

Debate Grows Over Biotech Food

Efforts to Ease Famine in Africa Hurt by U.S., European Dispute

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Sunday, November 30, 2003; Page A01

MUNYAMA, Zambia -- When the people by the lake began to starve, they fell back on the knowledge of their ancestors. They picked poisonous fruits from the bush and boiled them for three days to eliminate the toxin, concocting a barely palatable dish. But sometimes hungry children would sneak a taste early, villagers said, and the poison would make them ill.

Kebby Kamota, father of 11, could take it no longer. "Three days! Three days!" he shouted, explaining how long his children would sometimes go without food as a drought worsened last year. "When I saw my children getting hungry, it was not easy for me."

Even as the bellies of the children ached, bags of relief corn sat in a warehouse, sealed tight, in this village on the shores of Lake Kariba. The U.S. government said the corn, a variety created by modern biotechnology and grown in the United States, was safe to eat. The Zambian government wasn't so sure, and it ordered the food locked up even after aid groups had shipped it to stricken villages.

So Kamota rounded up a mob that forced its way into the warehouse and distributed corn to scores of village families. A feast ensued. With that momentary act of defiance, the villagers of Munyama not only restocked their barren larders, they unwittingly became symbols in the long-running fight between Europe and the United States over agricultural biotechnology.

To biotechnology advocates, the villagers, along with people who broke into other Zambian warehouses last year, showed the human costs of an irrational new technophobia, centered in Europe and intent on blocking the development of gene-altered crops.

To skeptics of biotechnology, the Zambian villagers became a symbol of the American government's willingness to use destitute Africans as pawns in pressing the interests of Western corporations.

The debate over this technology has become a leading issue in international relations, subject of a huge trade battle. Wall Street is watching anxiously as it presses companies to recoup their massive biotech investments by selling more seeds. Environmental advocates are marching in the streets to oppose the crops. Even the Vatican is weighing the issue, recently opening a debate about which is the moral course.

The fight has turned into an intense, emotional struggle over the very nature of food and the future of agriculture. And it is a fight now playing out in the capitals and remotest villages of Africa, the continent with the most difficulty in supplying food for all citizens.

As European resistance stiffened in recent years, the biotech industry began to argue that genetically altered crops offer a prime hope for helping Africa solve its agricultural problems and feed itself.

The biotech-for-Africa argument reached a crescendo over the summer in Washington, at the convention of the Biotechnology Industry Organization, when President Bush and various members of his administration gave speeches endorsing the industry line.

"For the sake of a continent threatened by famine, I urge the European governments to end their opposition to biotechnology," Bush told the trade group. "We should encourage the spread of safe, effective biotechnology to win the fight against global hunger."

European political leaders reacted angrily to the suggestion that they were willing to starve Africans, and they have accused American companies of deliberately exaggerating the potential role of the technology in solving Africa's problems. People with long experience in African agriculture said that only a subset of the continent's food problems are solvable, even in principle, by genetic engineering

"They tried to lie to people, trying to force it upon people," the European environment commissioner, Margot Wallstrom, said recently. She and other European leaders have argued that, for all the rhetoric about helping Africa, relatively little biotech money has gone into researching the staple crops, such as cassava and bananas, on which millions of Africans depend.

"When they argued about feeding the starving, why did they not start out with these products?" she said. "Feeding the starving shareholders, yes, but not others."

Many citizens in Europe, battered by a series of food-safety scandals, perceive no clear benefits to themselves from the technology and are worried that the crops might be harmful.

Some governments have been persuaded in principle by such arguments. But others have resisted biotech crops for fear adopting them would hurt their ability to sell exports to Europe. Only five countries -- the United States, Argentina, China, Canada and South Africa -- have aggressively adopted the crops.

Earlier this year, the United States filed suit in the World Trade Organization to overturn a de facto European moratorium on new crop approvals. There's talk the Europeans may lift the suspension before the end of the year, but even so, it's not clear European consumers will buy biotech food.

For both sides of the debate, Africa has become a kind of proving ground, a stage on which they hope to claim the moral high ground. The reason is plain enough: Of the 800 million undernourished people on the Earth, a quarter live in the part of Africa that lies below the Sahara Desert, the world's greatest concentration of food insecurity.

Largely lost in this transatlantic shouting match have been the voices of Africans themselves. Do they want the technology, and is it really going to solve many of the problems that haunt their continent?

Trickling Down

If biotechnology is ever going to transform agriculture in Africa, you wouldn't know it from the evidence on the ground today. A recent journey through four African countries, and telephone interviews with people in several more, turned up evidence of success only in South Africa. There, both commercial farmers and poor, subsistence farmers are growing biotech crops, and they appear to be reaping economic gains.

But even in South Africa, the crops that have been successful were developed in America, and have essentially trickled down to African farmers. Projects are underway across Africa to use genetic engineering to improve staple crops on which tens of millions of poor people depend, such as cassava, cowpeas and sweet potatoes. But after more than a decade of work, not a single program has led to government approval and release of a new variety.

Ugandan banana biologist W.K. Tushemereirwe hopes to change that. "I am in the group that thinks biotechnology has a role to play in Africa's future, particularly if it focuses on developing our indigenous crops, not replacing them with new crops," he said in an interview.

Outside the Ugandan capital of Kampala, white-coated scientists working in his unit hunkered down recently at a laboratory bench in a new government laboratory devoted to genetic engineering. In this mountainous African country that straddles the equator, as much as any place in Africa, the advocates of modern biotechnology aim to prove their claims about helping the poor.

Bananas are the world's fourth most-important crop, after rice, corn and wheat, based on the number of people who depend on them as a staple. Starchy bananas, similar to plantains, are a vital food in Uganda and throughout the tropics. But, as a result in part of growing trade links that help spread plant diseases, bananas are under attack from a host of pests, and conventional efforts to combat them have been only partially successful.

With support from President Yoweri Museveni, the Ugandan government recently opened one of the most advanced biotech research laboratories in Africa to work on bettering the banana. Yet the work has only just begun -- making the banana crisis one of several instances where the biotech industry's public-relations campaign has outrun scientific achievement.

Industry meetings have repeatedly highlighted the development, in Belgium, of a banana variety resistant to one serious disease, black sigatoka. But that plant is a lowland variety that would not be suitable for growing in mountainous Uganda. Belgian and Ugandan researchers have struck up a collaboration, but even if the research goes smoothly, they said, they could easily be a decade away from having an improved highland banana.

Western agricultural companies have pledged to support other projects scattered around Africa. Monsanto Co. has backed efforts in Kenya toward a virus-resistant sweet potato, but after a decade of work, field tests were disappointing. Biotech advocates said government approval of any improved African crop remains at least three to five years away.

Some of the problems are political. Amid global controversy, many African countries have been slow to put in place the necessary regulations and test capability for biotech crops. All sides agree that new crops are going to have to go through arduous reviews, since the environmental risks they entail vary from place to place.

"Yes, this technology has concerns -- it has some risks," said Luke E. Mumba, dean of natural sciences at the University of Zambia and an advocate of biotechnology. "We must look at each product on a case-by-case basis. There should not be a wholesale rejection of say 'no' to biotechnology."

Many of the publicly funded, pro-biotech agricultural researchers doing the work said that money, not politics, has been their biggest problem. Companies have begun to contribute valuable patents and technical help for African projects, they said, but the industry's assistance has not been accompanied by any large infusion of cash.

The Belgian work has gotten "very, very, very little" support from industry, said the lead researcher, Rony Swennen, of the Catholic University of Leuven. Governments are starting to help, but still, money is so tight he can afford to train only one Ugandan researcher at a time in the most critical gene-engineering techniques.

"From different sources everywhere, I have to scratch a little bit of money," Swennen said. "I believe that genetic engineering can contribute a lot, but it's lying on the shelf. It's really a shame."

Some scientists said African farming faces more pressing needs. Hans R. Herren, director general of the International Centre of Insect Physiology and Ecology, in Nairobi, has worked in Africa for 25 years, and he won the World Food Prize for a program to control the cassava mealybug, a threat to the staple crop of 200 million Africans. Asked, as a mental exercise, to design a battle plan for solving Africa's agricultural problems, he said that biotechnology would certainly be on it -- but well down the list.

"I think it is wrong to sort of say that we need genetically modified crops to feed Africa," he said. "We need many other things first. You would need better agronomy, you need better fertilizer, you need better crop management. You have to make sure there are markets, there's storage, there are roads, there are trucks. Maybe in 15 or 20 years when we have solved all these other things, biotechnology will have something to contribute."

Yielding Profits

It is summertime in the southern hemisphere, and a fierce, hot wind blew across a district of South Africa called the Makhathini Flats in the KwaZulu-Natal province. This poor, rural area is one of the few places in Africa where farmers are already growing gene-altered crops. Far down a dirt road, a man named T.J. Buthelezi recently sat in a sandy yard with his back to the wind and told the story of his rising fortunes.

KwaZulu-Natal is home to the Zulus, the proud tribe that once humbled the British empire in battle. Today, more pride than money is in evidence there. Farms are tiny, people tend to plow with donkeys or oxen and spray their crops with tanks strapped to their backs, and they harvest by hand. Electricity, cars and indoor plumbing are rare. Buthelezi lived in a thatched-roof mud hut not long ago. Behind him as he spoke stood a

new house made of concrete blocks, with a metal roof.

Buthelezi said he was wary, a few years back, when a man from the local cotton company began pushing a new type of biotech seed, developed in America, that was twice as expensive as local cotton. But he was curious, so he planted some of the seed near his regular cotton. He was stunned by the differences.

Cotton is an arduous crop to grow, with African farmers typically spraying expensive, dangerous chemicals 10 or more times a season to fight off fast-moving worms and other pests. That is a huge constraint on Zulu farmers -- lacking modern equipment, they can grow only as much cotton as one or two people can spray by hand in a day, limiting their farms to a few acres.

The new crop, Buthelezi said, required far less spraying, only a couple of times the whole season in his case. The yields were higher, and despite seed costs, the overall economics were much more favorable than with regular cotton. He realized that he could plant bigger crops, eventually giving him the money to build a new home and send his children to school.

"This is the field that feeds my family," Buthelezi said on a tour of the plot where he ran that first experiment. "This is the field that took my kids into school. This is the field that built my houses. I was able to sit down with my wives" -- he has five of them -- "and say, 'What are we going to do with this money?'" "

Buthelezi heads a farmer association and has spoken in Washington in favor of the biotech cotton, drawing accusations from environmental groups that he has become an industry shill. But researchers at Britain's University of Reading, in the most elaborate study of its kind yet done in Africa, have verified the economic benefits of biotech cotton. And a half-dozen farmers interviewed in the Makhathini Flats told tales similar to Buthelezi's. The Reading researchers found evidence that the new crop is safer, too -- hospital admissions for pesticide poisoning, an occupational hazard for cotton farmers, are falling.

Cotton is not a food crop, of course, but the extra cash the biotech cotton is throwing off has allowed farmers to buy the food they need. "Before, my wife used to tell me that we've got to plant a field of vegetables there and there, because we didn't have money to buy food," Buthelezi said. "Now, we do."

And the whole cycle may be starting over, this time with corn, in another part of KwaZulu-Natal near the town of Hlabisa. Farmers there have just started planting biotech corn and said they, too, are seeing benefits. Poor farmers here and in the Makhathini Flats tend to buy their seeds each year on the commercial market. Biotech seeds can cost twice as much as traditional ones but the crops they produce require less fertilizer and pesticides, and less work to maintain -- generating higher margins.

Richard Sithole, a corn and potato farmer, showed off the new house he said he was able to build with improved profits from his corn crop.

"The biotech maize seed is very expensive, but looking at the costs for labor and

chemicals, I think it is less expensive overall," he said, speaking through a translator in IsiZulu.

Many of the cotton farmers in the Flats are women, and they said the easier-to-grow cotton has been particularly helpful for them, since the spray tanks they strap to their backs are smaller than those for men. Doris Gumbi vibrated with energy as she showed off her farm. She is the sole support for her husband -- he is old and ill, she explained -- and four children. With the new cotton, she said, a woman farming alone is able to make a living for her family.

Behind her stood a new house, with a metal roof, that she said she built with the profits from biotech cotton. She laughed about her leaky old hut, standing nearby. A telephone wire and an electric cable dropped down from a pole to the house -- the Gumbi family has joined the modern age.

She dipped her head shyly as she described her hopes for the future, unveiling a plan that would have been out of reach for a small Zulu farmer just a few years ago. "I want to buy a tractor," she said.

Nearing Starvation

In a place called Munyama, situated on steep hillsides by the shores of Lake Kariba, in southern Zambia, villagers live in mud huts and modest concrete houses, scratching out a living from the soil. No telephones ring. No electric lights pierce the darkness. Roads are all but impassable, and to reach the village, one travels by boat, dodging hippopotamuses at the water's edge. It would be hard to find a place farther removed from the modern world, yet here, last year, the debate over new technology reached a kind of flash point.

Crops failed in much of southern Africa because of drought, and southern Zambia, drier and hotter than the rest of the country, was particularly hard-hit. The Zambian government asked the World Food Program, a United Nations agency, for help. Calling on donor governments, including the United States, the food agency began bringing in corn, a staple food for many people in Zambia. Like a third of the corn grown in the United States, the relief corn was genetically engineered to resist worms.

Richard F. Ragan, director of the World Food Program in Zambia, said he asked government leaders in advance if they had any problem with such biotech food, and was told no. The Zambian vice president at the time, Enoch P. Kavindele, declared that if the food was good enough for Americans, it was good enough for Zambians. But after the food was on its way to villages, the Zambian political opposition questioned its safety, and a controversy erupted.

Over weeks of discussion, many leaders in Zambia came to fear the country could damage its long-term economic prospects for short-term relief. They worried that villagers would plant some of the corn, potentially transferring altered genetic material to local crops of baby corn, a product that Zambians grow for export. One of the few development strategies open to African countries is to market such high-value farm products to Europe, which is accessible from Africa by air freight. The Zambian leaders also focused on theoretical worries about the safety of eating biotech crops.

The government grew so concerned it ordered the corn sequestered, essentially freezing the food-aid pipeline for three months. Even corn already distributed to villages was ordered held under lock and key. And eventually, despite international appeals, the Zambian government decided it would not allow such corn into the country.

Recently, a group of Munyama villagers sat in a circle under a neem tree, recounting last year's crisis. Roosters crowed, goats bleated, and the lake lapped gently at the shoreline a few feet away as they spoke through a translator in Tonga, their native language.

The villagers said they planted vegetables and corn early in the season, but these wilted in the drought, and they could not catch enough fish from the lake to feed everyone. As the situation worsened, they said, some people collapsed of hunger, though none died. They resorted to eating poisonous fruits, known as "sozwe," that must be stewed for days to render them palatable.

When they heard that American corn had come to the village through an aid group, Harvest Help, they grew hopeful. But then their hearts sank when they learned the government had sequestered it. They had eaten American corn meal -- they call it mealie meal -- of that type before with no problem.

"As we were nearing starvation, there was actually food in the storeroom, and we knew where that food was," recalled Kebby Kamota, the farmer with 11 children. "So a small group of us decided we should come and demand the key by force."

They accosted an aid worker, Bernard Munyey. "They said, 'If you want to remain in peace, not in pieces, you will give us the key,'" said Munyey, who eventually relented. Recounting the feast that ensued, the Munyama villagers smiled and laughed.

The police came, but merely issued warnings. And Kamota, though regretful about resorting to force, said he would do it again.

"I'm actually glad I took that decision," he said. "If I had not done that, some people were going to die."

An Array of Barriers

Whatever the sentiment in the remote villages of Zambia, back in the capital, Lusaka, the country's leaders remain among the most skeptical in Africa toward biotech crops.

In an interview at his office, the agriculture minister, Mundia Sikatana, said that even putting aside concerns about food safety and the environment, biotech crops would do little to solve the structural problems of Zambian agriculture.

Zambia has vast tracts of arable land, sunshine and 40 percent of the water reserves in sub-Saharan Africa. But it also has a recent history as a socialist, centralized economy, one kept alive for many years by revenue from a copper industry now in the doldrums. Economic liberalization has not brought much prosperity.

Sikatana outlined a daunting array of agricultural barriers, many typical of the problems throughout sub-Saharan Africa. Few of them sounded amenable to solution by geneticists.

The country lacks sufficient facilities to store crops or adequate roads to transport them. The farm-credit system is inadequate, Sikatana said, and farmers don't consistently get critical supplies, such as fertilizer.

As last year's crisis worsened, Sikatana -- newly sworn into office -- pledged that if the country did not produce a bumper crop this year, he would resign. It did, thanks in part to crash programs to help farmers, and he didn't. Sikatana is pushing a whole series of plans, from winter crops to irrigation to fertilizer distribution, to improve the country's output. But the most important task, he said, is to erase the old socialist mentality.

"People would be given coupons to go and line up for free food, so why would they grow anything?" he said. "It wasn't easy when I called the Zambians lazy. I came under attack. But the mind-set started changing."

Indeed, people across Zambia appear determined to turn the country's agriculture around and show the world they can feed themselves -- without biotech crops. A can-do spirit has taken hold even in places like Munyama, where villagers are experimenting with irrigation and winter crops.

Environmental groups have argued that donors like the United States could easily supply non-biotech food relief to countries wary of gene-altered crops. But there's strong political resistance in the United States to letting anti-biotech forces score a symbolic victory.

American biotech advocates have asked why Zambia would let people starve to serve a tendentious objection to modern technology. But in interviews, several Zambian leaders turned that question around, asking whether in another crisis the United States would be willing to let Zambians starve to make a point.

"We have had to tell people, 'The outside world has no responsibility for our failures,' " Sikatana said. " 'They will not feed us -- we must feed ourselves with what we grow.' "