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Biotechnology and bio-hegemony in Uganda: unraveling the social relations underpinning the promotion of genetically modified crops into new African markets

Matthew A. Schnurr

This paper aims to uncover the social relations used to promote genetically modified (GM) crops into new African markets. It unravels the network of corporate actors, development agencies, policy officials, and research scientists that support the unquestioned dominance of GM in Uganda, which houses one of the largest experimental program dedicated to agricultural biotechnology on the continent. Gramscian insights reveal how these constellations of power align to support biotechnology at the expense of other technological possibilities, and how this consensus maintains its position of dominance while remaining largely unquestioned and unchallenged.

Keywords: agricultural biotechnology; GM crops; hegemony; Gramsci; Uganda

Introduction: biotechnology and bio-hegemony¹

It was over three weeks into the Wikileaks scandal before the issue of genetically modified (GM) crops was mentioned. While it wasn't the most explosive topic to emerge out of the leaked documents – any reference to GM was buried on the back pages of newspapers rather than in the headlines – a number of communiqués came to light that shed important insight into the strategies used to promote the expansion of GM technologies into new markets.

Leaked cables show that the government of the United States colluded with agribusiness to support the entry of GM crops into new markets. Documents describe how diplomats in several outposts pushed GM crops as a strategic political and commercial imperative. Cables from France show a determined effort to penalize those countries that were most vocal in their opposition to GM crops. The US Ambassador to France under President George W. Bush recommended 'a target retaliation list that causes some pain across the EU', in response to a decision by France to halt experimentation with a new variety of GM maize.² Documents reveal efforts by American diplomats to lobby the Vatican on the issue, with the aim of convincing the Pope to lift his long-time opposition to

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²Ref: 07PARIS4723, created 2007-12-14 16:04.

biotechnology.³ Other cables exposed the existence of Biotechnology Outreach Programs, campaigns coordinated by the US State Department to accelerate biotechnology's expansion in Tunisia, South Africa and Mozambique.⁴

As with many of the documents exhumed throughout this scandal, those leaked cables pertaining to GM confirm what most people already knew to be true: the government of the United States is collaborating with the biotech industry in a coordinated and calculated campaign to influence other governments to open their doors to GM technology. What the Wikileaks cables underscore is the degree of sophistication in promoting these technologies abroad, as well as the complexity of actors and relationships that are being enrolled to advance this campaign.

This article seeks to uncover these constellations of power that underpin the promotion of GM crops into new African markets. To understand the desirability of this technological drive towards GM, I rely on the analytical concept of bio-hegemony, articulated by Peter Newell (2009), in which he mobilizes Gramscian insights into how networks of power align to support biotechnology at the expense of other technological possibilities. Gramsci articulated his original notion of hegemony as a means of understanding relationships of power and the concrete ways in which these are lived and perpetuated (Crehan 2002, 99). Hegemony refers to

...the ability of a class fraction, through the active building of consent...to gain the upper hand, to propagate itself throughout society – bringing about not only a unison of economic and political aims, but also intellectual and moral unity, posing all the questions around which the struggle rages not on a corporate but on a 'universal' plane, and thus creating the hegemony of a fundamental social group over a series of subordinate groups. (Gramsci 1971, 181–182)

Gramsci's notion of hegemony places analytical emphasis on the strategies used by dominant groups to secure the consent of subordinate groups to their rule: that is, how the power relations underpinning various forms of inequality are produced and reproduced. A project becomes hegemonic when its projection of reality pervades all the different layers of a given society, including its institutions, its customs and its norms (Gill 1986).

Newell applied Gramscian insights to the realm of biotechnology to illuminate how hegemony operates in practice. He coined the term bio-hegemony to refer to the 'alignment of material, institutional, and discursive power in a way which sustains a coalition of forces which benefit from the prevailing model of agricultural development' (Newell 2009, 38). Newell uses the analytical concept of bio-hegemony to unravel the consensus that supports GM, and explore how this consensus maintains its position of dominance while remaining largely unquestioned and unchallenged. In this sense, bio-hegemony constitutes a strategic and coherent social structure – a 'historic bloc' in Gramscian terms – which describes the alliance of social forces needed to advance a particular agenda.⁵ Peter André (2007, 20)

³Ref: 05VATICAN514, created 2005-08-26 07:07.

⁴Ref: 10TUNIS18, created 2010-01-13 14:51; Ref: 10PRETORIA75, created 2010-01-13 13:26; Ref: 10MAPUTO51, created 2010-01-14 16:30.

⁵The term 'historic bloc' is a difficult one to define because Gramsci uses it in two distinct and somewhat contradictory ways. In addition to the above definition that focuses on the alignment of interests needed to move a particular agenda forward, Gramsci also refers to historic bloc as the outcome of this process; that is, the complete alignment of formations that 'stabilize and reproduce relations of production and meaning' around a dominant set of ideas (André 2007, 22). I choose to emphasize the first definition over the second and understand historic bloc more as a fluid process with hegemonic ambitions rather than the product of these ambitions.

has made significant strides in elaborating the specific characteristics of the ‘biotech bloc’: an alignment of civil society, state actors and corporate capital that seeks to advance agricultural biotechnology as the most appropriate mechanism for improving agricultural yields. He suggests that the biotech bloc is engaged in a protracted war of position, designed to gain influence across both civil and political society in an effort to ‘normalize their own perspectives as hegemonic’ (Andrée 2007, 27). If and when this is achieved, the goal of hegemonic formation will be realized: ‘to transcend a particular form of common sense and create another which [is] closer in conception of the world of the leading group’ (Gramsci 1971, 421).

This article seeks to uncover how bio-hegemony is being promoted and supported by an alliance of interests in the east African nation of Uganda. My goal is to uncover the strategies, networks and alliances that solidify the new ways of thinking associated with bio-hegemony, in the hopes that an analysis of the social relations underpinning the promotion of biotechnology will deepen our understanding of how these technologies are endorsed, and who benefits from this emerging consensus.

The Ugandan case

Gramsci’s conception of hegemony was fluid and loosely defined: he argued that the particular characteristics of hegemony could be illuminated only within specific spatial and temporal contexts (Crehan 2002). Thus, the workings of the biotech bloc must be uncovered through careful empirical analysis of how relationships of power operate in a particular context at a particular time. This article explores the exercise of bio-hegemony within the case study of Uganda, a country that is emerging as a continental leader in agricultural biotechnology.

GM crops are relatively new to Africa. South Africa became the first country to commercialize biotechnology in 1998. Since then, three other countries – Egypt, Burkina Faso and Sudan – have followed suit, with a host of others poised to introduce GM technology over the next few years. Uganda is one of the countries closest to commercializing GM technology. Uganda’s experimental program with agricultural biotechnology is now one of the largest on the continent. 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). Confined field trials focus on GM cotton and GM *matooke* banana, along with smaller experimental programs investigating genetically modified maize and cassava. Legislation that would allow for the mass commercialization of GM crops was submitted to Parliament in 2010. Most observers expect this bill to pass into law sometime in 2013.

This article draws on over 70 in-depth interviews with research scientists, policy experts, lobbyists and promotional organizations undertaken between 2009 and 2012.⁶ In order to analyze the construction of hegemony, Gramsci suggests that we need to examine shifts within three distinct but inter-related arenas of power (he terms these ‘relations of force’): the level of material forces of production where actors develop product and technology strategies to direct experimental programs and secure future

⁶Due to the highly politicized nature of GM, codes are used to guarantee the anonymity of all interviewees. Information on the interviewee’s role within the broader debate over GM crops is provided (e.g. policy official, biotechnology outreach organizer, research scientist), along with the date that the interview was conducted.

markets, the organizational level where proponents build coalitions and consensus among key state actors, and the discursive level where sophisticated promotional strategies are crafted to convince the public of the merits of these technologies (Gramsci 1971, 181–184; see also Levy and Newell 2005, 63). The desirability of GM is secured through these three arenas of power, each of which is critical to understanding how biotechnology is positioned as the dominant technological possibility for increasing agricultural production in new markets. While each of these dynamic components will be discussed separately for analytical clarity, it is through their interactions that they are able to reinforce one another and move this particular agenda forward.

Material power

Material power derives from and is expressed through control over agricultural production, as well as the ability to shape the dynamics of both research and regulation (Newell 2009, 41). This section seeks to evaluate how material forces of production and technological change contribute to the projection of GM's dominance in Uganda. This requires an analysis of the major productive actors in the field of agricultural biotechnology, including research scientists, donors and regulators. In the Ugandan case, material power is derived from two sources: first, from control over crop and trait selection, which is ostensibly determined by research scientists, but ultimately controlled by development donors who fund their training and research, and, second, from strategies designed to eschew national regulations in favour of regional harmonization initiatives that seek to create an open regulatory regime more sympathetic to GM technology.

Two experimental streams into GM technology are currently underway. The first involves transplanting existing GM crops that have worked elsewhere in the hopes that they will thrive in Uganda. This is the model being followed with Monsanto's Bt cotton, genetically engineered to secrete a protein-producing gene from the bacterium *Bacillus thuringiensis*, which makes them resistant to most species of Lepidoptera, including American, pink, and spiny bollworms. Confined field trials (CFT) at government experiment stations in Serere (eastern Uganda) and Kasese (western Uganda) have finished two trials of the mandatory three-trial cycle, with the final round of planting planned for 2012.⁷

These experimental trials with Bt cotton are supply- rather than demand-driven. There are somewhere between 200,000 and 300,000 cotton farmers in Uganda, cultivating between 100,000 and 150,000 hectares of cotton annually, making it the country's third-largest agricultural export.⁸ But there are few indications that bollworm is a major ecological constraint hampering Uganda's cotton production. Historical analysis reveals that black-arm disease, a bacterial blight endemic to the region that causes leaf spots and boll rot, was the most devastating constraint to cotton production throughout most of the twentieth century (Schnurr 2011), while other pests such as lygas, aphids, jassids and stainers – against which Bt cotton offers no protection – continue to cause significant damage.⁹ Agricultural experts agree that Ugandan farmers are able to effectively control bollworms with

⁷The first planting in 2009 consisted of Monsanto's Bt cotton (Bollguard II) and Roundup Ready Flex, which is resistant to Monsanto's Roundup herbicide. The second planting in 2010 consisted of these two alongside a new 'stacked' variety that contains both Bt and Roundup resistance. The third planting was scheduled to be completed in 2011 but compliance issues delayed planting, postponing the third CFT until 2012. Interview with Biotechnology Outreach Organizer #1, 15 May 2012.

⁸Interview with Policy Official #1, 22 June 2010.

⁹Interview with Policy Official #2, 15 June 2010.

minimal pesticide spraying, leading some to suggest that Bt cotton provides a solution for an obstacle that barely registers with most cotton farmers. As one of the country's leading cotton experts observes wryly: 'you can't come and solve something that is not a problem'.¹⁰

Experiments with Bt cotton have been met with significant reluctance on the part of the national organization mandated with supporting Uganda's cotton farmers, the Cotton Development Organization (CDO). Officials there remain skeptical that a technology conceived and developed for the cotton fields of the southern United States will be able to succeed within the very distinct environmental constraints present in Uganda. Nearly all Ugandan farmers grow cotton on a few acres as part of a mixed farming strategy, while studies in South Africa suggest that the economics of Bt cotton require vast, monoculture fields in order for both the farmer and the ginner to be financially viable (Witt *et al.* 2006). CDO officials have also expressed doubt over whether cotton farmers will be able to afford the increased technology fees associated with Bt technology (while the exact fee has yet to be worked out, costs of Bt cotton in South Africa are between 30 and 40 percent more expensive than non-GM cotton seed [Fok *et al.* 2007, 478]).

A final issue concerns the cotton varieties being used. All of the current experimental trials underway in Uganda use SureGrow 125, a Bt cotton variety imported from the United States. A number of challenges have arisen as a result of transplanting a temperate cotton variety into a tropical climate. One issue is the increased sun exposure in Uganda, which allows the cotton to mature more quickly (often in three months rather than the five to six months it takes in the US), but yield less.¹¹ Another issue is that the American varieties have determinate flowering; that is, bolls are produced at the same time, which is ideal for mechanized picking. But Ugandan farmers prefer staggered flowering because most of their picking is done by hand.¹² Both the CDO and cotton farmers want to see Bt-resistant genes inserted into Ugandan cotton varieties that are already adapted to local growing conditions. At present there is no commitment from the technology purveyors to move forward on this.

This final point is a crucial one, as the local adaptation of the background variety into which the new genetic trait is introduced is a key variable that determines Bt cotton's fortunes in a new agro-ecological setting (Glover 2010a, 483). More generally, there appears to be a significant gap between the technological promise of Bt cotton and the agro-ecological and socio-economic realities that frame successful cotton cultivation in Uganda. Similar disparities between technological potential and farming realities have been reported in other countries where Bt cotton has been transplanted, including India, China and South Africa (Glover 2010b, Schnurr 2012). This model of technology transfer that begins with existing technologies like Bt cotton rather than the context-specific demands of Ugandan farmers seems unlikely to produce results that will meaningfully improve Uganda's cotton sector. Despite these concerns over ecological compatibility and economic viability, Bt cotton is widely expected to be the first GM crop selected for wide release if and when the technology becomes commercialized, buoyed by outside support more than that of Uganda's own cotton sector.

The second kind of experimental program currently underway combines GM technology with traits and crops that are considered particularly important for African farmers. The

¹⁰Interview with Policy Official #3, 4 May 2011.

¹¹Interview with Biotech Outreach Organizer #1, 15 May 2012.

¹²Interview with Research Scientist #1, 7 May 2012.

primary focus of this experimentation stream is the East African highland banana, known locally as *matooke*, Uganda's primary carbohydrate staple. *Matooke* provides an estimated 30 percent of the country's daily caloric intake, and occupies the greatest proportion (38 percent) of utilized agricultural land (Kalyebera *et al.* 2007). Current experimental field trials are testing *matooke* that is genetically engineered to resist various pests and diseases, including nematodes, weevils, banana bacterial wilt disease and black sigatoka fungus, as well as a separate project on bio-fortification designed to boost the content of Vitamin A and iron.¹³

Donors play a critical role in shaping these breeding programs. Each experimental program is supported by a particular funding regime, most commonly some combination of the International Institute for Tropical Agriculture (IITA), United States Agency for International Development, and the Bill and Melinda Gates Foundation. Each funding model tends to replicate the same template: a promising young Ugandan researcher is plucked from graduate school and invited on a fully funded scholarship to complete his or her PhD abroad, using recombinant DNA techniques to work on a particular gene or trait related to a promising genetically modified version of *matooke*. Once the researcher has completed his or her PhD training, s/he secures employment working for the National Agricultural Research Organization (NARO), usually to work on the same project, with a focus on developing the laboratory work into confined field trials and eventual commercialization. In this manner research scientists become enrolled as extensions of donor programming, creating experimental breeding programs that reflect donor priorities and concerns, which in turn preserve their highly specialized positions. As one observer puts it, 'All these guys [GM scientists] are engineering themselves to survive'.¹⁴

In Gramscian terms, these scientists serve as organic intellectuals for the biotechnology bloc, intellectual allies who use their credibility as experts to advance arguments in favour of GM technology. Research scientists act as instruments of hegemony, serving as the 'the thinking and organizing element of a particular social movement...directing the ideas and aspirations of the class to which they organically belong' (Gramsci 1971, 3). Their support for biotechnology is rooted both in the epistemic community to which they belong and in the real-life reality that their defence of biotechnology is crucial to securing their own professional well-being, when other employment options are limited. Due in large part to their high level of intellectual specialization, these scientists are able to position themselves as objective experts detached from any underlying political motives, despite the fact that they are heavily invested in the success of GM crops (Wainwright and Mercer 2009). Their work in articulating and elaborating the need for biotechnology serves their own interests and the aligned interests of donors, on whom they continue to depend for their professional well-being. This strategy of relying on research scientists to deflect criticisms or concerns ensures that donors retain their material control over the genetic building blocks of GM technology, particularly trait and crop selection.

A second strategy used to secure material power revolves around the governance and regulation of GM technology. A capable, legislated regulatory regime that conforms with international protocols on environmental and food safety is a precondition for the release of GM technology: none of the multinational seed companies that own commercial biotechnology products are willing to operate in countries without one (due to liability concerns). The development of legislation that allows for the dissemination of GM crops in Uganda

¹³Interview with Research Scientist #2, 10 June 2012.

¹⁴Interview with Research Scientist #3, 5 May 2011.

has been long and slow. This process was initiated in 2003 with funds from the United Nations Environmental Program's Global Environmental Facility Project (UNEP-GEF). 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.¹⁵ Initiated in 18 nations across Africa, a major thrust of the program focused on regulatory harmonization, fuelled by the transboundary nature of GM crops, as well as the prevailing push towards integration via the East African Community that persisted throughout the 1990s.¹⁶ The UNEP-GEF model revolved around creating 'a single template' of regulations that was then tailored to each individual country's particular circumstances.¹⁷

In Uganda, the UNEP-GEF process provided regulatory building blocks – including a draft biotechnology policy and bill – and, even more crucially, cemented an open regulatory approach to GMOs that would ensure their easy movement in and out of the country. The process concluded in 2005, but little progress has been made on the policy front since then. The biosafety policy was first presented to 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, a second outcome of the UNEP-GEF process, which was first presented to Cabinet in 2010. The bill's progress has been even more tumultuous than the policy's: initially, the principles of the bill were approved by Cabinet and sent to Parliament, but then Parliament sent them back to Cabinet for further debate. The principles of the bill sat before Cabinet for over a year before final approval was given in June 2011. The bill was then shuttled off to the Solicitor General's office for drafting, where it remains at the time of writing. Once completed it will be sent back to Cabinet for approval before going to Parliament for a first reading, then to various parliamentary committees for further study and public consultation, then on to a second reading in Parliament and a final parliamentary vote, at which point it will require Presidential assent. No commercial release of GM technology can proceed until this bill is passed into law.¹⁸

Getting the biosafety bill passed is priority number one for the biotech bloc. The organization spearheading this effort is the Program for Biosafety Systems (PBS). PBS is an International Food Policy Research Institute (IFPRI)-managed program, formed in 2002 and funded through USAID's Collaborative Biotechnology Initiative (CABIO). Active in nine countries throughout Africa, PBS's mandate involves supporting policy development, capacity building, risk assessment and regulatory approval in order to create an enabling environment to advance the safe use of biotechnology into new markets (PBS 2012). In its first phase (2002–2007), PBS' activities were focused on supporting the UNEP-GEF

¹⁵The UNEP-GEF process focused on five pillars of effective governance of agricultural biotechnology as articulated in the Cartagena Protocol: national policy on biosafety, regulatory regime, risk assessment, personnel and capacity, systems for public awareness and participation. For more see UNEP (2006).

¹⁶Interview with Policy Official #4, 6 May 2011 and interview with Policy Official #5, 7 May 2011.

¹⁷Interview with Policy Official #4, 6 May 2011.

¹⁸Interview with Biotech Outreach Organizer #2, 5 May 2012. Current experiments with GM technology – both in the laboratory and in CFT – are regulated by the *Act of the National Council of Science and Technology* (1991), allowing these to move forward in spite the slow progress of the biosafety bill.

process and cementing Uganda's experimental capacity in biotechnology. The focus of the current phase of funding, which lasts from 2007 to 2012, is the adoption of the biosafety bill, the final step to instituting a fully functional biotech system. PBS has reoriented much of its east African efforts towards the bill's passage, which will be key to extending the PBS program when it comes up for renewal in 2013; as one key PDS organizer relates, '[our] challenge is we need to deliver the law'.¹⁹

Frustrated by the slow pace of the bill's passage, PBS instituted a new approach in October 2010 designed to accelerate this process. Known as net mapping, this strategy seeks to identify and engage those actors key to the passing of the biosafety bill. Based on an approach used successfully by PBS to hasten the passage of the Kenyan biosafety bill, net mapping begins with ranking stakeholders into 'towers of influence' that reflect their relative importance in getting the bill passed.²⁰ Individual strategies are then honed for each actor identified as high priority. The outcome of this net mapping exercise was the Uganda Biotechnology and Biosafety Consortium, initiated by PBS as an umbrella organization of biotech boosters, with the goal of better coordinating their interventions with key government actors involved in the policy process. The consortium's two primary targets are the Prime Minister's office, which coordinates the activities of the different regulatory Ministries, and the Solicitor General's office, which is responsible for drafting the bill. The consortium's secretariat meets weekly to decide how best to target these officials, either by coordinating workshops, arranging meetings with key individuals, or inviting representatives to visit confined field trials in person.²¹

Another strategy being employed to counter the slow pace of Uganda's national biosafety legislation is an increasing focus towards super-national regulatory efforts, which would compel all east African nations to align their regulations with those countries in the region that have the most enabling regulatory regimes (Morris 2008). The argument for regional harmonization began to circulate early in the UNEP-GEF process, as many of the participating African countries began to recognize the similar conditions they were facing, and that decisions around GMOs were not easily contained within national borders.²² Zambia's decision in 2002 to ban American food aid due to its GM content intensified discussions around the implications of one country's biotechnology policy on its neighbours. This controversy led to a formal request by the Ministers of Agriculture within the Common Market for Eastern and Southern Africa (COMESA) region for a comprehensive study of the potential impact of GM technology for regional issues of trade, food security and emergency food aid. This COMESA-commissioned study was undertaken by the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), an amalgam of the national agricultural research institutes from 10 east African nations.

The major recommendation that emerged from this study called for a coordinating office to support and guide member states in their dealings with GM. This program, known as the Regional Approach to Biotechnology and Biosafety Policy in Eastern and Southern Africa (RABESA), was established in 2004 to formalize regional guidelines and provide oversight

¹⁹Interview with Biotech Outreach Organizer #3, 7 May 2011.

²⁰Interview with Biotech Outreach Organizer #2, 7 May 2011.

²¹Interview with Biotech Outreach Organizer #4, 8 May 2012, and Biotech Outreach Organizer #5, 13 May 2011.

²²Interview with Policy Official #5, 7 May 2011.

on issues related to GM. RABESA's financial support comes almost exclusively from USAID, with additional logistical support provided by PBS, the African Centre for Technology Studies (a Kenyan think tank), and International Service for the Acquisition of Agrobiotech Applications (a not-for-profit body with close links to agri-business), who, together with two representatives from ASARECA, form the RABESA steering committee.

RABESA has emerged as an important advocate for policy harmonization. Couched in the language of free trade, RABESA's supporters argued that restrictive policies towards GM could potentially undermine the broader trade in agriculture that makes up more than 30 percent of COMESA nations' total GDP (Paarlberg 2006, Gachenga 2008). They paint a grim picture of the consequences of non-alignment, suggesting that the 'chances of trade disputes erupting are high' (Wafula 2007, 84). Others warn that

Differences in country policies, regulatory capacities and technical expertise are likely to undermine trade between countries and delay the benefits envisaged under regional integration. This situation necessitates a regional approach and consensus on biotechnology and biosafety policies. (Meléndez-Ortiz 2007, xv)

To entrench this vision of regional harmonization, RABESA has been working towards implementing a common assessment mechanism to govern the commercialization of GM crops. Current plans focus on creating a centralized regional framework and harmonized risk assessment requirements in the form of a 'biosafety roadmap': a consolidated template with minimal acceptable guidelines and procedures designed to fast-track applications for commercial growing (Karembu *et al.* 2010). The ultimate aspiration is to implement a centralized and standardized assessment mechanism, whereby an application that is vetted, tested and approved in one COMESA country could be approved in another without additional delay. The country that approved the initial application would forward their results and recommendations to a COMESA panel of experts, who could provide technical advice on whether subsequent applications in other countries would duplicate those already undertaken in the first.²³

The argument in favour of regional harmonization centres on efficiency: 'by so doing they would cut down the time, they would cut down the cost, they would also cut down the resources...it would be more efficient'.²⁴ A synergized regulatory approach promises enhanced capacity, better information sharing, and improved cost-effectiveness by eliminating the duplication of resources and redundancies (Karembu *et al.* 2010). Proponents of regional harmonization recognize the rights of nation-states to make their own regulatory decisions, but warn against 'excesses' in which an individual nation might prioritize its own interests over those of the entire region, as such an attitude would 'undermine the very objective of regional cooperation' (Waithaka *et al.* 2008, 10).

Multilateral harmonization initiatives such as UNEP-GEF and RABESA are best understood as efforts to circumvent the complications that hinder the rollout of more sympathetic regulatory regimes at the national level. A common biosafety roadmap offers a prototypical enabling framework that reinforces the idea that there is a single path for the regulation of GMOs. Ostensibly designed to rectify the unevenness and variability among national biosafety frameworks, these regional initiatives lament those countries (such as Tanzania and Zambia) who are the most resistant to GM technology, while encouraging those whose

²³The biosafety roadmap is currently being reviewed by COMESA Ministers. It would then require final approval at both domestic and regional levels before coming into being.

²⁴Interview with Policy Official #5, 7 May 2011.

policy process has stalled (such as Uganda) to move forward so that they are in line with those who have implemented more open regulatory regimes (such as Kenya and South Africa). As Levidow (1996) and Glover and Newell (2004) note, this emphasis on multi-lateral harmonization is a strategy used by the biotech bloc to overcome regulatory delays: national differences (read: any type of domestic concern or hesitation) are treated as abnormalities or misunderstandings that need to be aligned to ensure that international trade is not threatened. The result is a one-size-fits-all approach designed to limit the ability of individual countries to opt out of a regulatory framework that is less sympathetic to GM technology.

This first section has identified two distinct strategies used to secure material power over agricultural biotechnology in Uganda. First, experimental programs on GM crops are heavily donor-driven. The first GM crop ever planted in Uganda and that which is closest to commercial release, Bt cotton, is favoured because of its commercial potential, but makes little sense given the agro-ecological and socio-economic make-up of the nation's cotton industry. Uganda's flagship experimental program into genetically modified *matooke* banana is shaped largely by donor-driven programs that train and fund junior scientists who then go on to fill key positions as national researchers driving GM's expansion. These scientists become enrolled in this process as their professional well-being becomes dependent on the technology's eventual commercialization, serving as organic intellectuals for the biotech bloc. Second, increasing pressure to shift regulatory regimes from the national to the super-national level serves to circumvent restrictive national regulations and elude Uganda's frustratingly slow parliamentary process. Shifting the scales of the regulatory approach to the regional level is a means of achieving a more sympathetic system of governance for GM technology. Through these two strategies, bio-hegemony entrenches structural power over both the material resources and regulation of agricultural biotechnology.

Institutional power

The second pillar of bio-hegemony, institutional power, derives from and is manifest in access to bureaucratic structures and decision-making procedures responsible for governing agricultural biotechnology (Newell 2009, 47). Institutional power sheds light on the mechanisms and operations of biotechnology's influence within state structures, through both formal and informal channels. This section focuses on unraveling the relationships, networks and alliances among key state institutions that propel the promotion of GM technology in an effort to reveal the politics of influence within state structures; that is, how these institutions align with each other and with other actors to promote the particular possibilities associated with agricultural biotechnology.

Two government institutions have primary responsibility for managing Uganda's program with GM crops. The first is NARO, Uganda's national research authority. 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. NARO runs all aspects of experiments with GM technology, from embryogenic cell development to CFT.

Both corporations and development agencies maintain a strong level of influence over NARO's experimental agenda, mostly through collaborations initiated by intermediaries. One of the longest standing is the Agricultural Biotechnology Support Project (ABSP), currently in its second stage. Established in 1991 and then reconstituted in 2003 as the research arm of USAID's CABIO, ABSP II is a consortium of private and public organizations designed to promote biotechnology in three regional centres: south Asia, southeast Asia,

and east Africa (these operations are headquartered in Uganda).²⁵ Focused on research programs with clear commercial outcomes, ABSP II acts primarily as a liaison between NARO and the biotechnology giant Monsanto, the major technology donor for much of the GM materials used by NARO scientists. ABSP II spearheaded the negotiation around access to Monsanto's Bt cotton technology, and continues to provide funding and support for Bt cotton trials at Soroti and Kasese experimental stations (ABSP II 2012). It plays an active role in supporting infrastructure development, having been one of the major funders for the refurbishment of NARO's Kawanda Agricultural Research Institute, the headquarters for the experimental program into GM *matooke*.²⁶ ABSP II has also invested heavily in human capital. It facilitated many of the fully-funded scholarships for Ugandan PhD students to study abroad, recruiting these students to work as NARO research scientists once their studies were completed. In a number of instances, ABSP II provided bridging salary for as many as four years before NARO was able to pick up these salaries in full.²⁷

The second major government institution governing GM technology is the Uganda National Council on Science and Technology (UNCST). Established in 1990, UNCST is a semi-autonomous statutory body that is the national authority on biosafety and biosecurity; they are the technology regulators. As with NARO, external donors exert considerable influence within the council's operations. The third component of the World Bank Millennium Science Initiative, which provided more than US \$30 million over five years to support Uganda's research program on biotechnology, was set aside to strengthen UNCST's core activities. In setting up this program, the World Bank expressed frustration that UNCST's institutional limitations were partly responsible for the lack of progress in passing the biosafety bill (World Bank 2011). Building the UNCST's capacity is a core bank strategy for achieving a favourable policy framework, which is a prerequisite for the commercialization of GM technology into Uganda.

Both NARO and UNCST have been targets of expensive campaigns designed to convince research scientists and policy officials of the merits of GM technology. USAID's PBS coordinates 'seeing is believing' tours, in which NARO and UNCST officials, as well as cabinet members, high-ranking civil servants and journalists, are flown to South Africa to witness first-hand the success of the first country on the continent to legislate the dissemination of GM technology. Three such fully-funded visits were conducted between 2006 and 2009, during which Ugandan dignitaries spent approximately 10 days visiting farms planted with Bt maize and Bt cotton, hearing from industry representatives, and strategizing around how these successes could be emulated in Uganda.²⁸ Visitors were encouraged after hearing accounts of South Africa's success, convinced that GM crops offered the small-scale farmer 'an opportunity to join the mainstream of economic farming' (Republic of

²⁵The first phase of ABSP was initiated by USAID in 1991 with a core budget of \$6 million and an additional \$8.6 million of support from country offices. The major institutional partner was Michigan State University. Most of the funds were used to support the development of genetically modified potatoes and tomatoes, both of which performed below expectations. The advent of CABIO in 2002 restructured ABSP into two separate organizations: a research arm (ABSP II) and a policy arm (PBS). ABSP II, now based out of Cornell University, shifted its focus away from long-term research and development projects, focusing instead on 'product commercialization packages' that were likely to see field-ready products in a short time-span. For more see Kent (2004).

²⁶ABSP funding helped pay for the renovation of the Kawanda laboratory buildings and the construction of the biosafety greenhouse, as well as expenses associated with running CFT.

²⁷Interview with Biotech Outreach Organizer #6, 9 May 2011.

²⁸Since 2009, other 'seeing is believing' tours have been coordinated, mostly by ISAAA. Visits have been undertaken to Burkina Faso and India to view their respective successes with Bt cotton.

Uganda 2008, 11). Invited guests returned home confident that Bt cotton specifically, and GM technology more generally, were needed to ‘improve farming, increase productivity and income’ (Republic of Uganda 2008, 10). These first-hand visits helped convince NARO and UNCST officials of the merits of GM technology:

Those ones [seeing is believing tours] have played a part in shaping the current thinking... those who went there physically and realized what was going on the ground, it makes much more sense than just talking from the paper that one would read here and there, which may not give the true picture, than if one went and talked to the farmers themselves, where that activity is ongoing.²⁹

NARO and UNCST also collaborate actively with pro-biotech lobby groups to ensure their message regarding the potential merits of GM technology is widely disseminated. Both institutions worked with PBS, the Science Foundation for Livelihoods Development (SCIFODE), and the African Agricultural Technology Foundation (AATF) to create the

Open Forum on Agricultural Biotechnology (OFAB).³⁰ Started in 2007, these monthly lunch meetings are designed ‘to facilitate the flow of information from the scientific community to policy makers and the general public’ (OFAB 2012). These informal luncheons held at Kampala’s glitziest hotels bring together NARO research scientists and UNCST regulators, along with other key stakeholders such as lobbyists and Members of Parliament, to share information, solidify networks and coordinate their efforts (UNCST 2010). The importance of these opportunities for hobnobbing and sharing ideas has been stressed elsewhere: relaxed meetings provide like-minded colleagues with an opportunity to come together, exchange gossip, strategize about the latest technological and political developments, and provide a safe space in which new ideas and strategies can be floated and refined (Newell 2009, 51).

This section underscores the high level of engagement between policy makers, development agencies, and corporate capital within NARO and UNCST, as well as the strategies used – direct funding for salaries and research infrastructure, organized trips to see South Africa’s success with GM, regularly scheduled informal lunches – to massage these state institutions and make them more amenable to the introduction of GM crops. These close and privileged relationships do not in themselves reveal evidence of hegemony in practice, but they do suggest a strong alignment of purpose among the key research and regulatory institutions and the biotechnology bloc (Newell 2003). The social ties created through these trips, visits and lunches are critical to expanding GM’s politics of influence within NARO and UNCST. These organizational strategies represent what Gramsci terms a ‘diffused’ and ‘capillary’ form of indirect pressure (Gramsci 1971, 110), designed to bring government actors into the consensus of bio-hegemony. The end result is a mutually supportive relationship between key government institutions within the Ugandan state and well-financed and well-connected donors and lobby groups committed to GM’s expansion.

Discursive power

The third pillar of bio-hegemony, discursive power, derives from and expresses itself in the ability to construct and reinforce prevailing framing of issues, in order to secure the

²⁹Interview with Biotech Outreach Organizer #7, 15 June 2010.

³⁰AATF was established in 2003 (with funds from the Rockefeller Foundation) to increase access to proprietary biotechnologies that could address constraints facing small-scale farmers across Africa. Current AATF funding comes from a consortium of USAID, DFID, and some special project funding from the Gates Foundation.

supremacy of a particular ideology. Discursive power is fundamental to ordering triumphant narratives that promote biotechnology's achievements while simultaneously deflecting challenges and critiques. Gramsci placed significant emphasis on the role the media plays 'in normalizing the perspectives and ideologies of ruling elites, and thereby supporting the material base upon which their structural power ultimately rests' (Newell 2009, 52). This section seeks to uncover the ideological apparatus at work in Uganda; that is, the strategies used to promote and produce ideas that entrench the consensus towards bio-hegemony. Exposing the carefully constructed campaigns that ensure widespread support for biotechnology sheds insight into how the projection of a particular set of ideas comes to be accepted as the best interests for society in general.

The two organizations that play the most active role in shaping media coverage around the introduction of GM crops in Uganda are PBS and SCIFODE. Of all of PBS' many activities to expand GM's reach in Uganda, ensuring a steady stream of positive publicity is its most important. PBS remains committed to ensuring the distribution of credible information on GM technology while seeking to correct 'misinformation' propagated by skeptics or opponents.³¹ PBS's main partner in this effort is SCIFODE, established in 2006 as a promotional organization dedicated to advertizing biotechnology's potential in Uganda.³²

The communications strategy designed by PBS and SCIFODE has three strands. The first targets policy makers from relevant government ministries and aims to convince them of the merits of GM technology. PBS and SCIFODE work closely with NARO to highlight the successes of ongoing CFT by orchestrating visits for Members of Parliament, municipal politicians, farmer union leaders and journalists. The focus of these visits is to sensitize key stakeholders to the new technologies and underscore the rigorous compliance with existing guidelines, in order to highlight the tangible and demonstrable benefits of GM technology (Kingiri and Ayele 2009, 137). One observer suggests that these field visits have had a significant impact in overcoming some of the initial reluctance towards GM technology: giving policy makers an opportunity to see GM crops in the ground and ask all sorts of questions has increased their level of awareness of and confidence in biotechnology.³³ Highlights of these visits – along with other carefully crafted reports and op-ed pieces designed to sway wary policy makers – are reported in the quarterly PBS publication *Biovision*. Circulation targets parliamentarians and key policy makers: copies of each edition are hand-delivered to their offices. These coordinated efforts are geared towards influencing the perceptions of those decision-makers who will shape Uganda's future with GM:

Most of the decisions are made by leaders, like politicians, government leaders; those are the key people that will make the decision about a particular GMO, and those are the one that preliminarily understand what is going on...so those are the ones we are primarily targeting.³⁴

³¹Interview with Biotech Outreach Organizer #2, 6 June 2009.

³²SCIFODE is still searching for program funding. Current funding is a hodgepodge of various small projects: helping NARO publicize results of CFTs, supporting UNCST in its coordination of OFAB meetings and some small contracts with PBS, as well as recently-signed memoranda of understanding with both the Water Efficient Maize for Africa program and the Africa Biofortified Sorghum project to coordinate their communications and marketing in Uganda. Source: Interview with Biotech Outreach Organizer #5, 13 May 2011.

³³Interview with Biotech Outreach Organizer #7, 4 May 2011.

³⁴Interview with Biotech Outreach Organizer #2, 14 June 2010.

The second element of this communication strategy is geared towards the masses. Again, USAID's PBS plays a central role here. PBS was the first to embark upon a broad-based media campaign in 2005, when it launched its initial publicity blitz aimed at convincing the Ugandan public of the merits of GM technology. This process began internally with what PBS referred to as its 'risk communications' strategy: extensive staff training on how to dispel some of the ecological, political and ethical criticisms levied against GM technology. This morphed into more general outreach that focused on radio programming, chosen because it was the medium that ensures the widest reach among poor, rural farmers. PBS hired a slew of professionals with a background in media relations and marketing to offer 'proactive communication solutions' in order to create a positive narrative around the arrival of GM technology.³⁵ More recently, other organizations such as NARO and UNCST have joined PBS in this task, creating a multi-platform media strategy that stresses the promise and potential of GM, including documentaries airing on local television, live call-in shows with pro-biotech experts designed to reassure public concerns, alongside radio programming that focuses on how other African countries have moved forward and benefited from GM.

The final proactive element of this broad communications strategy is focused on the media agents themselves. Both PBS and SCIFODE have cultivated close relationships with science reporters at the major print, radio and television media outlets. These journalists are invited on all CFT visits, attend OFAB meetings regularly, and participate in some PBS-run media training exercises. This 'constant engagement' is designed to cement strong relationships and ensure journalists get exposed to 'controlled information', to help ensure positive reporting and coverage.³⁶ The cozy relationship between the biotech bloc and media outlets was on display at the inaugural Ugandan Science Journalism Awards, held at one of Kampala's premiere hotels in December 2010. Organized by SCIFODE in collaboration with NARO, the Bill and Melinda Gates-funded Water Efficient Maize in Africa project, and the Africa Harvest Biotech Foundation International (a non-profit dedicated to bringing biotechnology to Africa, headed by leading biotechnology advocate Florence Wambugu), this gala event celebrated the efforts of Ugandan journalists in reporting issues of biotechnology and genetic modification. The awards committee (comprising the coordinator of PBS, as well as high-ranking officials from both NARO and UNCST) gave out multiple awards for effective science journalism with a focus on biotechnology in print, radio and television. Winners and runners-up each received a plaque and a certificate, as well as an envelope with an undisclosed amount of cash.³⁷

The coordination and sophistication of this three-pronged communications strategy was recently tested by a series of negative opinion pieces published by an expatriate columnist in the *New Vision*, one of the country's leading broadsheets. These columns focused on some of the most contentious elements of the debate over the future of GM crops in Uganda, including concerns over the increasing presence of foreign-owned commercial plant breeders, loose regulatory structures, and existing loopholes surrounding monitoring and enforcement (Oloya 2010). Biotech supporters responded immediately. The first volley were letters to the editor sent by a NARO research scientist, SCIFODE's executive director and a long-standing member of the National Biosafety Committee. But officials at PBS felt

³⁵Interview with Biotech Outreach Organizer #8, 9 June 2010.

³⁶Interview with Biotech Outreach Organizer #2, 6 May 2011.

³⁷Interview with Biotech Outreach Organizer #5, 13 May 2011.

these knee-jerk responses were a mistake; instead, they favoured a more coordinated effort that would offer a 'proper and coherent' response to these critiques. PBS convened a meeting of biotech supporters to 'develop a strategy to reduce some of the impact' of these critiques. They decided to avoid the tit-for-tat battle in the paper's editorial section: 'it becomes a debate and we don't want that'.³⁸ Instead, GM supporters pledged to respond to this negative press with a synchronized media campaign designed to dull the sting of these critiques. Measures included the creation of a database as an information resource, awareness workshops for top officials within key Ministries, and even offering money to journalists willing to write pro-biotech articles that could help offset this negative publicity.³⁹

These efforts show the degree to which proponents are committed to a coordinated and carefully crafted communications strategy that promotes the social acceptance of GM technology. As Freidburg and Horowitz (2004, 9) show in the South African context, the power of this technological storytelling lies in the capacity of dominant groups to highlight favourable publicity while downplaying or obscuring information that might discredit the overall narrative (see also Glover 2010b). Led by PBS and SCIFODE, biotech supporters cultivate close relationships with media outlets through invited visits, training programs and well-funded awards that encourage sympathetic coverage. They too act as organizers and articulators of hegemony, serving as organic intellectuals or 'permanent persuaders' for the biotech bloc, using their privileged status to frame public debates around GM in order to gain widespread support for biotechnology (Gramsci 1971, 10). Their goal is to educate society on the need for change and to create broad consent for biotechnology. When opposition to this dominant framing penetrates their proactive strategies, these agents work together to help discredit the source and minimize its impact, thereby legitimizing GM as the sole technological possibility for moving forward. In this way, the dominant narrative of GM's potential promise to Ugandan farmers is secured.

Conclusion

This analysis of bio-hegemony in practice elucidates the diversity of material, institutional and discursive strategies used by the biotech bloc to advance and secure the GM agenda in Uganda. I have sought to unravel the social relations that underpin the promotion of GM crops, in order to understand how the interests of the dominant class of biotechnology supporters come to be accepted as the common good. As Gramsci (1971, 182) emphasized, hegemony is predicated on consent, hinging on processes of alliance formation, relationship building and collaboration. This analysis has tried to uncover the particular coalitions and compromises used to privilege GM as the sole technological option capable of rescuing Uganda's agricultural production.

This analysis has identified two preliminary insights into the nature of bio-hegemony in Uganda. First, bio-hegemony is murky. The structures and processes that privilege GM's expansion in Uganda are muddled, opaque and difficult to unravel. Complex layers of funding arrangements and intermediary organizations, as well as myriad formal and informal relationships connecting government, corporate capital, research scientists, development agencies and lobby groups, are enrolled in promoting and maintaining the

³⁸Interview with Biotech Outreach Organizer #2, 6 May 2011.

³⁹Interview with Biotech Outreach Organizer #2, 6 May 2011.

consensus towards GM. Unraveling this Gramscian war of position reveals the social relations used by the biotech bloc to gain influence within key institutions, develop organizational capacity and win new allies in order to normalize their perspectives as hegemonic (Andrée 2007, 27). These multiple contingencies and linkages make it difficult to isolate who is actually behind GM's expansion in Uganda, and why certain actors have such a vested interest in seeing them succeed.

Second, bio-hegemony operates largely from the outside in. Donors play a critical role in sustaining all three pillars of bio-hegemony: they fund research projects and pay staff salaries, they create and support regulatory institutions, they dictate research priorities and direction, and they construct and fund promotional campaigns. While the money comes from elsewhere, intellectual allies in Uganda carry out most of the work: research scientists and lobbyists become enrolled in the campaign for biotechnology, advancing the interests of donors who fund their salaries and programs. These organic intellectuals serve the interests of the dominant class to which they belong, acting as ideological deputies who facilitate and enable the consolidation of the hegemonic project by generating widespread consent and collapsing society's general interests with their own (Gramsci 1971, 5–6, 12). In this way 'a particular ideology... born in a highly developed country, is disseminated in less developed countries, impinging on the local interplay of combinations' (Gramsci 1971, 182).

While multilateral organizations (such as the World Bank) and philanthropic organizations (such as the Gates Foundation) play significant roles in sustaining the consensus towards GM, USAID remains the single the most important organization supporting bio-hegemony in Uganda. Its research arm, ABSP II, funds infrastructure, trains research scientists and directs research into agricultural biotech. Its policy arm, PBS, courts key stakeholders by arranging site visits (both foreign and domestic), lobbies for sympathetic policy regimes and crafts media campaigns designed to convince the public of GM's potential. USAID is, by far, the most important actor funding, coordinating and advancing the interests of the biotechnology bloc.

Why is USAID so invested in biotechnology's success in Africa? The senior biotechnology specialist who coordinated much of USAID's Agricultural Biotechnology for Sustainable Productivity project (the precursor to ABSP II and PBS) suggests that the agency supported biotechnology as a key component of sustainable agriculture, which fit within USAID's broader mandate of facilitating public-private partnerships that would allow poorer countries to gain access to technical expertise and encourage the transfer of biotechnology tools (Cohen 1999). Biotech companies were made equal partners in developing and implementing these programs, enticed by the possibility of developing pathways for new market access (Lewis 2000, 197–199).

Critics argue that USAID's programming emphasis on agricultural biotechnology is paving the way for corporate interests committed to GM's expansion into Africa. The Spanish non-governmental organisation GRAIN (2005, 11) suggests that USAID's efforts reflect the broader aims of the US administration, which remains committed to convincing African countries to open their doors to agricultural biotechnology. Others argue that USAID's motives are more sinister, suggesting that experimental programs into African staple crops, such as GM *matooke*, serve as Trojan horse projects that allow for the germination of new collaborations between biotech companies and African research centres, produce good public relations for corporations and facilitate the implementation of regulations sympathetic to GM technology (for more on this critique see Lieberman and Gray 2008). Still others suggest that USAID is engaged in a proxy war designed to

convince African nations to adopt biotechnology so they will shift their trading partnerships away from Europe in favour of the United States.^{40,41}

Research into how bio-hegemony operates in other locations suggests that corporate interests are less pronounced in Uganda than they are elsewhere. Studies in India (Newell 2007) and Argentina (Newell 2009) focus primarily on the role of corporate capital in sustaining biotechnology's dominance. In both cases, it is corporations, not development agencies, which play the central role in sustaining the consensus towards GM. Corporations play a much subtler role in Uganda: multinational seed companies have little direct presence in the country, and do not participate directly in any of the alliances and strategies detailed above. Instead they work closely with USAID and fund third-party intermediaries – such as ABSP II and PBS – who advance the position of the biotech bloc on the ground.

Comparing how bio-hegemony operates in these distinct locations further reveals that bio-hegemony is more fractured and less entrenched in Uganda than in the other two case studies. While GM's dominance within research, regulatory and public spheres has been secured in both India and Argentina, bio-hegemony in Uganda is much more tenuous. In particular, the continued delay of the biosafety bill has emerged as the single biggest stumbling block to GM's expansion. While on the surface bio-hegemony in Uganda seems difficult to displace, the unpredictable nature of domestic politics – whether intentionally or not – has stifled this consensus and forced the biotech bloc to work harder than it thought it needed to in order to create a sympathetic regulatory regime. This delay appears to be rooted more in timing and politics than some significant mode of resistance: biotech supporters point to the poor timing of cabinet shuffles and national elections that have torpedoed efforts to pass the requisite legislation.⁴² They remain convinced that the bill will be passed sometime in 2013.

Does this persistent gap between hegemonic ambitions and achievements signal bio-hegemony's untimely demise? As Newell (2009, 38) emphasizes, bio-hegemony is fragmented and contingent, constantly shifting in reaction to changing conditions and new challenges to its dominance. In Uganda, innovative strategies such as net mapping and regional policy harmonization have been advanced to overcome the slow progress of the biosafety bill. In reaction to a series of negative op-ed pieces, new alliances were formed to produce a public relations rebuttal that was unified and consistent. As Gramsci (1971, 172) notes, hegemony is in continuous motion, constantly reconfiguring and reacting in response to new challenges to its authority. Biotech supporters in Uganda seem alert to these potential vulnerabilities and have demonstrated a willingness to forge new coalitions and adopt fresh strategies to ensure they don't fester.

⁴⁰Interview with Research Scientist #3, 5 May 2011.

⁴¹It remains to be seen whether the Obama Administration's new *Feed the Future* campaign, announced with much fanfare in 2009, will represent a dramatic shift in USAID's approach to agricultural biotechnology in Africa. To inaugurate this program, US\$ 3.5 billion was allocated to combat hunger and improve food security in 20 target nations, including Uganda. Secretary of State Hillary Clinton's speech during a 2009 visit to east Africa – in which she lamented the lack of private investment in African agriculture and promised a continuing commitment to using technology to improve agricultural yields – suggests that USAID's focus on expanding biotechnology's reach in Africa will continue within this new program (see Crossfield 2009). Program leaders with ABSP II and PBS have also expressed confidence that *Feed the Future* does not represent a radical shift away from USAID's emphasis on using agricultural biotechnology to help improve African agriculture.

⁴²Interview with Biotech Outreach Organizer #6, 9 May 2011.

Yet this relentless reconfiguration of social relations might also open up gaps or fissures that could offer possibilities for destabilizing or re-orienting bio-hegemony. As Levy and Newell (2005, 50–51) emphasize, understanding the complex dynamic of social systems is the necessary first step to articulating strategies that challenge the dominant consensus: ‘social change requires incremental measures that take into account the constraints of existing structures, while developing strategies for more radical change that alter those structures’. As with the coordinated campaigns that emerged through the Wikileaks scandal, when these social relations that underpin the promotion of GM crops are laid bare they are subject to scrutiny and dissent. Unraveling the strategies used by powerful groups to sustain their dominance offers the best method for uncovering entry points into resistance and accommodation, which might in turn lead to bio-hegemony’s downfall or reconstitution (Andrée 2011, 176). The social relations which are today aligned so resiliently in support of GM technology could be the starting point for interrogating or disrupting the structures that underpin this consensus.

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Matthew A. Schnurr is an Associate Professor in the department of International Development Studies at Dalhousie University. He is an environmental geographer with research interests in environment and development, political ecology, agricultural biotechnology and environmental justice. His current research focuses on farmer attitudes and intentions to adopt genetically modified crops in east Africa. Email: matthew.schnurr@dal.ca