GREATER HORN OF AFRICA
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SUMMARY

The use of Genetically Modified (GM) crops has been a contentious issue since the development of the first crops ten years ago. Previously this debate was largely conducted in the industrialized nations. However, the African dimensions of this debate have come to the fore with the decision of several southern African governments to reject donations of GM food aid.

While the immediate dilemma is whether to accept GM food for relief purposes, this is inextricably linked to the broader question of the potential application of GM crops to reduce long term food insecurity. While promoted in some quarters as a potential answer to Africa's food problems, until fairly recently, very few GM technologies were applicable to Africa. This is a highly complex debate with scientific, political and ethical dimensions—and little propensity of protagonists to concede any space to the opposing view.

When Zambia and Zimbabwe refused to accept GM food aid in July, food security organizations in Africa suddenly faced a crisis over GM foods. This is clearly a debate that is only beginning, and one that many in the humanitarian communities—including many food security experts—only vaguely understand.

This issue of the GHA Food Security Policy Review summarizes the main arguments for and against GM technology, and identifies the issues relevant for the regional context. Our intent is deliberately not to promote any position, but rather to present policy makers the basic arguments in order to conduct a better informed debate about a critical public policy issue.

Genetically Modified Crops and Food Security: Outlines of a Contentious Debate

Dan Maxwell and Nick Maunder

The GM Food Aid Debate in Southern Africa

Recent events in southern Africa have served to highlight the issues surrounding the use of GM foods in addressing food insecurity in Africa. As this debate extends into the Greater Horn of Africa (GHA), the lessons and experiences derived from Southern Africa deserve more detailed examination.

In July 2002, both Zambia and Zimbabwe made it clear that, in spite of a major food crisis in both countries, neither would accept GM crops (maize in particular) as part of international humanitarian assistance. Insofar as the US is a major donor of both bi-lateral humanitarian assistance and a major contributor to WFP, who were coordinating the food response, this rapidly became a major issue because the US does not separate GM and non-GM maize in its exporting channels.

The July announcement was intended as temporary, while governments of both countries studied the GM issue, and put in place policies where there had been unclear or non-existent policies previously. At issue were two major concerns, and a number of secondary concerns. The first had to do with the safety of GM foods, and the potential implications for human health. The second was the potential of some food aid to be used for seed, and the possibility of accidentally introducing GM strains of maize—which would contaminate local varieties of maize since maize is an open pollinating crop. Once introduced, whether intentionally or accidentally, the presence of GM genes in local maize varieties would be impossible to reverse. The knock-on effect of this, authorities feared, would be restrictions on future exports from both countries to markets such as the EU, which strictly regulates GM crops. Zimbabwe subsequently decided it could accept GM food aid, provided that it was milled prior to distribution so there was no possibility of GM maize being retained for seed by farmers. Zambia announced in late October that its total ban on the importation of GM foods—milled or not—would stand. GM maize already imported into the country would have to be re-exported, and humanitarian assistance would only be accepted if it conformed to strict standards prohibiting GM imports. Several other countries in Southern Africa that are also facing a severe food security crisis this year (including Malawi) subsequently adopted policies similar to Zimbabwe's. Zambia is only country is the region to put into effect a total ban. Local news media in Zambia are currently reporting a variety of stories about the wildly misleading information (on both sides of the argument) circulating in the countryside—even as the food security crisis depends. There has been at least one incident report of local communities breaking into warehouses that contained GM maize waiting to be re-exported, and taking the food.

This discussion paper is intended to inform the debate within the humanitarian community on the use of Genetically Modified foods and crops. CARE-USA has developed a provisional policy paper on GMOs, but this paper represents the views of the two authors and is not an organizational position paper of CARE.

The Greater Horn of Africa Food Security Review is an occasional publication produced by and for food security professionals working in Eastern Africa. This report provides policy relevant analysis on both transitory food insecurity and the underlying causes of vulnerability and poverty.

The major issues here are over food safety, and genetic contamination of local crops by GM varieties. Part of the latter issue has to do with the issue of protecting bio-diversity, part of it has to do with access to export markets—Zambia has made it clear that it is as concerned about the latter as the former. But food safety appears to be the main worry: President Levy Mwanawasa has referred to GM foods on several occasions as "poison." These questions are explored in greater detail in the next section. Behind the political drama in Southern Africa stand several distinct and probably irreconcilable issues:

The difficulty of having a rational policy debate about the pros and cons of a highly politicized technology. The politics of GM food were already so polarized that by the time that the Zimbabwe/Zambia ban was announced, neither the pro-GM nor anti-GM political lobbies were interested in promoting a reasoned debate. Misinformation abounded.[1] Much of the polarization is between the Europeans and the Americans. WFP was accused of acting on behalf of American business interests by introducing GM foods through food aid; WFP responded that it was not in the business of promoting anybody's business agenda, but required food to be considered safe for human consumption by the donor nation, which in this case was the US. WFP Director James Morris is on record, however, as favoring GM technology as the answer to Africa's long-term food security problem.[2] The Americans accused the Europeans—especially the powerful European environmental lobby—of browbeating African governments into rejecting both much-needed emergency assistance, as well as promising technologies, because of ill-founded fears about "frankenstein foods."

Bio-Diversity, trade and control over markets. Part of the fear of the authorities in Southern Africa is that the response to a short-term crisis could lead to permanent damage in their export market options. The fear is that some GM maize, provided as food aid, would inevitably be planted thereby 'contaminating' local maize production. This fear is both about bio-diversity, and the extent to which contamination would harm trade relations. Genetic contamination occurs when GMO genes are mixed with local and non-GMO varieties. To some extent, the fear about the impact of this on trade seems to be unfounded, since it is not maize exports per se but rather maize-fed livestock products that are the major concern for these countries, and the EU does not ban the importation of livestock products that were fed GM maize[3]. The EU recently clarified its stand on this point, and whether it has any effect on policy remains to be seen. Nevertheless, there is a continuing concern that a pro-GM or laisse-faire policy could lead, at least in the short to medium term, to problems in trade relations with Europe. The concern is adverse long-term effects on trade because of an ill thought-out response to short-term problems.

The humanitarian imperative Many in the humanitarian community have questioned whether the middle of an acute crisis is the right time to have a debate about this topic—in effect accusing the anti-GM lobby of scoring political points on the backs of starving people. Indeed, the food security situation has deteriorated in Zambia since the ban went into effect.

But many anti-GM activists accused the Americans and WFP of using the crisis to introduce GM foods—which in effect would have amounted to a *fait accompli* with regard to GM technology, because once introduced, it cannot be "deleted." The Zimbabwe policy was greeted with some relief by some in the humanitarian community (although there is still a row over payment for the milling; and the delays caused by the milling requirements have slowed down deliveries). Anti-GM activists have pointed out that there is no excuse for not providing a non-GM pipeline for humanitarian assistance in the first place, and for not promoting more openness in the debate prior to the onset of a major crisis. WFP accepts the Zambia policy, but says the policy will complicate the response to the current crisis, and there is an uneasy sense in the humanitarian community that this debate is primarily among external parties, with adverse effects for vulnerable people.

National Sovereignty. Clearly another issue here, quite apart from the merits of GM crops themselves, is the issue of "who decides?" One of the concerns behind Zambia's policy was to create space for consideration of the merits of GM crops, and not wanting to be "pushed around" by the international community in the meantime. Zambian civil society groups have called on their government to act swiftly in this matter, and in the meantime to ensure the availability of non-GM food for starving people, and called on the rest of the world not to "politicize" the issue, or force Zambia to accept food it does not want.

[1] See "Some Africans prefer hunger to a diet of gene-altered corn" by Danna Harman, in the Christian Science Monitor, 11/14/2002.

[2] James Morris addressed the UN Security Council on 3 December 2002 on the prospects for long-term food security in Africa: "We will need more investment in agriculture - including embracing the promise inherent in biotechnology, and changes to international trade regimes so Africa's farmers are not driven from the market place by subsidized exports from the developed world."

[3] European Union Press Release, "EC Clarifies Its position on GMOs," Annex II of WFP, Policy *Issues, Agenda Item 4*. WFP Policy on Donations of Foods Derived from Biotechnology (GM/Biotech Foods). Rome, WFP/EB.3/2002/4-C of 14 October 2002.

Box 1: What is meant by "Genetically Modified" crops, and where are they being grown?

"Genetically modified crops" refers to crops developed through the use of transgenics, or the ability to transfer genes (and the traits that crops therefore embody as a result) from one species to another. Isolated genes are literally transplanted into another species, permitting the recipient species to take on the transferred characteristic. This process is different from conventional plant breeding in two ways: first, the two organisms (from which the gene is selected and into which it is introduced) do not need to be related or genetically compatible; and second, it is only the particular desired characteristic that is transferred.

In the last ten years GM crops have become a major component of global agriculture. It is estimated that 52.6 million Ha are currently under GM crops Of this total 63 percent is Soya, 19 percent maize, 13 percent cotton and 5 percent oilseed rape (canola). No GM varieties have been developed for some crops—notably wheat and sorghum. The GM industry is particularly well established in the US, where 68% of the global total acreage is grown. GM crops are being grown commercially in 12 other Countries. In the US an estimated 60% of the total soya crop and 30% of the maize crop is now GM. Furthermore, as the GM crops are not separately stored or processed, effectively the entire US soya and maize crop is considered GM. In turn this means that nearly all US processed foods have some GM content

The amounts of GM crop has been low in Africa—partly because of policy and regulatory issues, and partly because much of the technology was not developed for or adapted to Africa. GM trials are being conducted in Kenya, Nigeria, Zimbabwe, Egypt and South Africa. South Africa has licensed GM maize and cotton production. Cases of unapproved usage have been reported from several other Countries.

BOX 2: GM crops—the arguments for

According to its proponents, genetically modified crops are beneficial to agriculture in a number of ways:

- Improved Yield: The proportion of the most useful part of a plant can be increased, for instance giving a larger grain head and shorter stem (results usually achieved with classical breeding programs).
- Control weeds: Plants can be developed which are tolerant of agricultural chemicals, so that larger amounts of the chemicals can be used to control pests and weeds without harming the crop. A well-known example is Monsanto's "Roundup Ready" soya which is resistant to the company's own herbicide, Roundup.
- Disease-resistance: Crops are being developed which will have built-in resistance to major viral and other diseases. For instance, virus-resistant sweet potatoes are being field-tested in Kenya.
- Reduce use of chemicals: Plants can be engineered to contain insect toxins, so that less chemical pesticide has to be applied. The most common technique is to insert toxin-producing genes from the Bacillus Thuringiensis insecticidal bacterium, for instance into cotton.
- Tolerance to wider ranges of soil and weather conditions. It may be possible to engineer crops that will survive in previously hostile conditions, such as excessive salinity, alkalinity, or drought. Non-leguminous plants can be made to fix nitrogen.
- More nutritious varieties: The most well known example so far is "golden rice", a rice engineered to contain beta-carotene, which is the precursor of Vitamin A. This could help solve the problem of vitamin A deficiency, which affects up to 250 million people worldwide and can cause blindness.
- Improved food quality: Some varieties of cassava, require intensive pounding before it can be safely eaten to eliminate toxins that can cause paralysis. Genetically altered cassava could eliminate the need for such processing. To date, there is no evidence of food safety threats from GM foods.

(Adapted from: "GMO Crops in Africa: Promises, Problems and Threats". Michaela Mongelard and Kitty Warnock, PANOS Institute, August 2002.)

Additionally, the pro-lobby argue that there is a degree of inevitability over the spread of GM crops – the benefits, including the economic benefits, are too compelling to allow the technology to be "put back in the box". Therefore, while acknowledging the inherent concerns, it is better for public institutions to embrace the new technology at an early stage, rather than to leave it to as the preserve of the private sector. In particular investing in the development of GM crops through public research will allow the development of varieties which harness the potential for the benefit of society as a whole, while minimizing the problems.

BOX 3: GM crops – the arguments against

According to its detractors, GM crops pose a number of concerns:

- Food Safety: The most direct concern is whether GM foods are safe to eat. Concerns have been raised over possible increased levels of toxicity, the potential to induce allergies, or create resistance to antibiotics. Although no major cases have resulted in the US, where an active consumer lobby exists, GM foods have been around for a relatively short time period, and the potential consequences of their consumption remain unclear. Furthermore the poor handling of recent food safety problems in Europe (for example "mad cow" disease) has seriously undermined trust in "expert" and "scientific" opinion.
- Genetic Contamination and Loss of Bio-Diversity: Documented cases are on record of the genes contained in GM crops passing, via cross-pollination, into indigenous varieties and wild relatives. The best-documented case of this has occurred in Oaxaca, Mexico, where maize is thought to have originated. Despite good controls, genes from genetically altered corn have been discovered in the local varieties of corn. Loss of bio-diversity could affect future genetic resources, whether for biotechnology or conventional breeding.
- Other environmental impacts: Given that one of the most common GM crop genes is for resistance to a proprietary weed killer, GM crops may tend to increase a trend of chemical use – not decrease it. Other impacts of concern are the evolution of resistance in pests to the GM crops (e.g. to the widely used Bt toxin) and unknown toxic impacts on non-targeted insects, affecting the ecological balance.
- Concentrated, proprietary ownership: The vast majority of the GM seed industry is owned by a very small group of private sector companies. Despite all the good things said about it, the real motivation for GM development is profit, not solving the problems of small farmers. A wide-ranging debate over intellectual property rights, genetic "sovereignty," and genetic patenting remains unresolved.
- Trade: Different countries and trading blocs have different rules regarding the planting, eating, and import/export of GM crops and foods. Probably the strictest controls exist in the European Union. The presence of GM crops, whether accidentally or intentionally introduced, would limit the ability of other countries to trade with the EU (as well as other markets) in the affected commodities.
- Undermining exports of developing countries: GM versions of tropical crops are being developed that could be produced in temperate climates. This could threaten the traditional exports of much of the developing world. Examples include vanilla beans and *gum arabic.*
- "Playing god:" A further important strand of dissent comes from those who object to genetic engineering on moral and ethical grounds. There are ethical questions about altering the basic building blocks of life in a way that could never take place naturally.

Can GM Crops build food security in Africa?

While the immediate debate has centered on the use of GM crops as food aid, this is a pre-cursor to the broader policy implications of biotechnology for developing countries. GM technologies no doubt possess the potential to revolutionize agricultural production in ways that we are only beginning to exploit. But will the reduction of hunger in Africa be one of these?

The introduction of Bt cotton into Africa offers an interesting case study illustrating the potential of GM crops in Africa. Although not a food crop, cotton is an important cash crop in low rainfall areas and therefore an important component of livelihoods. It is also the crop at the forefront of the introduction of GM varieties into Africa.

Cotton production is valued at US$20 billion per year, with the majority of the production occurring in the developing world. It also has a major insect problem (especially the bollworm) which causes extensive production loses and requires the regular application of large amounts of pesticide (estimated at 20% of total global use). The introduction of the Bt gene into cotton successfully confers resistance to the bollworm. It is grown commercially (including in South Africa) occupying approximately 10 percent of the 35 million hectares sown to cotton annually.

To many the introduction of Bt cotton has been hailed as a clear-cut example of the benefits of GM technology. Citing evidence from field studies one report concluded "Countries which have introduced Bt cotton have derived significant and multiple benefits – these include increased yield, decreased production costs, a reduction of at least 50% in insecticide applications, resulting in substantial environmental benefits and significant economic and social benefits for small producers" (James 2001).

However, a variety of wider concerns exist over the ability of GM crops to improve the food security of small-scale African farmers. There is the major question of who controls the research and whether it is in their interests to invest in applications to address food insecurity. As anti-GM activists point out, GM research is driven by a small number of large agri-business corporations. The major commercial force behind the development of GM foods is just five companies—Dow, DuPont, Syngenta, Aventis and Monsanto. They control three out of every four patents issued over the past ten years for genetically modified crops. 90 percent of the GM seeds planted around the world is either owned by or licensed by one company—Monsanto.[4] These corporations are in turn driven by profits and consequently, relatively little research is being done on GM crops for small-scale African farmers.

Even if public institutions conduct the research, the real beneficiaries remain uncertain. Concerns remain that we risk replicating the results of the first Green Revolution, where the beneficiaries tended to be the well-resourced or richer farmers. The anti-GM lobby points to the increased integration between the seed producers and the chemical industries as a worrying indication that new GM crops are likely to be reliant on high levels of input use, which will be unaffordable to poor farmers. There is considerable concern that the introduction of new GM crops may not just by-pass the small-scale African farmer, but further disadvantage them by making their products less competitive in the market.

Other commentators argue that investments in improved roads, better markets and extension services may be more important and efficient ways to stimulate production in Africa.

However, the emphasis on increasing agricultural productivity only opens up the question of the real causes of food security. Many experts would agree that the main problem is limited and unequal access to resources, and to markets. Therefore increasing overall food production and availability will do little to address food insecurity.

Policy and Regulation

Clearly a crucial element of the whole process should be the development of clear policy guidelines and regulatory controls by national governments in order to protect the health and economic well being of their citizens, as well as the environment. In the vast majority of African countries clear policies have yet to be developed. A pre-cursor to this has to be an inclusive debate within each country—that takes account of economic, political and ethical considerations in addition to the scientific evidence. This implies that the conclusions at a national level may not be uniform. Beyond the national level, there is also a clear need for harmonization of policies at the international level—particularly trade policies

Even when such guidelines are developed, the ability to actively enforce them will remain a major challenge, as has been noted even in developed countries. Significant capacity enhancement will be required in Africa

[4] Source: ETC Group

Conclusion

To briefly summarize the debate:

To proponents of GM crops, they have the potential to improve yields, reduce dependence on chemical inputs, and provide protection against a host of crop pests and risks.

To opponents, they represent a threat to food safety, to bio- diversity, to trade and market access, to national sovereignty, and to the loss of control over basic building blocks of life to a handful of multi-national companies.

As will be obvious by this point, there is little consensus in the debate over GM foods, and little intent to promote consensus. The science of GM crops is still inconclusive, but many of the policy issues resulting will not be determined by science alone because there aren't empirical answers to many of these questions. Science can and should inform the debate about food safety and genetic contamination questions. But this is clearly a political debate in which protagonists are likely to pay attention to science only if it confirms already strongly held viewpoints.

A review of the main issues in the debate indicates that the introduction of GM technologies may have mixed consequences, especially for small-scale African farmers and ultimately on levels of food insecurity.

At a minimum, in the short term, improved information (to policy makers, consumer groups, researchers, and farmer's organizations) should be promoted about the potential benefits and problems, as well as known trade-offs, in making decisions in the short term.

Resources:

Articles

ODI (1999) *The debate on genetically modified organisms: Relevance for the South.* ODI Briefing Paper, London.

Robert Tripp (2000) *GMOs and NGOs: Biotechnology, the policy process and the presentation of the evidence.* ODI, London.

Avtar Kaul (2001) *CARE and Genetically Modified Organisms*. CARE: Atlanta.

Michaela Mongelard and Kitty Warnock, (2002) "GMO Crops in Africa: Promises, Problems and Threats". PANOS Institute, August.

World Food Program (2002) "Policy Issues, Agenda Item 4." WFP Policy on Donations of Foods Derived from Biotechnology (GM/Biotech Foods). Rome, WFP/EB.3/2002/4-C of 14 October 2002.

IFPRI (2003) *Biotechnology and Genetic Resource Policies*. Washington, DC: IFPRI.

Clive James (2001) "Global Review of Commercialized Transgenic Crops," ISAAA Briefs, No.24.

Websites

http://www.eldis.org/food/gm/index.htm This is a special feature within Eldis providing an overview of the key issues and links to documents on GM food aid.