



March 31, 2010

A Search for Regulators and a Road Map to Deliver GM Crops to Third World Farmers

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In Burkina Faso, a school for the future regulators of Africa's genetically modified (GM) crops is opening up next month.

The school, called the African Biosafety Network of Expertise (ABNE), has been set up by the African Union and is funded by the Bill and Melinda Gates Foundation. The operators are careful to point out that this is an "Africa-based, Africa-owned and Africa-led" initiative, an important point, for there are few debates in agriculture there that raise more political heat than issues of food sovereignty and genetically modified crops.

"We acknowledge that sovereignty is in the hands of Africans," said Lawrence Kent, deputy director of the Agricultural Development Initiative at the Gates Foundation. "For research to move forward, the African governments must move forward with biosafety capacity building."

In the transgenic crop fight, the foot soldiers on either side have been dug in for years. But despite the doubts about the necessity of GM, farmers have been voting with their seeds. The acreage where transgenic crops are planted has been increasing. Developing nations and small farming operations are the newest adopters of GM crops. By 2015, the European Commission predicts that there will be 120 commercial crops worldwide, up from the 30 currently grown.

According to the International Service for the Acquisition of Agri-biotech Applications (ISAAA), which monitors the planting of GM crops worldwide, the use of biotechnology increased by 7 percent over the past year. About 90 percent of the 14 million farmers who use GM are "resource-poor farmers," said Clive James, chairman of ISAAA.

Meanwhile, most scientists are calling for sweeping changes to agriculture to prepare for sustainable development and ensure the security of food supplies in the face of climate change and other challenges. The changes, they say, will invariably include transgenic crops.

Much of the new research is happening in developing nations, especially China. And public-sector scientists in these nations are now wondering how to get their crops to the dinner table, past a stringent and too-expensive regulatory process.

Sam Timpo of ABNE talks with a heavy accent over the phone from Egypt. He says it is necessary to develop regulations in the next few years. There is some haste, for another Gates-funded initiative is in the pipeline -- a royalty-free transgenic corn that, in theory, should withstand the droughts of sub-Saharan Africa. But in most African nations, there is no government biosafety agency to approve, monitor and track GM crops.

Biosafety regulations of countries are usually modeled after the Cartagena Protocol on Biosafety, an international agreement that promotes a "precautionary approach." It says that GM crops can be adopted if they are of minimal risk to the environment and human health. It lays out a clear set of guidelines to test for that risk.

But guidelines alone don't suffice. "As many as 100 developing countries lack the technical and management capacity needed to review tests and monitor compliance," wrote Jose Falck-Zepeda, a research fellow at the International Food Policy Research Institute, in a recent policy brief.

Since the first green revolution, investment in agricultural science from the public sector has been lagging in most parts of the world. The private players -- Monsanto, DuPont, Bayer CropScience and others -- dominated most of the research, creating fears about a monopoly over seed supply.

China develops the technology and the markets

The exception is China, which has the world's largest pool of agricultural scientists. With a stable of more than 100 crops waiting for approval, it is the most serious contender with private enterprises for engineering crops.

"They have pretty big capacity of biotech Ph.D.s, probably one of the biggest in the world, if not the biggest, in plant biology," said Guillaume Gruere, a research fellow at the International Food Policy Research Institute. "More than a hundred crops have been tested both in the lab and in the greenhouse. Most of those crops haven't gone further, but they could one day just get it out if they want to."

China's needs are big. It has to feed a population that will steadily grow, and it takes its food security challenges seriously, according to Falck-Zepeda.

The country also doesn't have to contend with some of the public perception issues that plague other nations. In November, the government approved insect-resistant rice and insect-resistant corn for final field trials, which should hit the commercial markets in two years. Given the nature of rice as a staple, this is an important milestone in the commercialization of a food crop.

"They have the money and understand that biotechnology is power," said Robert Zeigler, director-general of the International Rice Research Institute, based in the Philippines, which was instrumental in helping Asia increase its rice yields during the first "green revolution."

Looming 'South-South' transfers

China is investing heavily in pushing crops through its regulatory system. Late last year, the government invested about \$900 million in market biotechnology and teaching researchers how to transfer their nascent crops into the marketplace, according to Falck-Zepeda.

"They know that their internal market is so big and you have so many people internally in China that'll be customers," he said. "They have economies of scale."

And China is initiating "South-South" technology transfers of its seeds. Its non-transgenic hybrid rice seeds are being aggressively marketed in India, Bangladesh and Africa. Its transgenic cotton (a Chinese-developed variety) is available in India.

"Chinese transgenic material is coming," said Swapan Kumar Dutta, crop science director at the government-run Indian Council of Agricultural Research, referring to Chinese Bt cotton. "The Chinese know their business. They are doing it very purposefully."

Once China's recently approved transgenic seed hits the market, there are few regulations that could keep it from seeping into international markets. Given that developing nations usually have a better grasp of each others' needs, this would be a good development, according to policymakers. Farmers typically tend to purchase seeds that deliver the greatest profit, according to Dutta. And although the transfer of seeds involves the Cartagena Protocol, most nations do not have as strict an interpretation of risk as does the European Union.

In Argentina, soybean farmers simply borrowed some biotech seeds from neighboring fields in Brazil before the country decided to adopt the GM seeds. In India, Bt cotton was a reality in the illegal seed market long before the government approved Monsanto seeds, according to Gruere.

The dangers of black markets

The African Union and international aid organizations are working to fill in gaps in regulation because a regulated seed market would be safer than an illegal market, based on seeds smuggled in from abroad.

"The danger is when people adopt GM crops in a free-for-all atmosphere," said Francis Nang'ayo, regulatory affairs manager for the drought-tolerant corn initiative called Water Efficient Maize for Africa (WEMA).

A significant number of traits have already been developed by public-sector agencies in other parts of the world, as well. But the costs necessary for getting regulatory approval, which can run into millions of dollars, cannot be met by most of these agencies. Most GM crops die in the lab.

This is true in the United States, as well, where public-sector research into plant science has been slow. Getting through the regulatory system can cost as much as \$150 million for a single plant, according to Denise Dewar, executive director for plant biology at the industry-sponsored group CropLife International.

"The regulatory system is so expensive and time-consuming that the only organizations that can afford it are big biotech companies," said Nina Fedoroff, science and technology adviser to the U.S. Secretary of State Hillary Rodham Clinton. Since private companies choose to develop crops that make money, transgenic crops that are necessary for food security get left out, she said.

A business or a 'moral imperative'?

Currently, four crops (soybeans, corn, cotton and canola) and two traits (insect resistance and herbicide tolerance) that are most profitable are being developed by these companies. Other traits or crops that may be useful to the poorer world are largely ignored, since companies' primary responsibility is to the shareholder, according to Falck-Zepeda.

The drought-tolerant corn donated by Monsanto to sub-Saharan Africa seems to be an exception to this rule. "We see it as a moral imperative and think it is beholden upon us to share it," said Vanessa Cook, the project leader from Monsanto.

Monsanto could have other motivations for donating the drought-tolerant corn. The adoption of the crop could improve the standard of living over time and improve farmers' perceptions of other biotech seeds that may arrive for sale. It would be a long-term investment.

"It's no loss to them; they gain public relations," said Falck-Zepeda. "Eventually, they may be able to buy seed from Monsanto."

And having a socially advantageous and necessary crop such as drought-tolerant corn could hasten the establishment of biosafety systems.

"If you have a great crop that is ready, maybe it'll push things to go forward and have a bill on biosafety," said Gruere. "If the regulation is not ready, they won't approve anything and [the technology] will just stay in the lab and that's it."

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