The GM debate in East Africa

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The role genetically modified (GM) crops can play in meeting Africa's long-term food security needs is a serious debate. There are many challenges hampering African agricultural productivity and, given that only a third of African lands use even basic hybrid seed, countries and donors must carefully evaluate the benefit of investing in GM technology, especially if it comes at the expense of other parts of the agriculture sector.

During the course of a 12-month period, from 2012 through 2013, the Center for Strategic and International Studies (CSIS) undertook research to assess the potential for GM crops to contribute to food security in East Africa. Our three-person research team spent a week in each of three countries: Kenya, Tanzania and Uganda. We interviewed more than 150 people, and visited farms, research stations, media outlets and non-governmental organisations (NGOs). Our goal was to assess the state of the public debate and views of smallholder farmers, and gain a better understanding of the status of bio-technology research, regulatory and legislative efforts related to GM crops, and the forecast for adoption.

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polarised debate, often reflecting the strife experienced in the USA and Europe. The absence of commercially available products and significant communication gaps between key stakeholders compounds the confusion. Overall, in the three focus countries, politicians and the public have not been effectively engaged with objective scientific evidence that articulates exactly what the technology is, how it works, and how it might address food security challenges. While some forums for open discussion and exchange exist, debates are often intense and emotional, making it challenging to determine the path that will best benefit the country. Ultimately, GM crop cultivation in any of the countries could have a significant impact in the region. The three countries watch each other closely, and their economies are closely linked. If any of the countries commercialises GM crops it will be difficult to contain these crops within national borders.

Compared to its neighbours, Kenya embarked on an early path towards cultivating and regulating GM crops. It has led the region in developing a robust regulatory system and building its scientific capacity. Kenya has established a regulatory agency for biotechnology review and approval, and the country's advanced scientific community has a number of confined field trials underway in GM cassava, maize, sorghum and cotton. But a legal framework alone does not ensure the development and commercialisation of these crops, especially when the regulatory system is subject to political whims. In November 2012, Kenya's Minister of Public Health and Sanitation convinced

the cabinet to support her ban on GM food products. In effect, the Kenyan government disregarded its own biosafety experts and regulatory legal system, which is indicative of the role that politics and personalities will play in the development and commercialisation of GM products.

Kenya may be better positioned over the long run, but has not had the concentrated focus from government that is needed in the absence of concerted demand from farmers for new varieties of crops.

Tanzania has an uphill battle in adopting the technology, with great public antipathy towards GM crops and general mistrust of private companies seeking to make a profit at the expense of farmers and the environment. Tanzania's regulatory system is among the most restrictive and precautionary in Africa, and includes policies of strict liability and strict redress. The President has equivocated in his support of GM technology, and there is internal political opposition among some of the ministries. However, as the recipient of significant US and other foreign assistance in agriculture, the Tanzanian government is under pressure to develop a more accepting regulatory position towards GM crops, which would create a more inviting agricultural investment environment. Tanzania has a strong but comparatively small scientific community that is frustrated by the restrictions on advanced research. Like Kenya and Uganda, Tanzania is part of the Water Efficient Maize for Africa (WEMA) project, which in addition to developing conventional drought-tolerant varieties is researching GM varieties. However, Tanzania's regulatory structure has prevented it from conducting confined field trials

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of the GM varieties as the government has deferred participation in the GM component of the project. Regardless of Tanzania's policies, should its neighbouring countries adopt GM crops, the porous borders would allow seeds to be easily transported into Tanzania – intentionally or not.

Uganda's burgeoning scientific capacity, research efforts and developing biosafety regulatory system have resulted in both regulatory and research progress. Uganda has worked to move legislation through parliament, emphasising the importance of biotechnology for reducing pests and diseases that impair food security. At the same time, research centres are advancing trials on bananas that have made headway but still have not achieved the variety that will fully appeal to the Ugandan palate. Although its barriers to adoption are lower than Kenya's and Tanzania's given its less open political environment, it acknowledges that there is still a long road ahead.

Though Uganda undertook GM research to combat diseases that were destroying bananas, the country's staple food crop, there is not yet a driving demand for GM products among end users – farmers and consumers.

Main observations

GM debate

It is widely recognised among the countries' scientific communities that GM crops could have a significant impact in addressing specific challenges, including improving productivity, combating crop diseases, enhancing the nutritional content of food, and mitigating impacts from climate change.

However, the nature of GM research and regulation is distinctly reflective of each country's local context and governance system. Opinions tend to follow the same trends as the global debate, in part due to the fact that both research initiatives and opposition groups are often funded by European and US NGOs and governments. Political will matters greatly for this issue. Because this is a niche topic among African policy makers and there is not a strong demand signal from farmers, a political champion is required to see the issue through the government and legislature. Leadership and political will significantly impact broader attitudes towards GM products, along with ongoing and future GM research, development, adoption and commercialisation.

Sustaining momentum on the development and regulation of GM crops will be difficult in the face of a variety of forces: vocal opposition from a small constituency of highly engaged activists, bureaucratic inertia or ambivalence, and long delays as products move through the testing procedure. Countries that do wish to pursue GM crops should be prepared for a long process that requires sustained effort from a host of different constituents.

Investment in agricultural delivery systems is essential

Even in the event of successful commercialisation, poor agricultural infrastructure and the lack of effective channels to disseminate technology to smallholder farmers is an overarching challenge. The large majority of smallholder farmers have not adopted basic existing technologies and practices. Extension systems remain chronically weak and could dampen any potential impact of GM crops should a country choose to adopt them. New and

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creative approaches to extension and education in agriculture must become a priority.

The seed sector in each country is weak and unable to meet current demand, and is often infiltrated with counterfeit products. Estimates from domestic trade organisations note that less than a third of farmers in Sub-Saharan Africa plant improved seed varieties, and representatives stated that seed breeders and distributors are unable to meet demand. For GM crops to make an impact in the region, scientists, businesses, policy makers and other interested parties need to work on the supply side, focusing both on quantity and quality. To increase demand, products with desirable traits need to be on the market and available for farmers to choose. Currently, most of the products under development do not meet the taste, appearance or cooking preferences of most consumers – highlighting the inherent challenge of GM crops in a setting where farmers are the consumers, unlike in many developed countries where farmers do not routinely consume the GM crops they grow.

Regulatory capacity

It is clear that political bureaucracy plays a determining factor in the development of biosafety regulatory systems and the degree to which they foster the development of GM crops. The institutional structure that governs agricultural research, agricultural policy and biosafety plays an important role in advancing research and implementation. The particular focus of each regulatory system has an important bearing on the potential for development and adoption. In Uganda, the environment is enabling and communications are quite uniform. Governing structures around biosafety

have been generally well harmonised, with an early and consistent consultative process within government and greater consensus on the balance to be struck between biotechnology promotion and biosafety precaution. In Kenya, the regulatory system is robust but potentially limiting and subject to political intervention. In Tanzania, it is highly restrictive and the divisions and lines of authority around biosafety issues have created occasional tensions and jurisdictional uncertainties.[1]

Scientific capacity

African researchers are adapting donated GM varieties – for sweet potatoes, cassava and other crops – for relevance and preference within their individual countries. They are keen to drive the development of relevant transgenic technologies within their respective countries and throughout the region. Within the scientific establishment in each country visited, there is a sense of pride in the local advances in biotechnology and an eagerness to harness science to solve national and regional food security and development challenges. In each country, GM technologies will be developed and owned by public research facilities, so concerns about intellectual property rights are largely irrelevant even though these concerns still persist among many NGOs and with the general public. Many within the research establishment say that they need to better educate the public and policy makers on GM products and more effectively communicate the benefits and possible risks.

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Smallholder farmers

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modification and, because GM crops have not yet become publicly available, their potential remains a largely abstract concept. One view, expressed by a senior official at the Ugandan Science Foundation for Livelihoods and Development, is that "farmers are open to options as long as they work, and as long as it gives some value added".[2]

But without a product available to make that calculation, there is no strong demand signal from smallholder farmers for the technologies, and other pressing priorities at present take precedence.

Farmers will need good products and information in order to shift to using GM crops. Subscription-based services, enhanced extension efforts and community-based farm leaders may be able to perform the role of trainers and educators.

Regional and trade dynamics

There is a fear that the commercialisation of GM food crops by East African Community (EAC) countries could negatively impact export markets. However, when analysing trade data for GM crops under development (maize, cotton and cassava) there is little evidence that commercialisation would pose significant trade losses, as the majority of these crops are staple food products traded intra-regionally not internationally.

Work is being conducted by a small group of experts through regional bodies such as the EAC and Common Market for East and Southern Africa (COMESA),

but national policies and decisions will likely shape regional regulation of GM products. Nonetheless, as Uganda and Kenya move towards possible commercialisation of GM crops, the EAC will need a more harmonised framework for export, trade and biosafety regulation within member countries. Successful commercialisation of GM crops by one of these countries could accelerate adoption in the region as farmers and policy makers gain more tangible evidence of the possible benefits and drawbacks.

Conclusion

In the course of our research effort it became clear that there are two important reasons why governments and donors have chosen to focus on genetic engineering and biotechnology. One is that they have the potential to play an important role in battling pernicious pests and diseases as well as improving nutrition and reducing the use of water and chemicals, all of which can benefit farmers and consumers. Secondly, scientific progress will be enhanced if researchers have the opportunity to push their research and findings into new areas of discovery. There are scientific communities and research facilities in each country to host this activity, and there are scientists in developed-country universities and companies that are partners on the research efforts. However, each country has to overcome significant hurdles to the development and adoption of the technology.

As Kenya, Tanzania and Uganda move forward in their domestic debates on GM crops, it will be important for their governments, donors, the media and scientists to prioritise pathways for agricultural research that will have the greatest impact on food

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security in East Africa. GM crops may very well play an important role but, in all cases, for any technology to truly contribute to development and food security, the broader agricultural systems will require sustained and focused investments. Such investments would enable scientists to produce research and outcomes that will promote food security in their countries, improve extension and education for farmers to learn and adopt new methods of planting and stewardship, and build reliable seed systems with the capacity to meet demand with legitimate products.

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