

Our Environment, Our Wealth



GENETICALLY MODIFIED CROPS

"...future generations are likely to look back to our time and either thank us or curse us for what we do – or don't do – about GMOs and biosafety. Doing the right thing is not simple."

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There is growing debate about the potential value of modern biotechnology, and in particular of transgenics, to contribute to achieving Africa's development and food security goals. The challenge facing policymakers is not only to understand what the technology can do, or has done elsewhere, but to establish what opportunities it holds for the African context.

There are three critical issues. First, whether or not genetically modified organisms (GMOs) offer a sustainable food security option; second, what the implications are of transgenic technologies for biosafety as well as for human health and well-being; and third, the extent of existing African capacity to undertake research, and effectively monitor and evaluate genetically modified (GM) products and their use.

Food Security

- Global plantings of GM crops jumped by 20 per cent in 2004. For the first time, the hectareage growth in GM crop areas was higher in developing countries than in developed ones.
- Increasing crop resistance to insects and diseases and reducing weeds could help reduce crop losses and reduce dependence on costly fertilizers and herbicides, resulting in valuable savings for poor-resource farmers. However, as the Brundtland Report cautioned as early as 1987, the challenge of improving food security is more than just increasing food production.
- Due to GM licensing agreements and production systems, farmers are pushed to monoculture and thus reduce the variety of crops planted for household consumption.
- From 2002, GM crops have been offered as food aid. Examples of approaches to GM foods and food aid in Africa include:
 - ANGOLA – Banned imports of all GMO produce, except for food aid provided it was milled. WFP reported that the additional cost of milling discourages some food donors.
 - SWAZILAND – Has no restrictions on GMO imports.

- ZAMBIA – Banned import of all GMOs, citing concerns over environmental impact and effect on human health. In response, it is alleged that the World Food Programme moved some non-GM food aid stocks out of the country.

- Africa has more than 2 000 native grains, roots, fruits and other food plants (National Research Council 1996). Development of GMOs should aim to tap the special qualities of Africa's native flora and fauna in the efforts to improve food security and make genetic engineering beneficial to Africa's environment and development.

Biodiversity

- According to Food and Agriculture Organization and WHO, the introduction of a transgene into a recipient organism is not a precisely controlled process and can result in a variety of outcomes with regard to integration, expression and stability of the transgene in the host. Several concerns can be identified, such as: GM technology could result in the contamination of crops through gene transfer and the development of "super weeds"; transgenic crops may have a negative effect on non-target species that are harmless or beneficial; GMOs could impact on genetic diversity; and pest resistance can occur.
- There are counter claims to these concerns: the use of herbicide-resistant and pest-resistant crops is believed to have positive implications for biodiversity.
- The value of existing agricultural approaches and non-transgenic approaches for Africa need to be considered. The value and productivity of traditional agriculture in development and its genetic diversity should not be underestimated.

Human health concerns

- Increased use of herbicide-tolerant GM crops may pose new risks for environmental and human health. For example, Glyphosate is a major formulation of "Roundup ready" crops and is now the world's best-selling "total" herbicide. Due to the introduction of GMO-Roundup Ready crops, human and environmental exposure to the

herbicide is expected to increase. However, there is strong evidence that glyphosate-containing products are acutely toxic to animals and humans.

- New medical risks from GM technologies, for example, gene therapy involves the use of a virus to carry a modified DNA segment and the virus is potentially pathogenic. The risks of these treatments are largely unknown. There are concerns that medical applications involving genetic engineering may produce cancer causing genes from normal human genes.
- Increased antibiotic resistance may result. For example, Novartis' Bt-maize contains a marker gene, which codes for antibiotic resistance in E.coli. There is a risk that if animals or humans consume Bt-maize-based products such as cattle feed or starch, some antibiotics would be rendered useless.

Market and trade

- South Africa is the only African country that is commercially producing GM crops- In 2004, South Africa had 500 000 hectare under GM crops. Egypt is approaching commercialisation of four GM crops; these are potatoes, squash, yellow and white maize, and cotton.
- Private sector dominance has meant that most agricultural biotechnology research focuses on developed country concerns. An increasing number of African countries have GM Research & Development capacity. Much of this research is based on public-private partnerships (PPPs).
- Biotechnology companies may be reluctant to invest in costly research without the legal guarantee that they will be able to commercialize their products. Supportive legislative frameworks for research include strong intellectual property rights (IPR). However, there are concerns that strong IPRs will entrench global domination of world food production by a few companies, and place restrictions on farmers, including on their existing rights to store and exchange seed.
- Increased commercialization of GMOs in Africa could threaten organic agriculture and agricultural exports.

Ethics

GMO and ethics issues centre among other things on patenting, cloning of life forms and biopiracy. In Africa, many communities and consumers express ethical concerns about "playing god" as

plants are transformed in unnatural ways and the implications for traditional beliefs and values.

- Patenting genetic material traditionally available to a community without allowing the community free use of the material or providing any return to the community affects the fair and equitable distribution of resources, a necessity in the development of a sustainable society. There is concern that the access and intellectual property issues related to "terminator gene" technologies will lead to increasing dependence on industrialized nations by African countries and domination of world food production by a few multinational companies.
- Biopiracy is also of growing concern particularly as many African countries lack the legislative and enforcement systems to control illegal extraction of genetic resources. Additionally, the benefit sharing systems for the use of these assets and of traditional knowledge are poorly developed.

There are a wide range of responses, at multiple levels, to the growing challenges posed by the development of GM technologies and products. These include global and regional intergovernmental responses, science-based responses and civil society initiatives. As a whole, the overall approach of African governments has been to encourage a range of biotechnology research, both transgenic and non transgenic, while recognizing biosafety concerns and establishing systems to limit its impact.

The 6 main regional economic communities in Africa, ECOWAS, EAC, ECCAS, IGAD, SADC and the AMU, have taken the lead in developing policy guidance on GMO research, production and marketing in their respective regions.

At least 9 countries, among them, Benin, South Africa, Zambia, Zimbabwe have biosafety legislation or guidelines. Ghana, Kenya, Lesotho and Swaziland all have draft legislation that addresses the issue of biosafety, the commercialization of GM crops and the importation of GM foods.

Genetic modification technology may contribute to food security goals (such as MDG 1, target 2), but the problem of world hunger is not just one of food production but of distribution. The real causes of hunger are poverty, inequality and lack of access to food and land.

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