

## **Weighing the benefits of biotechnology**

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***A smallholder emergent GM cotton farmer at Marble Hall, South Africa, in one of the cotton fields, explains to the Ugandan delegation the advantages of GM cotton.***

According to Wally Green, biotechnology promises a better future for all of us. In Africa, biotechnology has the capacity to bring about near instant solutions for problems like hunger, malnutrition and poverty and South Africa, where Green is the Monsanto Biotechnology Regulatory Manager, is in a race to take advantage of the cutting edge science. Agricultural biotechnology has become the focus for several countries across the continent, with governments in North, South, East, West and Central African countries making rapid progress towards creating policy environments in which biotechnology research can flourish.

The leader of the pack is no doubt South Africa, which is the eighth largest producer in the world of genetically modified (GM) maize and cotton. Maize, also known as mealies or corn, is a food staple for both humans and livestock in the country with a population of 57 million. But annually, drought and diseases like maize streak virus, cause massive crop losses exacerbating challenges of food safety and poverty reduction for the predominantly black African masses. Monsanto is a leading producer and distributor of GM maize seed in SA, including a variety impregnated with a 'stack' gene to provide drought tolerance as well as pest resistance. However, the industry titan has been vilified by the anti-biotech movement, which has strong leanings towards the pro-organic food drive, for alleged crimes ranging from 'genetic pollution' to 'exploitation of poor farming communities'.

Wally Green maintains that, instead, the technology actually benefits farmers, citing huge savings in pesticides for one, and the fact that no expensive infrastructure is required. "Genetically modified seed with the drought tolerance gene enhances productivity through the intensification of agriculture, rather than 'extensification' which means the use of more and more resources like land and irrigation." This should be music to the ears of 'resource poor' farmers in South Africa and most of Africa where communities are held at ransom by the high-risk business of rain-fed farming. With increasingly alarming reports about desertification and climate change, proponents from both sides of the biotech divide can at least agree that poor farmers should be looking for more than divine intervention.

While the powerful anti-biotech lobby has, inadvertently or not, provided a boost to the organic movement which espouses 'natural' farming practices from field to supermarket, agricultural researchers concede that a lot of the food consumed presently has never undergone such rigorous testing as GM foods, and nobody can claim for sure that everything passed under the 'natural' label is in fact safe.

One case in particular points at modern rice hybrids that are produced and consumed worldwide, having been 'engineered' by a process called Gamma Ray Mutation which involves the use of irradiation in the creation of the hybrid. The 'mutant' hybrids have been part of the human diet for decades and have never been tested for harmful effects in the medium or long term.

An article in *The Economist* (2005) says today scientists use thermal neutrons, X-rays, or ethyl methane sulphonate, a harsh carcinogenic chemical--anything that will damage DNA--to generate mutant cereals. Virtually every variety of wheat and barley you see growing in the field was produced by this kind of "mutation breeding". No safety tests are done; nobody protests.

On the other hand, GM foods are highly regulated and subjected to rigorous testing and have to be heavily labeled before going onto the market, conditions which according to Wally Green, "are meant to slow down the technology". Agricultural biotechnology is being put forward as a cost-effective solution to the problem of malnutrition that plagues much of the African continent where hundreds of thousands of children die from or are adversely affected by nutrient-poor diets.

Food enhancement is possible with biotechnology, as crops like soya, rice, maize and potato have successfully been modified to provide increased enrichment in vital nutrients such as protein and vitamins.

"This food is as safe as or even safer than conventional food because it is thoroughly tested", Wally Green says. The organic movement, which has friends in anti-globalization and anti-multinationals, has been quick to play up the risks of eating 'mutant', 'frankenstein' foods, but for many of the world's poor, starvation is a much worse fate. At various biotechnology meetings in Pretoria, SA, in March 2007, a delegation of Ugandan researchers and policymakers examined evidence of the host country's rapid and steadfast adoption of biotechnology, specifically agricultural biotechnology. South Africa is the only African country producing GM crops commercially and is among a few countries worldwide recording the fastest growth in the number of hectares under GM crops.

In a tour organized by Africa Bio, an independent, non-profit biotechnology stakeholders association, the Ugandan delegation visited regulatory offices, laboratories, learning institutions as well as large and smallholder farms to familiarize themselves with biotechnology practice and legislation. According to AfricaBio President, Professor Diran Makinde, South Africa has achieved huge successes in this field because of government support. "Once the government is willing to explore new frontiers, everything else follows", he said in an interview, adding, "biotechnology stakeholders require an agreeable policy environment in which to operate so they can apply biotechnology safely and ethically."

The South African government has faced stiff resistance from the anti-lobby which includes strong organizations like Green Peace, Bio Watch, Safe Age (SA free alliance against genetic engineering). However, Ben Durham, head of biotechnology in the government's science and technology department reiterated the commitment of the government to maximizing the benefits of science and forging on towards creating a 'bioeconomy' with health services, agriculture, industry, mining and the environment identified as main areas for research and development. "The government is committing more and more resources to support biotechnology projects across the country. So far we are dedicating over 5% of the budget, and our goal is to increase biotechnology funding to at least double that", he said. The SA government adopted a national

biotechnology strategy in 2001, committing an initial R450 million (US\$69 million) from 2004 to 2007 to biotechnology development. The strategy highlighted the importance of a 'bioeconomy' and the development of commercially viable biotechnology products.

So far, the jury is still out on whether African governments will make the right choices for their people and take steps towards exploring the safe and viable use of biotechnology. At the core of the extensive consultations is the issue of trade, and whether African countries can protect their fragile foothold in international markets, particularly in Europe, which has created the greatest barriers to commercial GM crops. European governments have been accused of distorting the biotech debate in order to hide their failure to legislate food safety and expose their farmers to competition.

As the debate rages on, the proponents raise various important issues: Biotechnology has demonstrated the potential to raise productivity. Biotechnology has even greater potential productivity and environmental benefits in developing countries. Biotechnology also has demonstrated potential to deliver improved nutrition in developing countries. Biotechnology is farmer friendly, since its products are easy for farmers to adopt: the technology is embedded in the seed or plant cutting. Biotech crops can greatly reduce labor intensity for cultivators, who in Africa are mostly women. Biotechnology can reduce losses from spoilage and disease.