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Amid a Heated U.S.-EU Clash On Biotech, Africa Goes Hungry

Tinkering With Banana Genes Could Save
Ugandan Staple, but the Seeds Stay in a Lab

By **ROGER THUROW, BRANDON MITCHENER** and **SCOTT KILMAN**
Staff Reporters of THE WALL STREET JOURNAL

Ugandans devour more bananas than anyone else on earth -- about 500 pounds per person per year. They eat banana pancakes, banana mash, banana chips, banana bread. They season their beans with banana salt. They guzzle banana beer and sip banana gin.

So it's a national emergency when disease and pests devastate this staple crop. "It's terrible," said farmer Moses Kato while wandering through a thicket of banana plants in Magoggo, a village north of the capital of Kampala. Many of the big floppy leaves have been rendered yellow and brown by an airborne fungus called Black Sigatoka, denying the bananas the photosynthetic energy they need to grow. "A solution to the disease should be a top priority," he said. "There should be no delay."



The most promising solution, though, is bottled up in a test tube in the world's foremost banana lab 4,000 miles away in Belgium. There, scientist Rony Swennen has genetically modified banana cells to resist the leaf disease. Since 1994 his creation has literally been on ice, in frozen suspension, awaiting the chance to be planted in a test field in a tropical

country. His hopes soared three years ago when the Ugandan government came to him for help. He was promised that legislation would soon be enacted to bring his bio-engineered bananas into the country. He is still waiting. Until Uganda constructs a legal framework, officials say he can't proceed.

"It's outrageous when you have the tools to do the job but no one allows you to do it," says Prof. Swennen, forlornly showing off his test-tube creation. "I can't get it into the fields," he complains. "Everyone has their own agendas."

What has happened on the way to a better banana plant is that Uganda's urgent agenda has become pinned down in the heated crossfire between the U.S. and Europe over the future of genetically modified foods. The U.S. government and American biotech industry are pushing to bring genetically modified, or GM, seeds to Africa. The European Union, where consumers are deeply suspicious of the safety of lab-altered food, is trying to convince the Africans to adopt their own go-slow approach to biotech.

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Moses Kato

The stakes are enormous. The U.S. biotechnology industry has nearly saturated its major domestic markets with its first wave of plants. It is hungry for new markets and, even more so, favorable publicity to counter international fears that it is unleashing 'Frankenfoods' on the world. The industry hopes to polish its image with examples of biotechnology helping African farmers overcome pests, poor soil and drought.

For EU officials, the spread of biotechnology into Africa poses slippery political problems. European consumers are so leery of the technology that EU governments have had a de facto moratorium on new GM crops for four years. European countries have hinted that imports from their former colonies could be jeopardized if they switched to bio-engineered crops. That would dent the already bruised economies of Africa, whose biggest export customer is Europe.

Africa is once again caught in the middle, as it so often is in geopolitical skirmishes fought by the world's developed nations. During the Cold War, this continent was the proxy battleground between the Western and Soviet blocs, with each backing various governments and rebel movements to win over more "client states." Now, Africa, which desperately needs to find a way out of its chronic food crises, is the proxy battleground in the biotech struggle. It brings to life the popular African proverb that says when two elephants fight it is the ants that get trampled.

"We didn't want to get into a war over bananas, but we've ended up getting caught in the middle of something that's beyond us," says C. F. Mugoya, the associate executive secretary of the Uganda National Council for Science and Technology, the country's gatekeeper for GM projects. "If I want to eat a biotech banana here, the U.S. shouldn't care and Europe shouldn't care. If science offers us a solution, we should go for it if we want."

Push for Test-Tube Bananas

In 1999, the Ugandan government was moving aggressively toward embracing biotech crops. The crisis in the banana fields was so acute -- in parts of the country, some 80% of plants were being crippled by Black Sigatoka -- that the government pledged to spend \$2.5 million over five years on the banana biotech project. It was the first time the Ugandan government, one of the poorest in the world, had put so much money into scientific research. The university dispatched a student to work with Prof. Swennen in Belgium. Plans were made to transfer his test-tube bananas to Uganda.

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Then the contretemps over the safety of bio-engineered food between the U.S. and the EU erupted in Uganda, and the fast-track progress hit the brakes. Initially, scientists hoped that by the end of 2001 the government would have approved legislation setting up the legal framework to allow biotech experiments and GM seeds into the country. Now, with rumors spreading that GM

food can cause allergies, sterility and deformities, the government has slowed its deliberations to let the public debate percolate in open workshops and newspaper and television forums. The new law may not be in place until the end of 2003. Until then, all field trials in Uganda are on hold.

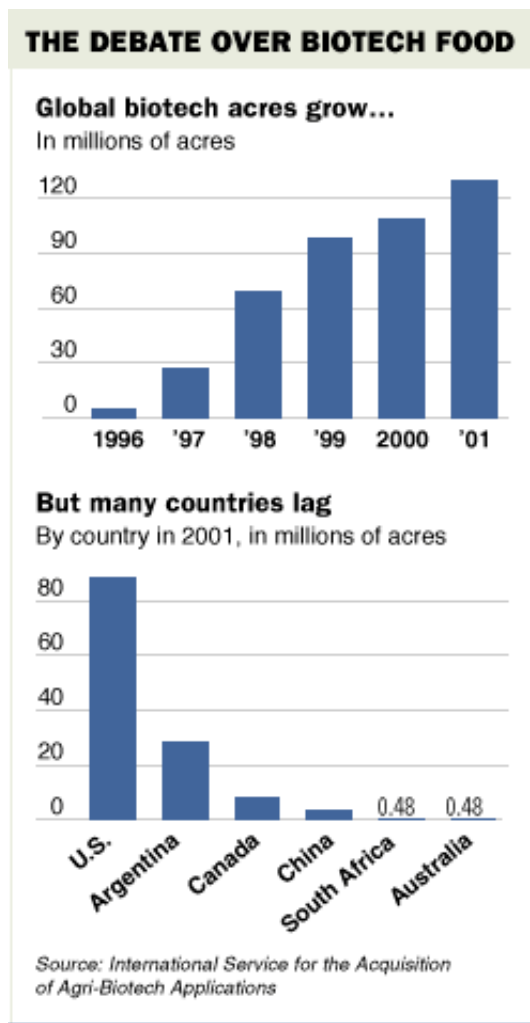
"Originally the politicians were 100% in support of us," says W.K. Tushemereirwe, the leader of Uganda's national banana research program. "Now, with the whole debate from abroad coming here, they are asking, 'are you sure about this?'"

"If you say 'biotech' here, all hell breaks loose," says John Aluma, the deputy director general of Uganda's National Agricultural Research Organization. He bemoans the emotions that have ensnarled his science.

Economic risks also cloud African biotech efforts. When Ugandan scientists considered an application by U.S. crop biotechnology giant **Monsanto** Co. to test genetically modified cotton in Uganda, the country's

cotton industry lodged an urgent protest. The United Kingdom and other European countries, it said, were threatening to stop imports of Ugandan cotton, worth \$19 million a year, if its character was genetically altered.

This gave additional fuel to John Bigyemano, the executive director of the Uganda Consumers' Protection Association and a leading antagonist of biotechnology here. "For us to embrace GM now is shooting ourselves in the foot," he says.



How the fight between the U.S. and Europe plays out could well determine to what extent Africa will use biotechnology to tackle its most intractable problems. Millions of tons of sweet potato, maize, bananas and cassava, crops upon which Africa's poorest depend, are lost each year to pests, disease and drought. Projects underway to give these plants the genetic blueprints to resist assault from the elements could mean the difference between life and death for many Africans. Other scientists are exploring using biotech crops to deliver vaccines and vitamins that can ward off human disease where medical care is scarce.

"We missed the Green Revolution. We don't want to miss the GM revolution," says Patrick Rubaihayo, professor of plant breeding and genetics at Uganda's Makerere University who is overseeing students working on the banana biotech project. "We're being fed by Europe, Asia and the U.S. If we miss the GM revolution, then we're finished."

He shakes his head at the quandary. "Our government is asking us, 'Who's telling the truth on GM? European organizations say it's not safe, the U.S. says it is. Which way do we go?'"

The debate over genetically modified food is difficult because it turns on fears of long-term consequences. The world's leading scientists say there is no evidence whatsoever that biotech crops are harmful to humans and that, if anything, they're probably safer to eat than conventional food because of the additional regulation to which they're subjected.

But some scientists worry that moving genes from an unrelated species into a plant could upset some delicate balance, perhaps igniting a chain reaction that causes the host to produce deadly amounts of a toxin that it normally only makes in small amounts. Transplanting genes between plants could also make it harder for consumers to avoid crops to which they are allergic. Many environmentalists fear that genetically modified crops could harm nature; for instance, there are worries that U.S. corn plants genetically modified to make their own insecticide could be hurting the American Monarch butterfly, a beneficial bug.

Prof. Swennen and the Uganda scientists say bananas should be the least worrisome biotech plant of all. Bananas don't produce pollen, eliminating the greatest environmental fear that they would run wild in the open. Because the genetic engineering is in the leaf and stem it doesn't affect the fruit itself, so nothing would be expected to change for the consumer. And since Ugandans eat or drink all of the bananas they grow, there is no export market to worry about.

Still, the project is engulfed in the fear that is creeping down from Europe, where protesters have destroyed biotech test fields and activists pump out position papers over the Internet. Mr. Mugoya, of the Uganda National Council for Science and Technology, says Ugandans ask: If Europeans are concerned, shouldn't we be, too? To quell the doubters, his council is overseeing the task of writing biosafety regulations, many of which likely will be similar to those in force in Europe.

Mr. Tushemereirwe, of the national banana research program, frets over the lost time. "The Europeans have the luxury to delay, they have enough to eat," he says. "But we Africans don't."

The building food crisis in southern Africa has brought the biotech battle to a fevered pitch. The government of Zambia turned away about 20,000 metric tons of U.S. food aid in October, saying the shipments contained genetically modified corn that was unsafe, capable of polluting the country's seed stock and, thus, jeopardizing its export markets, particularly to Europe. This raised suspicions in many African countries, including Uganda, where Mr. Bigyemano and others questioned whether the U.S. was more interested in helping American biotech farmers than hungry Africans.

Bush administration officials were outraged, and called on the EU to clearly assure African governments that American corn was good to eat. At a Brussels press conference, Grant Aldonas, the U.S. undersecretary of commerce for international trade, reacted with fury when a reporter repeated statements from anonymous European Commission officials to the effect that the U.S. was using Africa as a guinea pig to prove biotech is safe. "We provide food aid to starving Africans and that's a cynical act?" he asked. "That's frightening."

A spokesman for the European Commission, the EU's executive agency, hedged when questioned about whether the EU considers the American corn safe. "The EU position as far as food is that it's safe," said spokesman Michael Curtis, adding that "the environmental aspect is a completely different ball game."

The U.S. government, for its part, is spending about \$12 million annually on African biotechnology. It has funded scientists in America and Africa to genetically engineer potatoes and sweet potatoes to resist attack by disease and pest. Dennis Gonsalves, a plant pathologist from Hawaii who saved that state's papaya harvest from ringspot virus with a genetically modified plant, has received \$200,000 from the U.S. Agency for International Development to do the same for Uganda's crop. He hopes to have a papaya plant ready for launch in Uganda within three years.

That is, if the country has passed its GM rules by then. USAID, in addition to putting money into the banana project, is funding a consultant to help with drafting Uganda's biosafety framework. Alarmed by the American push, the development aid arms of various EU governments are countering with their own biosafety and regulatory funding in Uganda and the East African region.

Funding, Protest Worries

In the Laboratory of Tropical Crop Improvement at the Catholic University in Leuven, Belgium, just outside Brussels, Prof. Swennen nervously bides his time, surrounded by 1,000 varieties of bananas and their cousin, the plantain. He fears that any rash move by him to plant his test-tube creation in Uganda or anywhere else in the tropics would trigger protests and jeopardize any prospect of biotech bananas being planted. He also worries that the lab's \$2.5 million in funding, which began before the biotech controversy arose, would be threatened. "I'd have to close up," he says. "I'm scared I'd run out of money."

While he waits for a green light from Uganda, he is beginning work on developing a plant resistant to the nematodes that eat away at the roots of banana plants, even those in his own lab hothouses. The Ugandans say they could use that engineered plant, too.

In Uganda, the banana lab of the National Agricultural Research Organization is getting a fresh coat of paint and deliveries of new laboratory equipment. The scientists, while waiting for the national debate to subside, are busy isolating DNA samples and preparing cell suspensions of the local banana varieties for the day when they might be able to match them with Prof. Swennen's creations.

Out in the banana groves, the farmers are trying to cope with calamity. The root-eating nematodes are toppling plants so fast that new fields are being planted every couple of years, instead of every couple of decades. To strengthen the plants against the Black Sigatoka fungus and weevils that bore into the stem,

they have begun cooking up a homebrew of nutrients to add to the soil around each plant: cow manure, cow urine, hot peppers, tobacco leaves, banana peels and local herbs all boiled and fermented together.

This concoction, the farmers say, has helped improve the banana production somewhat, so most of them have a few bunches left over to sell at the market each week. Moses Kato says some of his fellow farmers are using the extra money to buy proper school uniforms for their children. One man, he says, bought a television. Mr. Kato built a latrine for his family.

Priver Namanya, one of the Ugandan scientists, tells the villagers that biotech bananas would boost production, and incomes, even more. "I'll like that," says farmer Yusufu Konyogo, "as long as the bananas will taste the same."

Write to Roger Thurow at roger.thurow@wsj.com², Brandon Mitchener at brandon.mitchener@wsj.com³ and Scott Kilman at scott.kilman@wsj.com⁴

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