = National Agriculture Research Organisation; NBA = National Biosafety Authority, Kenya.

Source: C. James, *Global Status of Commercialized Biotech/GM Crops: 2011*, Brief 43 (Los Baños, Philippines: International Service for Acquisition of Agri-Biotech Applications).

5. Theresa Sengooba, John Komen, Paul Nampala, and Arthur Makara, eds., "Capacity Development for Agricultural Biotechnology and Biosafety Decision Making: Enabling Confined Field Trials in Uganda," in *Proceedings of the International Conference on Agro-Biotechnology, Biosafety and Seed Systems in Developing Countries*, edited by Paul Nampala and Arthur Makara (Kampala: Science Foundation for Livelihoods and Development, 2010).

6. Republic of Uganda, *National Biotechnology and Biosafety Policy* (Kampala: Ministry of Finance, Planning, and Economic Development, 2008).

Tanzania

Agricultural biotechnology in Tanzania currently primarily involves more routine techniques such as tissue culture and micro-propagation, marker-assisted breeding, disease diagnostics, and livestock vaccine development. Tanzania has one of the most positive biotechnology policies in Africa. The national policy reflects a high degree of political will and a commitment on the part of the government to propel technology acceptance and adoption in various sectors of the economy.[7]

However, it has become apparent that Tanzania's current biosafety legislation, processes, and implementing regulations are in conflict with the national objectives for biotechnology development. In particular, strict liability provisions have hindered the approval of maize field trials as part of the Water Efficient Maize for Africa (WEMA) project. Mock trials (involving nonmodified maize lines) were successfully conducted in 2009, but the project failed to proceed to the next step due to the very strict conditions imposed on CFTs of GM maize. WEMA is a drought-tolerant variety of maize being developed through public-private partnerships under the leadership of the African Agricultural Technology Foundation. This project covers Kenya, Uganda, Tanzania, South Africa, and Mozambique. Approvals to conduct CFTs have already been granted in Kenya, Uganda, and South Africa by the biosafety authorities in these countries.[8]

To illustrate the policy conflict in Tanzania, the minister for agriculture was recently quoted stating that "the government has no intention to open doors for GMOs in the country. For a GMO to be introduced in the country there are strict liabilities attached under the Environmental Management Act, 2004; therefore there is no need to panic because we are all patriotic and we would not like to put the future of our country in doubt. The government has its experts at Mikocheni area in Dar es Salaam who are conducting research on GMOs and that the experts have been cautioned not to make any dubious recommendations because of the sensitivity of the matter. The government is committed in preserving local seeds, and we will not let them be replaced by foreign seeds."[9]

Rwanda and Burundi

Like Kenya, Tanzania, and Uganda, both Rwanda and Burundi have ratified the Cartagena Protocol on Biosafety (discussed in section 3 below). Rwanda has a limited but growing range of applications of conventional biotechnology covering areas such as such as plant tissue culture. Burundi is not equipped either with a clear biotechnology and biosafety policy or with specific biosafety regulations. The main challenges for the further development of

7. United Republic of Tanzania, *National Biotechnology Policy*, Dar es Salaam: Ministry of Communication, Science, and Technology, 2010.

8. David Wafula, Michael Waithaka, John Komen, and Margaret Karembu, "Biosafety Legislation and Biotechnology Development Gains Momentum in Africa," *GM Crops and Food Biotechnology in Agriculture and the Food Chain* 3, no. 1 (January–March 2012): 72–77.

9. Tanzania Daily News, "Tanzania: State Not Ready for GMOs—Minister," *All Africa*, November 7, 2012, http://allafrica.com/stories/201211070167.html.

biotechnology in the two countries include a low human resource and infrastructure capacity and an absence of the key components of a functional biosafety system.[10]

The technologies in the pipeline in Kenya and Uganda have the potential to address food insecurity and nutritional aspects, poverty, human health, and climate change challenges. For instance, the drought-tolerant maize being developed under the WEMA project has the potential to increase yields by 25 percent under moderate drought conditions. The adoption of GM insect-resistant cotton in Kenya has the potential to increase yields by 25 percent and to reduce the cost of pesticide applications by 20 percent. The African Biofortified Sorghum project seeks to develop a more nutritious and easily digestible sorghum variety that contains increased levels of essential amino acids, especially lysine; increased levels of vitamin A; and more available iron and zinc. Likewise, cassava with increased vitamin A, iron, and protein is under development.[11]

10. Godliving Mtui, "Status of Biotechnology in Eastern and Central Africa," *Biotechnology and Molecular Biology Review* 6, no. 9: 183–98.

11. African Agricultural Technology Foundation, *Mitigating the Impact of Drought in Tanzania: The WEMA Intervention*, AATF Policy Brief (Nairobi: African Agricultural Technology Foundation, 2011).

3 The Policy Context for East Africa

International Agreements and Standards Related to Biotechnology and Trade

In parallel with the expanding use of and trade in GM products, debate has evolved about the potential environmental and human health risks posed by these products. Consequently, genetic modification and its products are commonly subject to government regulation and risk assessment to ensure their biosafety. Biosafety is achieved by systematically assessing and managing the environmental risks of a GM product, evaluating the potential environmental and health consequences, and weighing these against the potential benefits. A step-by-step, case-by-case approach fosters a deliberate and informed process, and a responsible use of biotechnology.

As shown in section 2 above, governments in Africa generally have begun to develop their national biosafety systems quite recently, and, as with other areas of regulation, the task has been difficult. For most of them, international agreements such as the Cartagena Protocol on Biosafety (CPB) are an important starting point.

The Cartagena Protocol on Biosafety: Key Provisions

The CPB is a supplement of the Convention on Biological Diversity (CBD) that addresses the environmental impact of transboundary movement and the management and safe use of genetically modified organisms. The CPB's objective is "to contribute to ensuring an adequate level of protection in the field of safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity, taking also into account risks to human health, and specifically focusing on transboundary movements."[12] The CPB entered into force on September 11, 2003, 90 days after receipt of the 50th instrument of ratification. As of December 2012, 164 countries had ratified or acceded to the CPB, including all the countries in East Africa.

The two cornerstones of the CPB affect international trade. These are the Advance Informed Agreement (AIA) and the precautionary approach. The AIA enables an importing

12. Convention on Biological Diversity, "Cartagena Protocol on Biosafety to the Convention on Biological Diversity," Secretariat of the Convention on Biological Diversity, Montreal, 2000, http://treaties.un.org/doc/Treaties/2000/01/20000129%2008-44%20PM/Ch_XXVII_08_ap.pdf.

country to subject all first imports of GMOs intended for introduction into the environment to risk assessment before making a final decision on whether to import the particular GMO. The CPB provides details on the whole process of notification, acknowledgment, and decisionmaking, which is supposed to be completed in 270 days. Detailed information must be provided by the importer on notification, and GMOs should be clearly identified by accompanying documentation. For GMOs intended for direct use as food or feed or for processing, the CPB suggests a simplified procedure rather than the full AIA. For such shipments, detailed documentation requirements have been defined. It is important to note that the parties to the CPB have the option of exempting imports of certain living modified organisms (LMOs) from the AIA procedure or to instead require a simplified notification procedure, provided that adequate safety measures are in place. This provision takes into account future situations, when specific LMOs will have a track record of safe use in a range of importing countries.[13]

The second cornerstone of the CPB, the precautionary approach, in plain terms allows countries to block imports of, for example, seeds of GM plant varieties on a precautionary basis even in the absence of sufficient scientific evidence of their harmfulness. In short, the most immediate focus of the CPB is on trade (import and export) of GM seeds intended for planting in the field, or for direct use as food and feed or for processing (FFPs). Before a GM seed can be shipped for the first time, the importing country must decide whether to approve it. If the seeds are approved for import, they will need documentation provided by the exporter specifying their identity and traits. While progress has been made by successive meetings of parties under the CPB in specifying the documentation requirements for LMOs and LMO-FFPs, this subject matter is still evolving.

Recent Developments Regarding the CPB

A number of issues that were pending at the time of the CPB's signing are gradually being addressed in successive meetings of the parties to the CPB. In October 2010, the CPB was "completed" with the adoption of the Supplementary Protocol on Liability and Redress, adopted at the Fifth Meeting of Parties in Nagoya, Japan. As adopted, it should strengthen the CPB's objective to provide for the safe transfer, handling, and use of LMOs that may have adverse effects on biodiversity by compensating for, and preventing, damage to the environment. Its effectiveness remains to be seen, as it relies on the ability of countries to measure this damage under the highly specific guidelines of an administrative approach rather than strict liability.[14]

Another key element being elaborated concerns risk assessment and risk management, which is the cornerstone to biosafety decisionmaking. The general principles, general methodology, and points to consider in risk assessment for LMOs are laid down in the CPB's Annex III. Recently, an expert group on risk assessment and risk management has been

13. Convention on Biological Diversity and United Nations Environment Program, *Biosafety and the Environment: An Introduction to the Cartagena Protocol on Biosafety* (Montreal and Geneva: Secretariat of the Convention on Biological Diversity and United Nations Environment Program, 2003).

14. Convention on Biological Diversity, "The Nagoya-Kuala Lumpur Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety: An Introductory Note in Preparation for Signature and Ratification," Secretariat of the Convention on Biological Diversity, Montreal, 2010.

established to, among other things, prepare a "road map" and an action plan and to consider possible modalities for cooperation in identifying LMOs or specific traits that may have adverse effects on biological diversity, taking also into account risks to human health.

Finally, a start has been made on defining socioeconomic considerations in LMO decisionmaking. Article 26 of the CPB establishes the right of parties to take into account socioeconomic considerations arising from the impact of LMOs on the conservation and sustainable use of biodiversity, especially with regard to the value of biodiversity to indigenous and local communities, in reaching a decision on whether to import LMOs. The inclusion of socioeconomic considerations in parties' decisionmaking on the importing of LMOs must be consistent with their other international obligations. The CPB also encourages parties to cooperate on research and information exchange on any socioeconomic effects of LMOs, especially on indigenous and local communities. Information exchange is being encouraged through surveys, the collection of case studies, and online conferences on socioeconomic considerations.

Relating to WTO Agreements: SPS and TBT

Governments in East Africa will need to carefully interpret and implement the CPB provisions in line with existing trade agreements that may affect GMOs, such as those governed by the WTO—of which most East African countries are members. Within the WTO, the biosafety of GMOs falls mainly under the Agreement on Sanitary and Phytosanitary Standards (SPS Agreement). The SPS Agreement does not explicitly address GMOs but is important as it deals with laws and regulations that concern food and feed safety, and animal and plant health. The SPS Agreement allows WTO member countries to take restrictive measures to protect themselves from food safety risks, animal health risks, and invasive species risks from GMOs. The agreement requires that such measures be based on scientific risk assessments based on internationally accepted standards, and that they do not arbitrarily or unjustifiably discriminate between countries so that any measures taken are not disguised trade restrictions. When GMOs are traded internationally and are considered as a threat to human, animal, or plant life, or health in an importing country, risk management measures can be taken prior to their import. Member states can also take into account relevant economic factors when taking sanitary or phytosanitary measures. The SPS Agreement allows for *provisional* precautionary measures in cases where scientific information is insufficient. In such cases, countries would be obliged to actively seek additional information for a more comprehensive risk assessment, and to review the provisional measure within a reasonable period.[15]

In addition to the SPS Agreement, the WTO Agreement on Technical Barriers to Trade (the TBT Agreement) may apply to GMO packaging and labeling. The TBT Agreement is intended to ensure that WTO members do not use technical regulations, standards, testing, and certification procedures as disguised measures to protect domestic industries from foreign competition. The TBT Agreement allows governments to adopt technical regulations if they

15. John Komen, "The Emerging International Regulatory Framework for Biotechnology," *GM Crops and Food Biotechnology in Agriculture and the Food Chain* 3, no. 1 (January–March 2012): 78–84.

protect human health or the environment. Such measures should not be unnecessarily trade-restrictive, and not discriminatory between locally produced and imported goods. It would apply, for example, in cases where a country requires imported products to include in their labels any traces of GMOs.[16]

The SPS and TBT agreements under the WTO encourage harmonization among member countries on the basis of internationally accepted scientific standards. The SPS Agreement explicitly recognizes the standards developed by three relevant organizations: the Food and Agriculture Organization / World Health Organization Codex Alimentarius Commission, the Office International des Epizooties (the World Organization for Animal Health), and the International Plant Protection Convention. These standard-setting bodies all have their working groups on the safety aspects of GMOs and GM foods, and the resulting standards, recommendations, and guidelines should be the basis for WTO members' sanitary and phytosanitary measures or technical regulations regarding LMOs.

The CPB and WTO agreements as introduced above clearly have different scopes and present varying perspectives on the trade flows of GMOs and their potential adverse effects, which may give rise to disputes between GMO-exporting countries and potential importers. While the SPS Agreement places the burden on countries imposing restrictive measures, the CPB imposes the burden on exporters under the AIA procedure. The risk of potential conflict will increase as the parties to the CPB adopt more detailed rules and implementation requirements over time. There is no template for ensuring WTO-consistency in the design or implementation of national laws and regulations on biosafety. Many aspects of the relationship between the CPB and the WTO remain unclear, and will be worked out in practice in the future.[17]

16. Ibid.
17. Ibid.

4 Analyzing the Trade Implications of GM Adoption

Fifteen years after their introduction, and despite well-publicized opposition in certain countries, the four main GM products—maize, soybeans, cotton, and canola—are widely traded and consumed internationally, especially because the largest exporters of these crops are also the largest GM adopters. For instance, it was estimated back in 2005 that over 80 percent of maize and 94 percent of soybeans traded internationally were likely genetically modified.[18] Also, in the European Union, large quantities of the above-mentioned GM commodities are imported each year.[19] Beyond these formal trade flows, GM seeds and products have also been moving informally across borders. The intentional introduction of unapproved GM seeds has moved across borders in multiple countries in the past, as shown with the initial introduction of GM cotton in India and of GM soybeans in Brazil.

Trade-related effects and access to export markets are regularly cited as a concern in East Africa. Destinations such as the European Union, where the level of caution and consumer skepticism is still high, have attracted a lot of attention. More specifically, several African countries have been preoccupied with the notion that the adoption of GM crops would cause a wholesale a rejection of agricultural exports by importing countries in the Western world, especially by European countries. The dilemma within policymaking circles has been how to harness the potential benefits of GM crops while preserving trade interests and niche markets.[20]

A closer look at real versus perceived trade risks is essential in this debate. In recent years, for example, research commissioned by the Common Market for East and Southern Africa (COMESA) analyzed the issue in more detail. Using international trade data, the COMESA-supported project "Regional Approach to Biotechnology in East and Southern Africa" calculated the export losses that might be incurred, for six selected country cases, if the commercial planting of GMOs were to begin and if all the agricultural exports of these countries that might possibly be considered "GM" would then be rejected by all importers

18. Guillame P. Gruère, "Global Welfare and Trade-Related Regulations of GM Food: Biosafety, Markets and Politics," paper prepared for presentation at the Agricultural & Applied Economics Association's 2010 AAEA, CAES & WAEA Joint Annual Meeting, Denver, July 25–27, 2010.

19. For a complete overview of approved products in the EU, see http://ec.europa.eu/food/dyna/gm_register/index_en.cfm.

20. Robert Paarlberg, David Wafula, Isaac Minde, and Judi Wakhungu, "Commercial Export Risks from Approval of Genetically Modified (GM) Crops in the COMESA/ASARECA Region," African Centre for Technology Studies, Nairobi, 2006.

in Europe. The estimates generated confirmed that, if European importers would reject all exports from the region that might possibly be GM or GM-derived (e.g., animal products that could have been raised with GM feed), the total monetary value of all commercial exports lost would still be quite small. The commercial export risks from planting GMOs were found to be small because the agricultural crops most heavily exported from Africa to Europe (e.g., coffee, tea, sugar, bananas, cocoa, oil palm, groundnuts, and other fruits and vegetables) are crops not yet being developed nor grown for commercial marketing in GM form anywhere in the world. So even the most sensitive importers would have no reason to reject them after an African country began planting crops such as GM cotton or maize, which are currently in the pipeline in Africa and are commercially planted in a few African countries. Moreover, most GM cotton and maize events that are currently produced commercially worldwide have received clearance from the European Food Safety Authority and are approved for planting or importation into the EU for direct use as food, for feed, or for processing.[21]

For the purpose of this paper, we have conducted a more in-depth analysis of agricultural trade profiles for Kenya, Tanzania, and Uganda in order to assess any probable trade risks from adopting GM crops that are currently in the pipeline. Our main findings are presented in the next subsection.

Trade Profile Analysis: Agricultural Exports

Five commodities—maize, cotton, cassava, bananas, and livestock—were selected to analyze the volume and value of trade among four East African countries (Kenya, Rwanda, Tanzania, Uganda, and Burundi), the rest of the African countries, Asia, Europe, and the Arab countries in the Middle East. Trade profiles developed for these countries covered both exports and imports over a five-year period from 2006 to 2010 with data obtained from the FAOSTAT[22] database, and synthesized in figure 1. Maize, cotton, cassava, and bananas and their respective processed products were selected to represent key staple/strategic food security crops in East Africa. GM varieties of the four crops have been introduced for research trials in Kenya and Uganda. It is anticipated that approval for their commercialization may have implications on intraregional and interregional trade flows. The magnitude of such perceived and envisaged trade-related risks is analyzed pertinently by reflecting on the key destinations and also the degree of sensitivity to adoption of GMOs for food and feed. Trade in beef and other livestock products that may be raised on GM feed has also been an issue of concern. Intraregional and interregional trade in cattle meat is included in the analysis to give an indication of the degree of risks associated with exports and imports.

MAIZE

The cumulative export profiles of maize and maize products for the period 2006–2010 show that Africa is the leading market destination for EAC countries. The countries on the continent accounted for 64.2 percent of the total value of maize and maize products exported

21. Ibid.
22. Food and Agriculture Organization, 2010, http://faostat.fao.org/.

to selected destinations. Kenya, Uganda, and Tanzania exported maize and maize products to African countries valued at $122.2 million over the five-year period. Kenya was the largest exporter, followed by Uganda and Tanzania. The high proportion of exports from Kenya could be attributed to the strategic location of Kenya as a major transit territory for food aid shipments to various destinations in East and Central Africa. The second most important destination was cross-border exports within the EAC region, representing 34.4 percent of the total value of exports. Uganda is the leading exporter, with total maize exports valued at $39.7 million, followed by Kenya, at $14.7 million; Tanzania, at $9.5 million; Burundi, at $0.3 million; and Rwanda, at $1.1 million. The value and proportion of exports outside Africa is comparatively low. Asia accounted for $2.07 million (1 percent) of the total value of exports to selected destinations; the Arab countries in the Middle East, for $0.27 million (0.14 percent); and Europe, for $0.24 million (0.12 percent). Maize oil is the main processed product exported by the EAC countries to various destinations.

COTTON

An analysis of exports of cotton and cotton products indicates that Tanzania is the leading exporter, followed by Uganda, Burundi, Kenya, and Rwanda. During the period 2006–2010, Tanzania exported cotton and cotton products to the rest of EAC countries valued at $267 million, followed by Uganda, $3.4 million; Burundi, $0.6 million; Kenya, $0.13 million; and Rwanda, $0.05 million. Asia is the most important destination for cotton and cotton products from the EAC countries, representing 49 percent of the total value of exports to selected destinations. The EAC is the second most important destination, accounting for 39 percent, followed by Europe, 9.4 percent; the rest of the African countries, 1.3 percent; and the Arab countries, 0.9 percent. The exports mainly consisted of value-added products such as cotton linter, cotton lint, cottonseed oil, and cotton carded or combed.

CASSAVA

Uganda is the leading exporter of cassava and cassava products in the EAC region. Uganda exported to the rest of EAC countries cassava valued at $0.8 million; to Tanzania, $0.5 million; to Kenya, $0.02 million; to Burundi, $0.004 million; and to Rwanda, $0.002 million. In the aggregate, exports within the EAC region accounted for 86.4 percent of the total value. The rest of African countries registered 10 percent of the total value; Europe, 0.85 percent; and the Arab countries, 1.71 percent.

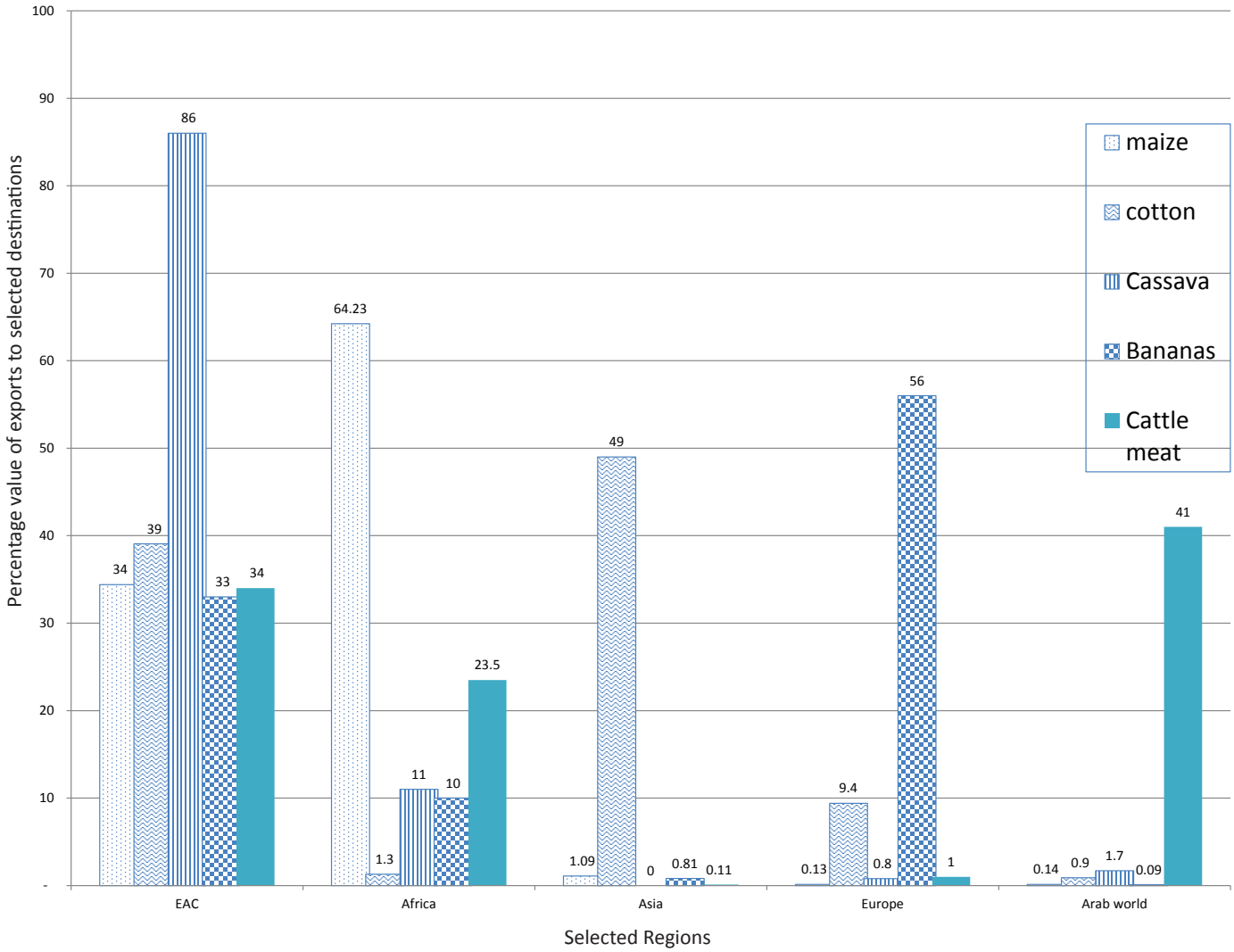
BANANAS

During the five-year period of analysis, Uganda was the lead exporter of bananas within the EAC region, with exports valued at $0.3 million, followed by Tanzania, $0.03 million; and Rwanda, $0.001 million. Kenya and Burundi did not register any exports of bananas to the rest of the EAC countries. Kenya was the leading exporter to the rest of the African countries ($0.1 million) and Europe ($0.2 million). In the aggregate, Europe is the most important market destination, representing 56.4 percent of the total value of exports, followed by the EAC region, 33.15 percent; the rest of the African countries, 9.5 percent; Asia, 0.81 percent; and the Arab countries, 0.09 percent.

CATTLE MEAT

Kenya is the leading exporter of cattle meat within the EAC countries, and its registered exports were valued at $2.1 million, followed by Uganda, $0.3 million; Rwanda, $0.03 million; and Burundi, $0.03 million. Tanzania did not export any cattle meat. Other important destinations for cattle meat exports from Kenya were the Arab countries, which were valued at $3.1 million, and the rest of the African countries, at $0.7 million. In the aggregate, the Arab countries are the leading market destinations for cattle meat exports from the EAC countries, accounting for 41.24 percent of the total value; exports within the EAC countries accounted for 34.14 percent, and the rest of the African countries accounted for 23.5 percent. Exports to Europe and Asia were negligible, representing 0.92 percent and 0.11 percent, respectively.

Figure 1. Proportion of Exports from EAC Countries to Selected Regions

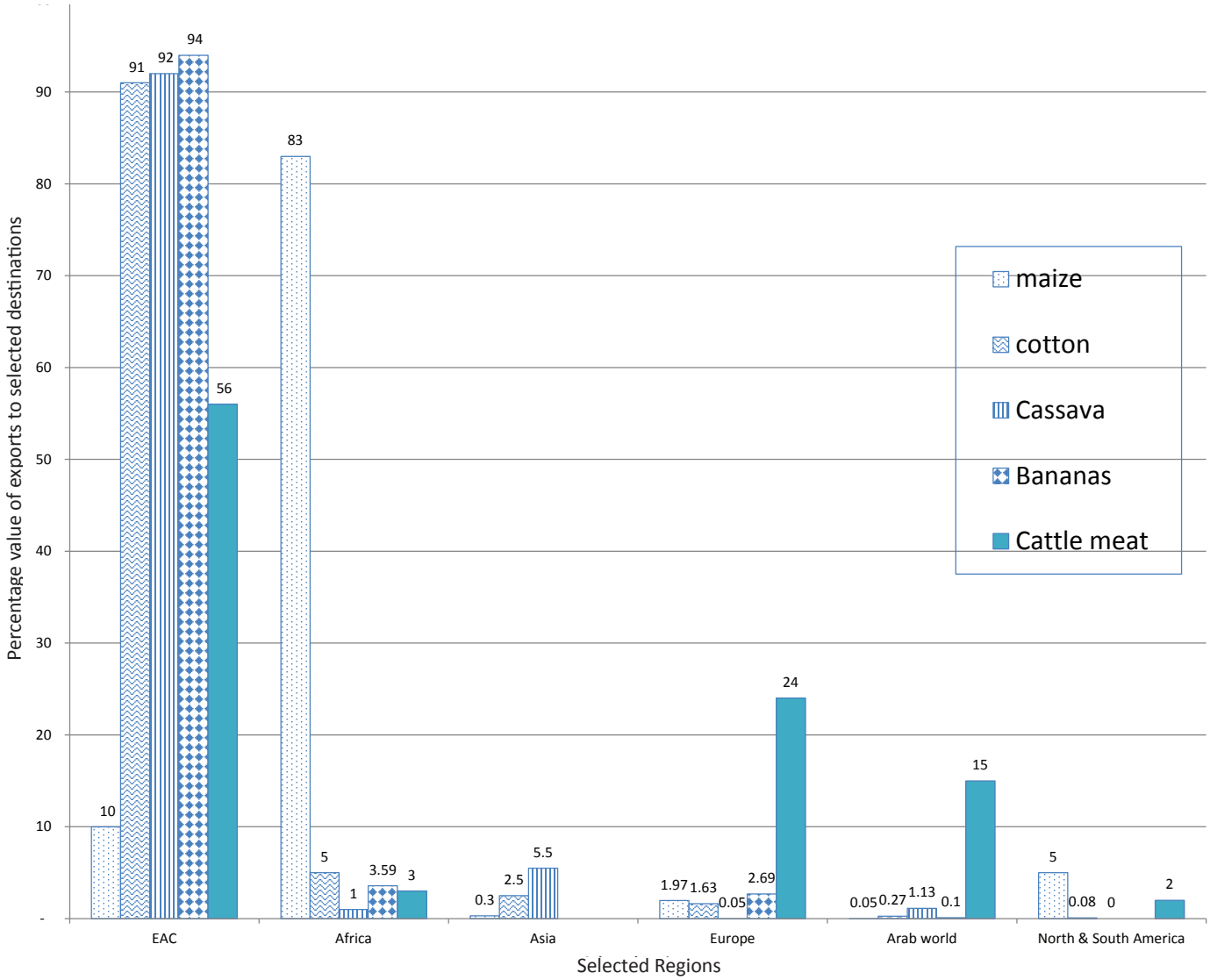


Source: Food and Agriculture Organization of the United Nations, 2010, http://faostat.fao.org/.

Trade Profile Analysis: Agricultural Imports

Figure 2 summarizes the value of imports by EAC countries from selected destinations expressed as a percentage of the aggregate value of all imports for the five products selected for analysis.

Figure 2. Proportion of Agricultural Imports to EAC Countries



Source: Food and Agriculture Organization of the United Nations, 2010, http://faostat.fao.org/.

MAIZE

The import profiles of maize and maize products within the East African countries indicate that Kenya is the leading importer, followed by Rwanda, Tanzania, Burundi, and Uganda. During the period 2006–2010, Kenya imported maize and maize products valued at $27.6 million. Rwanda recorded imports valued at $16.5 million; Tanzania, at $3.3 million; Burundi, at

$2.9 million; and Uganda, at $2.6 million. Cross-border trade within the EAC region and the rest of the African countries are the main sources of imports. The two sources represented 93 percent of the total value of imported maize and maize products. The next most important source were the North and South American countries, accounting for 5.5 percent of the value of imports, followed by Europe, 1.97 percent; Asia, 0.3 percent; and the Middle Eastern Arab countries, 0.05 percent. Maize oil is the main product that was imported from countries such as the United States, Brazil, Argentina, Belgium, Italy, the United Kingdom, Switzerland, Singapore, Malaysia, Egypt, and the United Arab Emirates. The rest of the EAC countries also depend on Kenya for maize oil imports.

COTTON

Imports of cotton and cotton products are, like maize, predominantly concentrated within the EAC countries. Kenyan import value for the 2006–2010 period amounted to $24.7 million, followed by Uganda, $3 million; Rwanda, $1.8 million; Burundi, $0.2 million; and Tanzania, $0.16 million. Imports of cotton and cotton products within the EAC countries amounted to 91 percent of the total value of cotton imported from the selected regions. The rest of the African countries accounted for 5 percent of the total imports, followed by Asia, 2.5 percent; Europe, 1.63 percent; the Arab countries, 0.27 percent; and North and South America, 0.09 percent.

CASSAVA

Trade within the EAC countries also accounts for a significant proportion of imported cassava and cassava products. Rwanda was the leading importer of cassava, valued at $1.2 million, followed by Burundi, $0.3 million; Kenya, $0.1 million; and Uganda, $0.02 million. Tanzania did not record any imports within the EAC bloc. The EAC countries accounted for 92 percent of the total imports, followed by Asia, 5.5 percent; the Arab countries, 1.13 percent; the rest of the African countries, 1 percent; and Europe, 0.05 percent.

BANANAS

The value of imported bananas is high within the EAC countries compared with other selected sources. The value of bananas imported by Rwanda over the five-year period was $0.6 million, followed by Uganda, $0.2 million; and Kenya, $0.04 million. Burundi is the smallest importer of bananas in the EAC region. The proportion of bananas imported within the EAC was 94 percent of the total value of imports from the selected destinations, followed by the rest of the African countries, 3.59 percent; Europe, 2.69 percent; and the Arab countries, 0.10 percent.

CATTLE MEAT

Cattle meat imports within EAC are high compared with any other region. Burundi is the largest importer, accounting for $0.4 million, followed by Tanzania, $0.2 million; and Rwanda, $0.02 million. Kenya and Uganda did not record any imports of cattle meat during the five-year period. The share of imports within the EAC amounted to 56 percent, followed by imports from Europe, 24 percent; the Arab countries, 15 percent; the rest of the African countries, 3 percent; and the North and South American countries, 2 percent.

Analysis of the Trade Implications

The data given above (see also Figure 1) confirm that the adoption of GM varieties of maize, cotton, and cassava is unlikely to have adverse effects on trade with potentially GM-sensitive destinations, such as Europe. First of all, various GM varieties of maize and cotton are traded worldwide and are generally accepted for processing as food, feed, and fiber. Second, a large proportion of exports is concentrated within the EAC region and the rest of the African countries. For instance, the EAC countries and the rest of the African countries, combined, account for the largest share of maize and maize product exports, amounting to 98.6 percent of the total value. Exports of cassava and cassava products to the EAC and the rest of the African countries added up to 96 percent of the total value. Exports of cotton and bananas represented 40 percent and 42 percent, respectively, of the total value of exports to various destinations; cattle meat exports accounted for 57 percent of the total exports. The proportion of maize and cassava exports to Europe is insignificant, accounting for only 0.12 and 0.85 percent of total export value, respectively. Bananas are the only product accounting for a high proportion of exports (56 percent) from the EAC countries to Europe that may encounter market barriers due to sensitivity to GMOs. Kenya is the largest exporter to Europe, and so far no expression of interest to introduce GM bananas for trials has been shown by technology developers.

The trade profile analysis strongly points to a high concentration of agricultural trade (exports as well as imports) within the EAC and the rest of the African countries. Aggregation of the total value of imports indicates that the EAC and the rest of African countries accounted for 91 percent of maize and maize products, 96 percent of cotton and cotton products, 93 percent of cassava and cassava products, 97 percent of bananas, and 59 percent of cattle meat imports. The monetary value and volume of exports to GM-sensitive destinations is very small and in most cases negligible. Although the Arab and Asian countries happen to be important destinations for commodities such as cotton and cattle meat, the degree of risk can be safely assumed to be low. Asian countries such as India and China have commercialized GM cotton, and they also import GM commodities for food and feed. Moreover, the Islamic community in the Arab countries has adopted a positive stance toward GMOs. For example, an International Workshop for Islamic Scholars on Agri-Biotechnology and Shariah Compliance recommended that "in ensuring food security, our Islamic obligations require us to urge all Muslim countries, governments, international organizations and research institutions, to support research and development and use of modern biotechnology, genetic engineering and their products."[23]

From the foregoing observations, it follows that the degree of risk associated with the commercial adoption of GM crops such as maize, cassava, and bananas is first and foremost an intraregional issue. This should be addressed early enough by regional regulatory dialogues and by accelerating the processes of harmonizing biosafety policies, in order to mitigate any market access bottlenecks. Given that the regional integration initiatives in Africa

23. Malaysia Biotechnology Information Center, "International Workshop for Islamic Scholars on Agribiotechnology: Shariah Compliance," Georgetown, Penang, Malaysia, December 1–2, 2010.

pay much attention to trade in key agricultural commodities and the need to minimize tariff and nontariff barriers, matters concerning decisionmaking on GMOs should be adequately mainstreamed into the regional integration policy and technical instruments. The East African Community Protocol on Environment and Natural Resources Management covers biosafety and biotechnology under Article 26. The protocol states that partner states shall develop and adopt common policies and laws that will harness the potential benefits of modern technology and prevent harmful effects of technology.[24] However, the EAC Secretariat has not yet made considerable progress in operationalizing and institutionalizing this provision.

The analysis therefore reaffirms previous studies conducted by Paarlberg, Anderson, and Jackson and by the International Food Policy Research Institute.[25] These studies stressed the need for policy coordination on GMOs at the regional level and also observed that the welfare gains associated with the adoption of GM crops outweigh the possible gains tied to greater market access in restrictive export destinations such as the European Union.

24. African Union, *African Strategy on Biosafety*, EXT/AU/EXP/ST/4(II) (Addis Ababa: African Union, 2006).

25. Paarlberg et al., "Commercial Export Risks"; Kym Anderson and Lee Ann Jackson, "Some Implications of GM Food Technology Policies for Sub-Saharan Africa," *Journal of African Economies* 14, no. 3 (2005): 385–410; Guillaume P. Gruère and Debdatta Sengupta, "The Effects of GM-Free Private Standards on Biosafety Policymaking in Developing Countries," *Food Policy* 34, no. 5 (2009): 399–406.

5 Trade Effects Through Private Standards

The analysis of trade profiles presented in section 4 above suggests that there would be only very limited effects on East African trade following the commercial adoption of agricultural GMOs. However, simply dismissing the perceived GMO trade risks as irrational fears would be naive. For instance, recent studies conducted by the International Food Policy Research Institute confirmed the strong influence from agri-food retailers and supermarket chains that have adopted their own "GM-free" standards.

Gruère and Sengupta provide a review of international cases where GM-free private standards set up by supermarkets or other buyers in developed countries have affected biosafety decisions, including commercialization in developing countries.[26] They reported on 31 cases where GM-free private standards influenced biosafety or biotechnology policy decisions, either directly or indirectly, in 21 countries, among which several were African countries. While not directly influencing any countries' decisions, the major food companies are indirectly influential because they set their own policies on GMOs and are therefore a factor that policymakers in Africa need to consider.

In the mid-1990s, GM-free private standards evolved from an increasing wariness among European consumers toward the increasing production and consumption of GM crops. Several supermarket chains seized on this fear, choosing to avoid GM ingredients in food items and then marketing these items as higher in quality. The demand for GM-free food items resulted in GM-free requirements for their suppliers in exporting countries. Traders and producers had to adapt by taking measures against the presence of any GM product in their country.

Gruère and Gupta classify the 31 cases into three categories: (1) cases where the alleged export risks associated with a specific decision on GM crops are largely unfounded; (2) cases where the export risks and policy decisions are debatable; and (3) cases where decisions are supported by real commercial risks. Interestingly, the authors note that Sub-Saharan Africa is the region where the most cases with unfounded risks are being reported. Several cases relate to cash crops. It is traditionally known that African countries have been leading exporters of cash crop commodities such as tea, coffee, cocoa, pyrethrum, sugar, tobacco, bananas, and a wide range of horticultural products to various destinations around the world. GM varieties for these traditional exports have yet to be developed, and the current level of consumer acceptance, or lack thereof, is unlikely to drive

26. Gruère and Sengupta, "Effects of GM-Free Private Standards."

any commercial interest in releasing GM varieties of these crops. This being the case, there are unrealistic and unjustified requirements from some of the export destinations.

For instance, Gruère and Sengupta report that GM-free certification is required for exports of tea from Kenya to the United Kingdom, while it is commonly known that GM tea has not been developed or commercialized anywhere in the world. They also find reports of organic producer groups in Kenya believing that producing GM field crops would jeopardize their exports of horticultural products. The Kenya Organic Agriculture Network, for example, expressed concerns that the introduction of GM varieties of maize or cotton would affect market access for horticultural products that are organically produced. Yet gene flow, or "contamination" from maize or cotton to horticultural products, cannot occur because the products are not biologically compatible.

These and others cases provide qualitative evidence of conceivable decisions in the presence of possible but unproven export risks in African countries.

6 Trade and Food Security Effects from Import Restrictions

Given the fact that the East African countries generally have a limited capacity in agricultural biotechnology, and that their national biosafety institutions and procedures for GMO decisionmaking are still evolving, government measures are sometimes taken regarding GMOs that contradict national policies. The decision by Kenya's Cabinet in November 2012 to ban imports of GM grains is a case in point, and will be elaborated in this section.

On November 8, 2012, Kenya's Cabinet chair, President Mwai Kibaki, directed the public health minister to ban the importation of GMOs until the country has certainty that GMOs have no negative impact on public health. This follows claims made in a recent paper by a team from the University of Caen, France, headed by Gilles Séralini, suggesting a causal link between the consumption of herbicide-tolerant maize (event NK603) and tumor development in rats.[27] These claims have been convincingly refuted by academic and regulatory authorities worldwide.[28]

Nevertheless, Kenya's Cabinet issued a statement that "there is no sufficient information about on the dangers of such foods" and ordered that the ban remain in force until there is sufficient information, data, and knowledge indicating that GMOs are not dangerous to public health. This decision was followed by a widely covered press conference on November 21, in which the minister for public health, Beth Mugo, said that a ban on the importation of GMOs remains until conclusive studies are completed. The move by the minister follows a directive by the Public Health Ministry until the necessary information about GMOs' impact on public health is verified. Mugo further said that government agencies have been instructed to immediately comply with this directive and enforce the ban on the importation of all GMO foods.

Since being recently adopted (June 2012), stringent labeling regulations already have had a negative impact on commercial imports of GM commodities into Kenya, and this ban primarily affects emergency food aid importations. Regarding the labeling of GM products, the Government of Kenya issued regulations requiring that all GM-derived products be labeled from production to marketing, which would include open air markets. The regulations also impose highly punitive fines of Kshs 20 million and a 10-year jail term if

27. Gilles E. Séralini et al., "Long-Term Toxicity of a Roundup Herbicide and a Roundup-Tolerant Genetically Modified Maize," *Food and Chemical Toxicology* 50, no. 11 (November 2012): 4221–31.

28. European Food Safety Authority, "Final Review of the Séralini et al. (2012a) Publication on a 2-Year Rodent Feeding Study with Glyphosate Formulations and GM Maize NK603 as Published Online on 19 September 2012 in Food and Chemical Toxicology," *EFSA Journal* 10, no. 11 (November 2012): 4221–31.

a trader fails to comply. It is not clear what prompted the government's move to adopt these regulations, as stakeholder consultations were assumed to be ongoing at the time.

According to the chairman of the Cereal Millers' Association, Diamond Lalji, "We are reluctant to import GMOs. Mandatory labeling requirement makes the products less attractive. Labeling GMO products creates an impression that they were not safe." The recent outright ban will add to the recent price hike for imported cereals, given the 30 percent higher price for cereal imports from non-GM-producing countries—as reported by Kenya's Cereal Millers' Association. Kenya will need to source its structural maize deficit (which was about 300,000 metric tons in 2011) from only non-GM producers. This can also be exacerbated by sporadic shifts in national trade policies. For example, Malawi is a major source of non-GM maize for Kenya. However, in 2011, the Government of Malawi unexpectedly suspended all export licenses for maize and maize products in the face of fears over looming shortages. The export ban further reduced Kenya's sourcing options in the region. It is as yet unclear exactly how the decision will have an impact on relief operations in Kenya, but it will definitely make the provision of emergency food aid more complicated and more expensive. In its current form, the ban would prohibit food assistance to Kenya that uses any form of "corn-soy blend," a common commodity used for emergency feeding programs. It is estimated that 2.2 million Kenyans rely on food aid.

According to Rose Ogola of the World Food Program, "thousands of Kenyans relying on relief supplies would be the hardest hit by the Cabinet ban on the importation of genetically modified foods. We have not yet assessed how this will affect the supplies at hand, let alone those in the pipeline." Kenya's National Biosafety Authority (NBA) was sidelined in the decisionmaking process. The NBA has the legal mandate, under Kenya's Biosafety Act (2009), to make science-based decisions on all types of GMO applications (contained use, environmental release, imports, and exports). The NBA has well-trained staff in its executive office, and relevant food safety expertise on its scientific board. Since its establishment in 2010, the NBA has issued 28 approvals for GM commodity imports, based on sound scientific assessments. This ban demonstrates a weakness in Kenya's legislative process and regulatory system, as one the Public Health Ministry's concerns and a resulting presidential and Cabinet decree usurped Kenya's agricultural biotechnology law, regulations, and institutional authorities mandated to address the safety of GM products.

Beyond trade and food aid effects, implications of the ban will be significant for Kenya. The decision will further hinder Kenya's investment in GM technology to modernize its agricultural production. As noted by Richard Okoth, a biotechnology scientist at Kenyatta University, Nairobi, the government's imposition of a ban while continuing to fund research on biotechnology through the National Council for Science and Technology is a contradictory position.[29] "The essence of GMO research is to provide a product that can complement efforts toward food security. This ban will discourage research, as the product for which the research is being conducted has been placed on import ban," Okoth said. Biotechnology research funding might be compromised, as international donors could be reluctant to provide funds following the ban.

29. Otieno Owino, "Scientists Torn over Kenya's Recent GM Food Ban," *SciDev*, November 30, 2012, http://www.scidev.net/en/sub-suharan-africa/news/scientists-torn-over-kenya-s-recent-gm-food-ban-1.html.

7 Conclusions and Recommendations

The potential and actual welfare gains of adopting GM crops and products are well documented in a growing body of peer-reviewed literature. Nevertheless, it is also becoming evident that some East African countries, including Kenya and Tanzania, have taken very precautionary policy decisions on GMOs and/or have adopted stringent biosafety laws and regulations. These decisions, as shown in this report, are likely to impede investments in relevant biotechnology research and development, as one promising option for addressing food insecurity and coping with the challenges associated with climate change. Moreover, import restrictions on GM grains are affecting food security through price hikes for staple foods and emergency food aid. Controversies about the importation of GM maize—from, for example, South Africa and Argentina—emerge regularly throughout Africa, even though regulatory authorities have declared the products to be safe.

The national biotechnology policies of the East African countries generally contain policy statements that recognize the potential and contribution of modern biotechnology in meeting socioeconomic development goals. In contrast, their biosafety regulations sometimes have stringent provisions that will undermine efforts to meet broader national developmental goals. In addition, they hinder efforts toward regional integration and free trade agreements to which they have subscribed in regional bodies such as the EAC and COMESA. The East African countries also face the danger of violating WTO accords such as the SPS and TBT agreements. The imposition of restrictions on cross-border trade in GMOs and their products, even among countries that have agreed to dismantle trade barriers, is likely to have a significant negative effect on intraregional trade and will hamper economic development. The clear disconnect between national biotechnology policies and biosafety laws and regulations is a crucial agenda item that needs to be addressed as a matter of urgency.

The analysis in section 4 above confirms that the adoption of GM varieties of maize, cotton, and cassava, which are currently being tested in East Africa, is unlikely to have adverse effects on trade with potentially GM-sensitive destinations such as Europe. First of all, various GM varieties of maize and cotton are trade worldwide and are generally accepted for processing as food, feed, and fiber. Second, a large proportion of exports is concentrated within East Africa and the rest of the African countries.

Because the lion's share of agricultural exports from the African countries goes to other countries in the region, a common approach to and, ideally, harmonized policies

toward imports and exports of GM commodities will be essential. Clear policies governing GM commodity trade across Africa will be a prerequisite to enable expanded, intraregional trade involving GM commodities in the future. The degree of trade risks associated with the commercial adoption of GM crops is first and foremost an intraregional issue.

Given that the regional integration initiatives in Africa pay much attention to trade in key agricultural commodities and the need to minimize tariff and nontariff barriers, matters concerning decisionmaking on GMOs should be adequately mainstreamed into the regional integration policy and technical instruments. It is encouraging to note that most regional economic communities in Africa, such as COMESA, have taken steps to formulate common policies on biotechnology and GMOs, also covering trade and food aid. Such initiatives should be supported by the international community, and furnished with policy analysis in order to arrive at informed decisions.

To conclude, our main recommendations are as follows:

1. The East African countries should carefully weigh the environmental, food safety, and trade-related benefits and risks of adopting GM crops, on a case-by-case basis, based on sound science and data.
2. The governments in East Africa should be cognizant of the longer-term implications of adopting regulatory frameworks and policy decisions on GM products that affect domestic food security and trade in agricultural commodities.
3. Subregional economic integration efforts offer opportunities to cooperate on matters of biosafety and GMOs. The East African countries should work toward ensuring that their national biosafety frameworks are aligned with the EAC's trade and economic policies as well as relevant WTO agreements.
4. Cross-country cooperation offers opportunities to pool expertise within the East African subregion, and to reduce the costs related to biosafety decisionmaking through the sharing of resources and facilities.

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