

# GETTING TO ‘YES’: GOVERNING GENETICALLY MODIFIED CROPS IN UGANDA

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**Abstract:** This paper critically examines the evolution of the regulatory regime to review and manage the potential social, environmental and health risks associated with the introduction of genetically modified organisms in Uganda. It reveals how and why institutions responsible for governing genetically modified crops have evolved over time and the implications of this progression. The paper investigates the inter-relationships that connect the various elements of genetically modified organism regulation, arguing that current policy and legislative efforts are the results of the early establishment of institutions and processes tailored towards the eventual endorsement of these technologies. Copyright © 2014 John Wiley & Sons, Ltd.

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## 1 INTRODUCTION

Africa has emerged as the ‘final frontier’ for genetically modified organisms (GMOs), having already penetrated food production systems on every other continent (Karembu, Nguthi, & Abdel-Hamid, 2009). Proponents argue genetically modified (GM) crops have the potential to improve yields and livelihoods and transform African agriculture by alleviating food shortages and facilitating economic development, whereas critics suggest that African farmers lack the seed distribution mechanisms, access to information and extension services, and risk management apparatuses needed to capitalise on these technologies (Tripp, 2001; Chataway, 2005; Spielman, 2007). Three African nations (South Africa, Burkina Faso and Sudan) are currently cultivating GM crops commercially, with another five (Kenya, Malawi, Nigeria, Uganda and Zimbabwe) conducting field trials

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(James, 2013). More than a dozen more nations are expected to pass legislation facilitating the commercialisation of GM technology within the next few years.

One of the key issues in the debate over the potential for GM crops to transform African agriculture is whether effective regulatory and monitoring regimes exist to evaluate and manage the potential social, environmental and health risks associated with these technologies. GMO's most ardent supporters maintain that the continent's current approach to regulation is excessive and constitutes the single biggest obstacle to 'unlocking GM's potential' (Cohen & Paarlberg, 2004: 1574). Proponents further contend that the African policy environment is based on 'extreme precaution', reflecting an 'incipient hostility' to biotechnology (Paarlberg, 2008: 118) that remains 'unfavourable' towards biotechnological improvements in agriculture (Juma, 2011: 12). The World Bank echoes these assessments, lamenting Africa's antiquated regulatory capacity as a 'major factor slowing approvals, even of products that have already undergone extensive testing [elsewhere]' (World Bank Development Report, 2008: 178).

Despite these critiques, a dearth of empirical studies exist that critically examine how African governments are managing and responding to the competing views of GM technology. Documents produced by the Common Market for Eastern and Southern Africa (Gachenga, 2008) and the African Union (Juma & Serageldin, 2007) celebrate the potential for GMOs to transform agricultural production, calling for increased capacity building, more open regulatory systems and greater investment to maximise their potential. Scholarly research has argued for an 'objective' approach to biotechnology policy that will maximise benefits to all users (Wafula & Clark, 2005; Kingiri & Hall, 2012). However, these observations and analyses focus almost exclusively on what governments should do to facilitate the regulation and approval of GM crops; they do not explain *how* or *why* interests come together to produce a particular regulatory path.

This paper examines the evolution of the institutions and regulations for GM crops using the notion of governance as an analytical framework that directs attention to the character of the relationships between different interests in a given process over time. By governance, we mean the character of the relationships between all parties—government, non-governmental, private, public, societal, international and domestic—that are engaged in a system of decision-making (McCarney, Halfani, & Rodriguez, 1995; Stren & Polèse, 2000; Kjær, 2004). There exists a wealth of critical literature using governance as an analytical framework to evaluate how interactions between various interests unfold in a particular setting and why (Hyden, 1992; McCarney *et al.*, 1995; Swilling, 1997; Friedmann, 1998; McCarney, 2000; Hyden & Court, 2002; Shami, 2003; Stren, 2003; Evans, Joas, Sundback, & Theobald, 2005).

To operationalise the concept of governance, we draw from critical studies of African policymaking processes and focus on three components of policymaking (McGee, 2004): the *actors* included and excluded from decision-making; the *knowledge* included and excluded from decision-making; the *structure* or *spaces* used in decision-making, such as forums for debate and engagement. This governance approach to policymaking has been usefully applied in other agricultural policy evaluations (Gore, 2008a) and recognises that policymaking generally—and GM policy specifically—is a dynamic process influenced by actors from the international through to the local level, the knowledge they carry and the spaces in which they interact (McGee, 2004: 8 in Gore, 2008a: 58).

With respect to GM crops, a governance approach responds to two shortcomings in the scholarly literature on the potential for these technologies to transform African agriculture. First, existing accounts insufficiently recognise how power and politics shape the

governance of new biotechnologies (Harsh & Smith, 2007). To date, evaluations of policy and regulatory processes of GM crops in Kenya (Kingiri, 2010) and Uganda (Wafula & Clark, 2005) suggest that the scientific and technical capacity to evaluate risks of GM crops has been weak but improving, particularly as a result of partnerships with private firms and international organisations. However, as others have pointed out, these relationships are not neutral: 'Partnerships should be seen for what they are: relationships, often unequal, where each partner strives to serve its own interests first and the outcomes of the partnership second' (Crewe & Harrison, 1998 in Smith, 2005: 651; Harsh, 2005). Ignoring the power imbedded in the policy and regulatory processes of GMOs minimises the role of those who will benefit from its commercialisation (Harrison, 2010: 107). Instead of avoiding these complicated dynamics, this paper gravitates towards them, by emphasising 'the politics of influence' that characterise the current regulatory system (Glover & Newell, 2004). Specifically, the paper focusses on the inter-relationships that connect the various elements of regulation—research, policy and promotion—emphasising how and why the constellation of actors and knowledge converge to produce particular outcomes in a given country.

The second shortcoming in the literature is an under-appreciation for how the specific national economic, social and political contexts in which GM crops are being introduced shape policy outcomes (refer to similar calls in Stone, 2010). Much of the current literature 'overlooks the process by which GMO rules and institutions are constituted and legitimized in Africa' (Ayele, 2007:240) and the conditions that have shaped key institutions. What is needed, according to Harsh and Smith (2007: 256), is a 'place-based approach to governance that emphasises the particular political, environmental and social conditions that influence the governance of biotechnology.'

This paper seeks to overcome these limitations by critically examining the evolution of GMO regulation in Uganda, a country with one of the largest experimental programs dedicated to agricultural biotechnology in Africa. The analysis of Uganda reveals that current regulatory and legislative efforts are the result of the early establishment of institutions and processes tailored towards the eventual endorsement of GM crops. We argue that the character of the interactions between private firms, international organisations, and Ugandan scientists and regulators produced a set of institutions and norms that serves to facilitate the eventual approval of GM crops.

The paper proceeds by first providing some general context about GM crops in Uganda. It then moves on to examine the evolution and roles of the two lead Ugandan organisations engaged in GM technology development and research. This section provides evidence of how each organisation interacts with external interests and what role each organisation plays in the regulation and promotion of agricultural biotechnology. Before GM crops can be commercialised in Uganda, a biosafety law must be passed by the Parliament. As of early 2014, this law had not yet been approved. Before concluding, the paper examines the path and obstacles to the successful passage of the country's biosafety law.

Evidence for this paper is derived primarily from 78 semi-structured interviews with government, private sector, research scientists, non-governmental organisations and multilateral institutional representatives, undertaken between 2009 and 2013. Participants were selected for inclusion in the study on the basis of snowball sampling: each interview concluded with a request that the participant recommend anyone else with knowledge or interest in the GM debate in Uganda who might want to participate in the study. Participants were asked a series of semi-structured questions around the potential for

GM crops to improve agricultural production in Uganda, with a particular focus on issues of institutional capacity, risk management and biosafety protocols. All interviewees quoted in the paper consented to participate.<sup>1</sup>

## 2 THE UGANDAN CONTEXT

The story of how Uganda emerged as one of the continent's most promising sites for GM technology is difficult to unravel. Enthusiasm around the possibilities of using GM techniques to improve agricultural production in Uganda first piqued around the year 2000. At that point, South Africa was the only country on the continent to have commercialised GM technology, and news of Bt cotton's early success there—especially among smallholder farmers in the Makhathini Flats—generated much enthusiasm about the possibility for biotechnology to improve Ugandan agriculture (Schnurr, 2012). A few years earlier, the Uganda Council on Science and Technology, with support from the United Nations Environment Programme's Global Environment Facility (UNEP-GEF), had initiated a baseline study on the establishment of a national biotechnology and biosafety framework, which identified the lack of regulatory capacity as a key hurdle to assessing the potential of agricultural biotechnology to improve Ugandan agriculture (Policy Official 4, 2 June 2009).

Donors emerged to address this gap. BIOEARN (Eastern African Regional Programme and Research Network for Biotechnology, Biosafety and Biotechnology Policy Development), an initiative of the Swedish International Development Agency, began operating in Uganda in 1999 with the aim of building capacity in the areas of research, monitoring and evaluation (Biotech Advocate 1, 10 May 2011). An emphasis on developing the physical infrastructure necessary for laboratory testing emerged around the same time: in 1998, the Consultative Group on International Agricultural Research provided funds to establish molecular biology laboratories at the Kawanda Research Institute, located just outside of Kampala.<sup>2</sup> This early focus on capacity building and infrastructure development was partly strategic, as donors sought to establish internal capacity to lessen Uganda's dependence on foreign technologies: '[we] realized that there would be less opposition towards research that originated in Uganda rather [than] that which had been imported from elsewhere' (Biotech Advocate 1, 2 June 2010).

It was around this time that Monsanto began operating in Uganda. The particulars around the company's early involvement are disputed. Monsanto claims that it was initially approached by the Ugandan cotton ginners' association in 1999, which saw the company's patented Bt and Roundup Ready cotton as particularly well suited given the country's problems with pests and weeds (Biotech Advocate 2, 15 May 2012). However, the then-Chairman of Uganda's Cotton Development Organization suggests that it was Monsanto who made the first overture in 2002 (Policy Official 5, 4 May 2011). What is known for certain is that a national task force was created to investigate the possibility of testing Monsanto's GM cotton in 2003. This task force recommended that Uganda move ahead with experimental trials, with the aim of having a farm-ready product within 5 years.

<sup>1</sup>We have preserved the anonymity of all interviewees because of the highly politicized and polarizing nature of these debates. Information on the interviewee's role within the broader debate over GM crops is provided (e.g. policy official, biotechnology advocate, research scientist, NGO), along with the date that the interview was conducted.

<sup>2</sup>National Agricultural Research Laboratories – Kawanda (NARL-K) is a public agricultural research institute managed by National Agricultural Research Organization (NARO).

Another factor that that generated interest in techniques of genetic modification was the challenge of using conventional breeding techniques to improve the country's primary carbohydrate staple, *matooke* banana. Banana is a sterile crop with a long generation time, making it difficult to improve via conventional breeding. Many of the improved hybrids that had been bred to resist the most prominent pests and diseases experienced associated changes to their colour or taste, which made them less desirable for both farmers and consumers (Research Scientist 3, 6 June 2010). Enthusiasm for the possibility of breeding GM versions of *matooke* began gaining momentum around the turn of the millennium, buoyed by the support of President Yoweri Museveni, who mused publicly on the possibility of using biotechnology to overcome some of *matooke*'s more pernicious pests and diseases (Research Scientist 2, 10 May 2011). Initial funding by the Consultative Group on International Agricultural Research was expanded to allow the Kawanda Research Institute to initiate the first laboratory experiments into GM banana in 2003, at which point President Museveni publicly endorsed genetic modification as a means of improving *matooke* banana production throughout the country (Tenywa, 2003).

Uganda's experimental program with agricultural biotechnology has continued to expand over the past 10 years and is now one of the largest in Africa. The widespread adoption of GM crops is a key element of the government's strategic commitment to expanding the use of agricultural technology throughout the country (Ministry of Finance, Planning and Economic Development, 2010). Currently, there are confined field trials (CFTs) focussed on five GM crops: cassava, maize, banana, rice and sweet potato (Table 1).<sup>3</sup> Recent predictions from one of the country's leading scientists suggest that GM cassava will be available for commercial use in 2016, maize in 2017 and *matooke* banana in 2018 (Kisha, 2012).

These early years were critical to the establishment of the governance regime for GM crops. Resources were invested in infrastructure to analyse and monitor GM technology, private industry and donors encouraged regulatory development and evaluation, and small task forces of scientists engaged in discussions and debates. It is notable that in the early period, policy and regulatory decisions were largely confined to a small number of actors—donors, private industry, crop scientists and regulators. As Uganda's experimental program expanded, the influence of these elite actors and their tendency towards inward-looking dialogue became even more pronounced.

### 3 GOVERNING BIOTECH IN UGANDA

Two government organisations have responsibility for the research and regulation of agricultural biotechnology in Uganda: the National Agricultural Research Organization (NARO) and the Uganda National Council on Science and Technology (UNCST). Each plays a critical role in the process of testing, evaluating and approving the use of GMOs. The evolution of each organisation, its relationship with external actors and its engagement with agricultural biotechnology reveals that as scientific and evaluation capacity increased, so did a regulatory and policy context that was largely supportive of the eventual introduction of GM crops.

<sup>3</sup>Confined field trials evaluating the potential of Monsanto's genetically modified cotton were halted in 2012, though there is the possibility that these could restart in the future.

Table 1. Overview of current GM experimental programs in Uganda

Crop	Genetic modification trait	Start date	Major funders	Project participants	Status
<i>Matooke</i> banana	Increased vitamin A and iron content	2007	Bill and Melinda Gates Foundation Grand Challenges in Global Health	National Agricultural Research Organization (NARO), Queensland University of Technology	Confined field trials
	Resistance to banana bacterial wilt disease	2000	United States Agency for International Development (USAID) via Agricultural Biosafety Support Program II (ABSP II)	NARO, International Institute for Tropical Agriculture (IITA), African Agricultural Technology Foundation (AATF)	Confined field trials
	Resistance to black Sigatoka fungus	2010	USAID via ABSP II	NARO, Cornell University, Venganza Inc. (NC)	Laboratory trials/ greenhouse
	Resistance to Fusarium wilt	2010	USAID via ABSP II	NARO, Cornell University, Venganza Inc. (NC)	Laboratory trials/ greenhouse
	Resistance to nematodes	2007	USAID via ABSP II	NARO, University of Leeds, Cornell University	Confined field trials
	Resistance to banana weevil	2008	Bioversity [Consultative Group on International Agricultural Research (CGIAR)]	NARO, Bioversity (CGIAR), Venganza Inc. (NC)	Confined field trials
	Delayed fruit ripening	2010	Rockefeller foundation	NARO, Rahan Meristem Inc. (Israel)	Laboratory trials/ greenhouse
Sweet banana	Resistance to nematodes	2009	USAID via ABSP II, Bioversity (CGIAR), Rockefeller foundation	NARO, Bioversity (CGIAR)	Confined field trials
	Resistance to banana bacterial wilt disease	2009	USAID via ABSP II	NARO, IITA, AATF	Confined field trials
Roasting banana	Resistance to nematodes	2009	European Union	NARO, IITA, University of Leeds	Confined field trials put on hold in 2012
Cotton	Resistance to lepidoptera	2009	Monsanto, USAID via ABSP II	NARO, Monsanto	Confined field trials put on hold in 2012
	Resistance to roundup ready herbicide	2009	Monsanto, USAID via ABSP II	NARO, Monsanto	Confined field trials put on hold in 2012
	Resistance to both lepidoptera and roundup ready (stacked gene)	2010	Monsanto, USAID via ABSP II	NARO, Monsanto	Confined field trials

*(Continues)*

Table 1. (Continued)

Crop	Genetic modification trait	Start date	Major funders	Project participants	Status
Cassava	Resistance to cassava mosaic disease	2008	Bill and Melinda Gates Foundation, Monsanto Fund, USAID, Buffett Foundation	National Crops Resources Research Institute (NACCRi), Danforth Center	Confined field trials
	Resistance to cassava brown streak disease	2011	Bill and Melinda Gates Foundation, Monsanto Fund, USAID, Howard G. Buffett Foundation	NACCRi, Danforth Center	Confined field trials
Maize	Water use efficiency (water efficient maize for Africa)	2007	Bill and Melinda Gates Foundation	NARO, AATF, Monsanto	Confined field trials
Rice	Water use efficiency, nitrogen use efficiency and salt tolerance	2013	USAID, UK Department for International Development (DFID)	NARO, AATF, International Center for Tropical Agriculture (CIAT), Arcadia Biosciences Inc.	Confined field trials
Sweet potato	Weevil resistance	2010	Bill and Melinda Gates Foundation, Rockefeller Foundation, CGIAR	NaCCRi, Danforth Center, Auburn University, Biosciences eastern and central Africa (BeCA), University of Ghent, University of Puerto Rico	Laboratory trials/ greenhouse

### 3.1 National Agricultural Research Organization

All of the CFTs currently underway in Uganda fall under the purview of Uganda's national research authority, NARO. NARO runs all aspects of experiments with GM technology, from embryogenic cell development to CFTs. As the technology developer, NARO is committed to varietal improvement as the best means of providing appropriate technology to the country's small-scale farmers.

National Agricultural Research Organization's experimental agenda has been and continues to be heavily influenced by private corporations and bilateral and multilateral development agencies. A dizzying array of actors—most of them third-party intermediaries funded by bilateral development agencies or philanthropic organisations—play key roles in funding, supporting and directing Uganda's experimentation program. The two most influential are Agricultural Biotechnology Support Program (ABSP) and Program for Biosafety Systems (PBS). These organisations supply NARO with funds to improve its research capacity in agricultural biotechnology by investing in infrastructure such as laboratories, greenhouses, fencing and disposal equipment (in the case of ABSP), or collaborate closely with NARO in its increasingly important work in outreach and promotion (in the case of PBS). Both organisations are funded by some combination of the United States Agency for International Development (USAID) and the Bill and Melinda Gates Foundation (Schnurr, 2013).

Over the past few years, the funding model linking NARO and these external donors has shifted from a more general investment in institutional capacity to one that revolves around specific projects. For instance, the newly initiated CFTs evaluating the Water Efficient Maize for Africa (WEMA) project are supported exclusively by the donor (Gates Foundation), who approached NARO in 2007 regarding the possibility of setting up trials to measure this crop's potential in Uganda. NARO is the agency in charge of operating all associated laboratory and field trials, with the funds for implementation, training and outreach coming directly from the WEMA project. A similar arrangement underpins the ongoing experimentation program into biofortified *matooke* banana, genetically modified to increase both Vitamin A and iron content (funded via the Gates Foundation's Grand Challenges in Global Health Initiative).

A critical question that emerges when considering the interactions of actors in GM crop development and implementation in Africa is whether countries are requesting support or whether external entities are driving the process by soliciting interest and promoting their ability to supply funds and technologies for evaluation and implementation. To date, Uganda's experimental program has largely been supply-driven. NARO officials tout the organisation's 'demand articulation process', whereby farmers' groups are convened to discuss their concerns in an effort to create breeding programs that reflect farmer priorities (Research Scientist 2, 10 May 2011). Such priority setting exercises are supposed to occur every year, but in reality take place no more than every 3 years; at the time of writing, more than 5 years had elapsed since consultations had taken place. When questioned, NARO officials malign farmers' ability to understand their own circumstances: 'it is a challenge for farmers to correctly articulate their demands' (Research Scientist 1, 9 May 2012). Other experts suggest that current experiments with GMOs are 'too technical' for farmers to grasp and that public consultation and end-user engagement should be left until these products are ready for commercialisation (Policy Official 2, 14 May 2011).

National Agricultural Research Organization's expanding research profile is about more than just scientific experimentation. Increasing research capacity and infrastructure has been embraced as a strategy to convince reluctant policy makers and the public of the merits and potential benefits of GM crops. Officials are explicit about this tact: 'that's the strategy we took. We said okay let's go bug policy makers with a number of research [projects], so that we show them, we have proof, that scientists are interested in doing what they are doing' (Policy Official 3, 5 May 2011). Investing in science and research is seen as a key element of pushing sceptical government officials towards commercialisation: 'Better to invest in science and research... then the bill will come quickly after' (Biotech Advocate 6, 9 May 2011). While external interests have supplied the tools for experimentation, many domestic interests have more than welcomed the investments as mechanisms supporting their research and policy goals. Hence, the start of a self-perpetuating cycle can be observed: resources and institutions are created, and those that work in these bodies labour to see them maintained, thus establishing path dependency and positive feedback; with investment, capacity building and program development, the system becomes self-reinforcing (Pierson, 2000).

This link between research and outreach is illustrated by the coordinated and calculated campaigns designed to convince farmers of the merits of GM technology and to 'prepare the population for biotech as an alternative' (Research Scientist 1, 9 May 2012). Each individual experimentation program has a comprehensive communications strategy associated with it. The particular delivery of each outreach campaign is shaped by a process of 'net mapping', a strategy developed by the PBS that seeks to identify and



engage those actors key to achieving strategic goals. NARO officials [working closely with their partners at PBS and Science Foundation for Livelihoods and Development (SCIFODE)] identify key individuals needing information and convincing, such as Members of Parliament (MPs), and then continually offer them on-site visits to the contained field trials to allow them to see the success of GM first-hand. NARO also collaborates with PBS to produce the monthly *Biovision* newsletter, which is hand-delivered to every MP's office and reaches out to farmer leaders directly, sharing promotional material at farmer events and rallies.

### **3.2 Uganda National Council on Science and Technology**

The second major government institution responsible for governing GM technology is the UNCST. UNCST is a semi-autonomous statutory body that serves as the national authority on biosafety and biosecurity; it is the technology regulator. Established by the UNCST Act of 1990, the Council is headed by the Executive Secretary, who reports directly to the Minister of Finance.<sup>4</sup> The Council's Secretariat is charged with the ever expanding regulatory responsibilities associated with GM trials, including managing all applications and approvals, as well as monitoring and evaluation.

The key biotechnology regulatory organ within the UNCST is the National Biosafety Committee (NBC). This 13-member committee is the Council's technical arm, charged with reviewing all applications related to GMOs and implementing relevant biosafety guidelines and regulations (Wafula & Clark, 2005: 685). The Executive Secretary appoints committee members to terms of 3 years, with the possibility for renewal (Policy Official 4, 6 May 2011).<sup>5</sup>

Any agency wishing to conduct research on GMOs must first submit its application through its organisation's own internal Institutional Biosafety Committee. Once approved by the Institutional Biosafety Committee, the application is sent to the UNCST Secretariat. The Secretariat ensures that all application requirements have been met before convening a meeting of the NBC to review the application. A smaller team of NBC members is assigned to review the application. That team then presents their findings to the wider committee. Often, the Principal Investigator (PI) of the project under consideration is invited to meet the committee to answer outstanding questions. All final decisions are reached by consensus.

The NBC is composed mainly of biotechnology scientists, most of whom have been key players in the research and promotion of GM crops for decades. Scientists occupy over half of the committee's 13 seats. The overrepresentation of biotechnology scientists clearly influences the perspective of the committee: in the 1990s, any NBC member who expressed concerns or doubts over proposed experiments was dismissed as being 'anti-technology' (Policy Official 2, 14 May 2011). In an effort to redress this, the current NBC includes a representative from the Ugandan National Farmers' Federation, as well

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<sup>4</sup>UNCST was governed by a 15-person Board of Directors until 2005, when this board was dissolved by the Executive Secretary (Policy Official 4; 6 May 2011). Now, management and control is consolidated entirely within the office of the Executive Secretary.

<sup>5</sup>The NBC was reduced from 15 members to 13 members in 2010 to save costs. Two plant breeder positions (one from NARO and one from Makerere University) were merged, and two environmental positions (one from Ministry of Forests and one from Ministry of Water) were also merged. Initially, members were appointed by the Board of Directors to 5-year terms that were renewable multiple times. Since the dissolution of the Board in 2005, NBC members are appointed by the Executive Secretary to 3-year terms, renewable once (Policy Official 3; 5 May 2011).

as a social scientist from Makerere University. Socio-economic criteria now figure prominently in all NBC decision-making: community impact assessments require scientists to outline how their trials will benefit the local community (for instance, the most recent experimental trial associated with the WEMA program at Kasese built a primary school in a nearby community).

It is noteworthy that in Kenya, efforts to open the regulatory process to socio-economic considerations did not ensure that such concerns would be weighted equally alongside those of scientists (Kingiri, 2010). There, scientists banded together into a probiotechnology coalition that dominated the decision-making process, leaving civil society representatives feeling marginalised and silenced. Non-scientists on the Ugandan NBC appear to feel more engaged than their Kenyan counterparts. However, the reality, suggests one member of the NBC, is that this shift towards incorporating socio-economic criteria into the NBC's decision-making process is little more than 'a bit of marketing' (Policy Official 6, 11 May 2011).

Similar complications surround potential conflicts of interest. Most NBC members are heavily invested in ensuring that GMOs succeed in Uganda. The pool of biotechnology expertise available in Uganda is so limited that NBC members approving each experiment are themselves invested directly or indirectly in most of the projects. NBC members recuse themselves if they are directly involved in an application as the PI, or co-PI. However, they do not recuse themselves if they have worked with the applying PI before or if they currently work for the same organisation sponsoring the experimental trials (Policy Official 3, 5 May 2011). Hence, almost all NBC members are indirectly involved in the applications they are evaluating: either they work for the organisation submitting the application, they collaborate with the sponsoring individuals in other capacities, or they trained with them as scientists. As one NBC member remarked, 'they all know each other' (Policy Official 6, 11 May 2011).

The perspectives of the NBC members are also influenced by donor organisations such as USAID's ABSP II and PBS. Donors have supported NBC members to take fully funded trips abroad that highlight the merits of GM technology (Policy Official 2, 14 May 2011). These 'seeing-is-believing' tours to South Africa, India and Burkina Faso allow NBC members to witness first-hand the success of those countries that have already commercialised GM technology. These fully funded trips, ostensibly geared towards educating NBC committee members, increase the likelihood that regulators will hold sympathetic views toward these technologies (Schnurr, 2013).

Once final project approval is granted, the NBC remains the responsible agent for ensuring that experiments comply with all regulatory procedures. Experiments are governed by strict guidelines to ensure that all transgenic material remains contained: CFTs are supposed to be surrounded by fencing and around-the-clock security to avoid any accidental release of materials or theft, and all transgenic material is burned at the conclusion of every study. The NBC, accompanied by members of the UNCST Secretariat and trained biosafety inspectors from supporting Ministries such as Agriculture and the National Environmental Management Agency, conducts both planned and impromptu visits to each experimental site a minimum of four times per year to ensure these regulations are followed (Policy Official 1, 8 May 2012). Issues of non-compliance are rare. When a violation is identified—such as a 2011 site visit to Bt cotton trials at the Kasese experimental station where NBC members witnessed harvested GM cotton sitting out in the open—a letter is sent to the PI demanding that the issue be redressed. If the problem persists, the PI could be threatened with removal by the NBC.

The NBC is thus positioned in a precarious dual role: it is responsible for both regulating and facilitating GMOs. One NBC member explains this tension as follows: 'When we were initiated we were told, we are not there to block research, so, we are there to promote research, but research that is socially responsible... this is the principle we work from' (Policy Official 6, 11 May 2011). But can a single agency effectively promote and regulate GMOs? As both Ayele (2007) and Kingiri (2010) argue in the Kenyan context, the dual role occupied by that country's regulatory agency is problematic: it underlines the tension between the economic argument in favour of GM crops as a driver of agricultural development and the legislative obligation to regulate this technology. NBC members are tasked with making crucial decisions around health and environmental safety while simultaneously championing the potential benefits of GMOs. As a result, it is impossible to determine where promotion ends and regulation begins.

Like NARO, UNCST's funding is almost entirely donor-dependent. A new state-of-the-art facility was funded through the World Bank's Millennium Science Initiative (with a total budget of over \$30m). Much of the Secretariat's operations—including the Biosafety Office, which is the hub of the Council's regulatory activities—are funded through USAID via their ABSP II project (Policy Official 4, 6 May 2011). As this USAID project winds itself down, a new organisation has recently partnered with UNCST with the promise of additional funds for institutional capacity building. The African Biosafety Network of Expertise (ABNE) is a joint Gates Foundation/New Partnership for African Development initiative, committed to building functional biosafety systems across Africa. Established in 2010 and based in Burkina Faso, ABNE established a node in Kampala in early 2012, which will serve as the base of its east African operations. Its current priorities include building capacity within UNCST (by offering internships and study tours to South Africa, the continental leader in GM crops) and 'sensitising' key government ministers to accelerate the passage of the biosafety bill (African Union, 2012). This increases the pressure on Uganda to move forward with commercialisation: it is unlikely that these investments in regional biosafety capacity building would be established in a country that was unwilling to serve as model for other countries.

In addition to housing the national biosafety regulator, UNCST also plays an increasingly prominent role in advancing the cause of GM technology in Uganda. Outreach is a key element of the UNCST's mandate as they strive to 'demystify' common misconceptions around GM crops (Policy Official 1, 16 June 2010). UNCST works with PBS and African Agricultural Technology Foundation (another NGO funded primarily by USAID and Gates Foundation) to run the Open Forum on Agricultural Biotechnology, monthly luncheons that bring together regulators, scientists and promotional organisations to share information, strategise over best practices and coordinate their efforts, all under the chairmanship of the UNCST's Executive Secretary (UNCST, 2010). UNCST also works with the USAID-funded PBS to create multi-platform communications strategies designed to sensitise the public towards GM technologies. The Executive Secretary of UNCST has spoken in a variety of platforms including radio, television programs and documentaries to convince the public of the merits of GM.

In sum, the regulatory system anchored by NARO and UNCST has evolved such that those invested in the technology's success are also the ones evaluating its risks. The result is a system that is self-affirming and technology-affirming. With respect to criteria for evaluating the governance of GM crops, the approval and evaluation process is characterised by large volumes of investment in the system itself, an emphasis on one-way sensitisation that provides knowledge conducive for support, and limited spaces or opportunities for dissent.

#### 4 THE FINAL STEP: A NATIONAL BIOSAFETY LAW

The last regulatory step before GM crops can be commercialised in Uganda is the passage of a national biosafety bill. NARO and UNCTST are deeply engaged in efforts to promote the passage of the bill. Commercialisation of GM crops cannot take place until comprehensive legislation is implemented, which conforms to international protocols on environment and food safety.<sup>6</sup> Regulators have been working on the biosafety bill for over 10 years. The original draft emerged out of a UNEP-GEF project, initiated in 2003. UNEP-GEF provided financial, logistical and technical support to create formal policies, procedures and guidelines to help less developed countries conform with the regulations of the Cartagena Protocol on Biosafety, which stipulates the minimum standards to ensure the safe transfer, handling and use of any living modified organisms across international boundaries.

In Uganda, the UNEP-GEF process provided regulatory building blocks—including a draft biotechnology policy and bill. The process concluded in 2005, but little progress has been made on the legislative front since then. The biosafety policy was first presented to the Cabinet in 2005 and was passed as the *National Biosafety and Biotechnology Policy* in 2008. The specific regulations governing the commercial release of GMOs are contained within the biosafety bill, which identified UNCTST as the competent authority to regulate biotechnology. The bill has languished since its initial drafting in 2005. Initially, the principles of the bill were approved by the Cabinet and sent to the Parliament, but then the Parliament sent it back to the Cabinet for further debate. The principles of the bill sat before the Cabinet for over a year before the final approval was given in June 2011. The bill was then sent to the Solicitor General's office for drafting. In May 2012, the first official draft (called zero draft) was circulated among the UNCTST Secretariat for their comments. Officials there were satisfied with this version, pleased that it reflected the biosafety framework articulated through the UNEP-GEF process and that it stressed both inter-institutional cooperation and capacity building at the UNCTST, which retains its position as the responsible regulatory authority (Policy Official 3, 5 May 2011). As the Head of PBS notes (Chambers, 2013), the current version of the bill takes a broadly 'permissive' stance towards GM crops. It has a favourable bent on many of the most contentious elements within regulatory debates, including the issues of liability (which is fault-based), the burden of socio-economic criteria required before approval (which is unspecified), no mention of the precautionary principle, and risk assessment that focusses on the product rather than the process of genetic modification.

Zero draft was approved by the Cabinet in November 2012 and had its first reading in the Parliament on 6 February 2013. At this point, the bill was referred to the Parliamentary Standing Committee on Science and Technology, which was given a maximum of 45 days to solicit public consultation on the bill and then submit its report back to the Parliament (Muyambi, 2013).

There are conflicting accounts of how this period of public consultation unfolded. Non-governmental organisations and civil society organisations report that the process was rushed, hurried and disorganised (NGO 1, 30 November 2013), whereas one media outlet suggests that opponents of GMOs seized on the public consultations to promote

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<sup>6</sup>Current experiments with GM technology—both in the laboratory and in confined field trials—are regulated by the *Act of the National Council of Science and Technology* (1990), allowing these to move forward despite the slow progress of the biosafety bill.

exaggerated fears around GMOs that were unfounded and untrue, implying that the biosafety bill was a ploy to allow Multi-National Corporations to seize control of the country's agricultural sector, as well as spurious links to toxicity and infertility (Sserwaniko & Ahumuza, 2013).

With the public consultation officially completed, the final report from the committee on Science and Technology was presented to the Parliament on 8 November 2013 for the bill's second reading. To the surprise of many observers, a number of MPs voiced strident concerns. The leader of the opposition pleaded with the Speaker for more time to consult with the public about the issue of GMOs before the bill was passed: 'I would plead you give us time to go and consult Ugandans before we debate it' (Nandala Mafabi quoted in Mulondo & Musoke, 2013). The Speaker obliged and gave MPs 1 month to consult with their constituencies on the bill. This is where the legislative process remains more than 6 months later.

Officials within NARO and UNCST recognise that the future of GMOs in Uganda hinges on the successful passage of this bill. They have coordinated their efforts with other institutions and agents to launch a synchronised lobbying, outreach and communications strategy designed to increase support for GMOs among key government officials, with the aim of accelerating the bill's passage and producing a supportive regulatory regime.

Representatives of NARO and UNCST continue to approach officials with invitations to meetings or visits to CFTs to help convince them of the safety and promise of GM. NARO and UNCST also helped create the Uganda Biotechnology and Biosafety Consortium, an umbrella organisation of pro-biotechnology actors formed with the goal of better coordinating their interventions with key government actors involved in the policy process. The consortium's secretariat meets weekly to decide how best to engage these officials, either by coordinating workshops, arranging meetings with key individuals or inviting representatives to visit CFTs in person (Biotech Advocate 4, 8 May 2012). Since the bill's introduction to the Parliament, the consortium has shifted tactics and focussed their outreach on the technical officers that parliamentarians will rely on to answer questions pertaining to the bill's details (they are reticent to reach out to parliamentarians directly for fear of being accused of interfering).

The Uganda Biotechnology and Biosafety Consortium is also increasingly focussed on ensuring President Museveni's support for this initiative. The head of the consortium sits on the President's Roundtable on Investment in Science and Technology and lobbied heavily to include the biosafety bill on the agenda, with the aim of drawing the President's attention to this issue. Consortium members remain confident of the President's support for biotechnology. While he has not made a public endorsement of GM technology since he opened the Kawanda Research Institute in 2003, research scientists and policy officials have shared anecdotal information that suggests President Museveni's implicit support for these endeavours. For instance, at one of the President's common visits to rural areas, he expressed frustration at the lack of action being taken to mitigate Banana Bacterial Wilt (BBW), the most pernicious disease affecting *matooke*. After being updated on the progress of GM trials designed to create BBW-resistance varieties, the President reportedly replied 'when the banana is ready, the law will be there' (Research Scientist 4, 14 December 2012). This is a crucial anecdote. If true, it reveals that lawmakers and political elite are awaiting verification from scientists that the technology is viable and poses no significant threat to human health or the environment. Once deemed safe, the President offers informal assurances that he will wield his considerable political influence to support legislation that will facilitate the commercialisation of GM technology.

However, despite these increasingly coordinated and calculated efforts to support the passage of the bill, NARO and UNCTST officials also remain frustrated by its slow progress (a full 8 years have elapsed since its original drafting). A number of theories have been advanced to explain the bill's slow passage. The most popular argument concerns the housing of the UNCTST within the Ministry of Finance and Planning. Originally located within the Ministry of Planning (which was later merged with the Ministry of Finance), the biosafety bill was presented to the Cabinet by the Minister of Finance, who has little expertise or incentive to promote this as a legislative priority. High-ranking officials within the Ministry of Finance seem disinterested in GMOs. They are regularly invited to Open Forum on Agricultural Biotechnology meetings and site visits of the CFTs but rarely attend. Biotech advocates argue that Ministerial representatives lack both the interest and the expertise to champion the potential of GM to Ugandan farmers (Biotech Advocate 3, 13 May 2011; Biotech Advocate 5, 6 May 2011). Political infighting has also slowed progress. For years, the various implicated ministries, particularly health and agriculture, have been jockeying for jurisdiction and control over the regulatory process, which has further undermined the bill's progress (Policy Official 4, 6 May 2011). What is needed, some of biotech's most ardent supporters argue, is a free-standing Ministry of Science and Technology, whose Minister could serve as champion of the biosafety bill.

Yet most proponents remain unconcerned by the slow passage of the biosafety bill. Many suggest that such processes take time. Others argue that this slow legislative progress is a product of the governance strategy that Uganda committed to early on: invest in research first and the law will follow after. Most research scientists, policy officials and donors remain confident that the heavy investment in research, and the very supportive institutional and regulatory structures currently in place, will ensure the bill's passage sometime in 2014, enabling Uganda's emergence as one of the continent's leaders in GM technology.

## 5 CONCLUSION

This paper has examined and explained the current state of GMO regulation in Uganda. In reviewing the evolution of Uganda's experimental and legislative program, the paper has argued that the evolution of the programs and regulations relating to GM technology have largely been supply-driven rather than demand-driven. That is, demand for experimentation and legislation have not come from farmers or even public representatives but rather as a result of a large volume of investment and support from external interests. The outcome of this investment and support has been to produce a permissive regulatory environment that is dominated by scientists deeply embedded not only in the research of GM crops but also in their promotion and evaluation. The point here is not to suggest that international support in Uganda was offered with a formal goal of creating a permissive regulatory environment but to acknowledge the very significant challenge of producing an alternative decision-making process if international support is to be relied on. The enormous investment in infrastructure and capacity, the 'seeing-is-believing' tours for Ugandan scientists, and the elaborate marketing strategies employed reveal how the governance of these technologies shapes outcomes.

While we argue that Uganda's regulatory path was shaped largely from the outside in, it is equally important to acknowledge how this country's particular political, economic and social contexts have buoyed this vision. From its inception, the country's relationship with

GM crops has—like most policy decisions in the country—hinged predominantly on President Museveni's own views on the subject. From the initial opening of the Kawanda research station to the recent anecdote revealing his desire for scientists to utilise genetic modification as a means of combatting BBW disease, the ability of non-Ugandan interest to be deeply engaged in policy and reform in the country occurs only if the President—democratically elected for the first time over 28 years ago—offers his endorsement. The limited space for deliberative debate and participation around the regulation of biotechnology, particularly when international actors are involved, is consistent with other contentious reforms in the country. In the energy sector, civil society organisations and MPs that challenged the President's rationale for constructing the Bujagali project, a large hydroelectric dam, were labelled as 'economic saboteurs' and 'anti-development' (Gore, 2008b). As the experience with the second reading of the biotechnology bill in late 2013 reveals, there remains a great deal of tension in Uganda when elected representatives and civil society dare to question the government's preferred reform path. It is impossible to know whether a more deliberative process would have limited dissent or concern with the bill. However, current efforts towards public consultation lack credibility. What is needed is a more sustained, public debate about whether GM technologies constitute an appropriate technology for Ugandan farmers and consumers. Instead, frustration mounts.

More broadly, Uganda's experience with GMO policy and regulation highlights ongoing concerns about the governance of GM crops in sub-Saharan Africa. The Ugandan case illustrates how early steps to evaluate and analyse biotechnology safety are not simply technical processes. These processes established the context for how the state, donors and citizens interacted and laid the groundwork for how the governance of GMOs would evolve; that is, who would be involved in debates and dialogue, what knowledge would be included and excluded, and how and where debate and dialogue would take place.

Still, it remains possible that the country could change course on its future with GMOs. Other nations on the continent were exposed to similar forces but undertook very different approaches to the governance of these technologies. Zambia shocked the world when it became the first African nation to refuse GM food aid in 2002, and has been recalcitrant towards GMOs ever since. Tanzania has proposed a much more stringent biosafety regime, one that the Head of PBS (Chambers, 2013: 22) describes as 'prohibitive and preventative', with 'strict liability provisions that are hindering technological progress' (though recent reports suggest the bill's language might be softened in the near future). Kenya was heralded as a continental leader in GM technology before an abrupt Cabinet decision banned the import of GM food late in 2012 (though again, there are signs this ban may soon be reversed). However, it is doubtful that Uganda will stray from its current path: the country has one of the largest experimental programs dedicated to GM on the continent; it remains a favoured destination for influential donors (as evidenced by the ABNE's decision to establish their east Africa node there); its primary carbohydrate staple (*matooke* banana) is, in many ways, ideally suited for genetic modification; there exists a centralised political will that stifles open debate on controversial topics. This context makes a radical change of course seem unlikely.

Uganda is set to become a continental leader in GMO research and implementation in Africa. While advocates may praise this outcome, it remains important to understand the character of governance that shaped this regulatory outcome. The early and ongoing interactions between private firms, international organisations and Ugandan scientists; the intimacy of those interactions; and the institutions, norms and processes developed for experimentation, evaluation and regulation set Uganda down a path that positioned it to approve the commercialisation of GM crops. The lesson from Uganda's experience is

not to condemn or encourage; it is to recognise that the governance of GM technologies is as much a political process as it is a technical one.

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