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Mozambique Eager for Biotech Cotton Field Trials

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Report Highlights:

During the week of April 16, FAS/Pretoria and FAS/Maputo staff met with a range of biotechnology stakeholders to determine the current status and political climate for the advancement of biotechnology in Mozambique, and to determine the best prospects for biotech outreach among decision-makers, producers, and consumers. Mozambique has shifted from its historical position of refusing to adopt agricultural biotechnology, and has embarked on a path of policy change that could allow for biotech (bt) field trials and eventual commercialization. However, the issue of liability and redress in conducting field trials, where the liability for damages would be placed on the private partner involved in conducting field trials, has created a disincentive for seed companies to partner in bt cotton field trials. This issue has caused multi-national seed companies to be reluctant to assist Mozambique in its efforts to conduct cotton field trials.

General Information:

Executive Summary:

During the week of April 16, FAS/Pretoria and FAS/Maputo staff met with a range of biotechnology stakeholders to determine the current status and political climate for the advancement of biotechnology in Mozambique, and to determine the best prospects for biotech outreach among decision-makers, producers, and consumers. Our findings show that Mozambique has shifted from its historical position of refusing to adopt agricultural biotechnology, and has embarked on a path of policy change that could allow for biotech field-trials and eventual commercialization. The government has specifically targeted cotton and corn as priority commodities for field-trials, with the possibility of adding cassava at a later date.

In 2007, the Government of Mozambique (GOM), developed a biosafety framework that allowed for the possibility of biotechnology field trials. Currently, a USAID-funded project, lead the Program on Biosafety Systems (The Program for Biosafety System (PBS) supports partner countries in Africa and Asia in the responsible development and use of biotechnology and is managed by the International Food Policy Research Institute (IFPRI)), in collaboration with the GOM's own Inter-Institutional Working Group for Biosafety (GIBS), reviewed Mozambique's existing biosafety regulations and developed several draft policy decrees for the Ministry of Science and Technology's review to facilitate biotech field trials. One constraint however, is the issue of liability and redress in conducting field trials, where the liability for damages would be placed on the private partner involved in conducting field trials. This issue has caused multi-national seed companies to be reluctant to assist Mozambique in its efforts to conduct cotton field trials.

Mozambique Cotton Institute

FAS Pretoria Senior Agricultural Attaché, Corey Pickelsimer, Agricultural Attaché, Nicolas Rubio, and Agricultural Specialist Almeida Zacarias met with the president of Mozambique's Cotton Institute. During the introductions, the delegation touched upon the need for Mozambique to adopt new agricultural technologies. We raised the recent meeting between Mozambican Minister of Agriculture, Jose Pacheco, and U.S. Secretary of Agriculture, Tom Vilsack, as an indicator of Mozambique's support for biotech (bt) cotton field trials. The Institute was aware that bt cotton field trials were discussed and are eager to see Mozambique move forward in this area.

The Cotton Institute gave a brief presentation on cotton production in Mozambique. Most of North and Central Mozambique produces cotton, as well as some in the Central-East provinces of Zambezi, Tete, and Manica. The industry involves over 200,000 families or more than five million people throughout the value-chain. Annual revenues are about \$40 million. Yields are about 500kg/hectare (ha) with some producers receiving up to 850 kg/ha. Currently all textile mills are closed as cotton is exported to Asia mostly and the textiles come back for manufacturing. On production and exports, there are 15 companies employing about 20,000 annually.

The Cotton Institute outlined several challenges the industry currently faces. One is the continued cotton chain revitalization as a response to a collapse in cotton production during Mozambique's civil war.

The second challenge is to test and produce bt cotton to improve yields and farm revenues. Third is to build capacity in cotton cropping systems among farmers. And finally, to increase average land holdings from the current half a hectare per family to one ha per family.

Biotech Adoption

Pickelsimer inquired about the potential demand for biotech cotton in Mozambique. The Cotton Institute felt there was significant demand and, in fact, bt cotton has been identified as a priority for the Cotton Institute and the Ministry of Agriculture. Major factors for low production in Mozambique is plant density per ha, pests, and cleaning time for cotton. There are two primary pests for cotton, aphids and bore worms. The application of pesticides is complicated and subject to human error. Farmers spend about \$80 per hectare for plowing and land preparation. With roundup the cost is only \$15-\$20. Additionally, the Cotton Institute believes the adoption of bt cotton will generate a 30-50 percent yield increase in Mozambique due to inefficient pest mitigation processes.

The Mozambique has significantly underutilized ginning capacity. Ginning is currently at 30 percent of capacity and returns to farmers are low. The Institute is looking to increase 48 percent of production from small-scale farmers to medium-scale farmers under a ten year time-frame.

Bottlenecks

In terms of adopting biotech cotton in Mozambique, the Cotton Institute commented that most decision-makers only see one side of the debate and do not see the big picture of the benefits to the entire country. From the Institute's perspective, most politicians feel that the current legislation allows for confined field trials. However, elements of the legislation that require the technology provider to bear responsibility for any negative impacts have made it difficult to find a seed company to partner in bt cotton field trials. The government wants to see the results of field trials before allowing commercialization, but the difficulty in finding a private sector partner for bt cotton field trials has been a significant impediment in doing so. If field trials were to occur, it would likely take place at the Nampula research station in Northern Mozambique.

Regarding the liability issue, the Cotton Institute spoke with multi-national seed companies and requested a derogation from government to circumvent the liability issue for bt cotton field trials. Additionally, the Cotton Institute has requested policy advice from private seed companies on how to address the liability issue. However the companies replied that they can't go beyond their expression of concern over the legislation component and refused recommend regulatory changes, but did not elaborate as to why.

Pickelsimer asked what the relationship is between Ministry of Agriculture and the Ministry of science and Technology, as the Ministry of Science and Technology is where all biotechnology legislation rests. The Cotton Institute feels the relationship between the two ministries is positive as they are in lock-step with each other on the issue of biotechnology. In order for any new biotechnology regulations, or decrees, to be passed, all relevant ministries must convene in a panel that is chaired by the Ministry of Science and Technology, and attended by the Ministries of Health, Agriculture, and the Environment.

The institute noted that current draft decrees are looking to pave the way for commercialization of biotech. The Government of Mozambique (GOM) has two special initiatives in an attempt to fast-track the development of bt cotton and maize, but the existing draft decrees will be for future commercialization of the general technology.

In closing, Pickelsimer discussed FAS/Pretoria Cochran and Borlaug programs with the Institute as a possible solution to help address policy constraints for field trials or any other biotechnology issue. The institute expressed significant interest in these programs and also noted that soybeans and possibly sorghum are the next commodities of interest.

Agricultural Research Institute of Mozambique (IIAM)

On Tuesday, April 17, FAS/Pretoria met with the Agricultural Research Institute of Mozambique (IIAM), which reports to the Ministry of Agriculture, to discuss the status of biotechnology in Mozambique. The newly hired Director joined the IIAM after working for the University of Eduardo Mondlane (UEM), the largest university in Mozambique. Pickelsimer made introductions and asked for an overview of IIAM. Previously there were separate research facilities for all areas of agriculture (livestock, forestry, agronomy, etc) and now IIAM represents the merger of all agricultural research under the Ministry of Agriculture. There are four areas; agronomy, animal science, training and technology transfer, and a planning and finance directorate. IIAM has four regional offices in the country in the northeast, northwest, south, and central provinces where local research occurs.

Pickelsimer asked about collaboration with other public or private organizations. IIAM has collaborated with regional universities, and other governments. Cassava research is a current priority and for the cassava project they have collaborated with Tanzania and Malawi. There has also been collaboration with IFPRI on policy. There has been some collaboration with Embrapa, Brazil. IIAM is currently seeking hybrid seed varieties for various research projects.

The Director discussed livestock improvement as a priority for Mozambique. Pickelsimer discussed USDA's relationship with cooperators and provided an overview of the U.S. Livestock Genetics Export Inc., a cooperator with the capacity to provide assistance in livestock improvement. We requested IIAM put their livestock specialist in contact with FAS/Pretoria to follow up on collaborative work in livestock improvement. One of the regional research stations has been charged with focusing on Nguni breed improvement.

On biotechnology, IIAM collaborates with the Ministry of Science and Technology (MST). The MST serves as the coordinating agency for biotech and is a relatively new ministry. Research is done by the various institutions and Ministries and the research institutions results typically lead to policy recommendations. However, IIAM and the other research entities do not write regulations for the MST. Policies can be recommended, then review for comments by GIBS, and then sent for review to the Council of Ministers.

IIAM recently partnered with PBS to do a comprehensive review of Mozambique biotech regulations and laid out several recommendations. The recommendations were finalized and presented in December 2011, and are currently in a comment period by GIBS, an advisory group to the council of Ministers comprised of representatives from the relevant ministries. The comment period should finish

in the next few weeks and the next step is to take the policy recommendations to the Council of Ministers. The policy recommendations in the PBS document were done in collaboration with the GIBS and it's expected that there will not be many comments on the findings. The recommendations seek to remove some of the stringent requirements for conducting field trials. IIAM expects some pushback to come from active anti-biotech NGOs. Rubio asked what would be the best way to do outreach in support of PBS findings. IIAM suggested public outreach is best at the moment. Outreach targeting producer groups, civil society, and NGOs would be the best target audience to better educate the public.

Pickelsimer asked about synchronicity and if this was considered in the policy recommendations. More specifically, if Mozambique had considered accepting biotech events that were approved in south Africa without having to do the entire research and field trial process in Mozambique for prior to approval. IIAM did not consider this but thought this was a good idea to explore in the future.

IIAM stressed at the end of the meeting that any policy recommendations that can be made must be made to GIBS.

University of Eduardo Mondlane - Center for Biotechnology (Dr. Luis Neves)

After introductions Dr. Neves gave us an overview of the biotech center in Maputo. The center was started seven years ago to develop research capacity in Mozambique. The university pooled its resources between the medical, veterinarian, and the agricultural schools to set up the biotech research center. The center is comprised of three groups; epidemiology, biodiversity, and molecular toxicology. Currently they have a master's program and are looking to build a doctorate program in the next few years.

Pickelsimer inquired about the status for biotechnology in Mozambique. Dr. Neves responded that in Mozambique, the biotech strategy was implemented by the MST in 2007. The university could explore biotech crops for research purposes, but would have to apply to the MST to research and grow specific bt plants. However, they currently do not have the facilities to conduct such research. The university is currently developing a lab for GE testing that is being funded by the private sector interested in having their products exported to Mozambique where GE testing is required to prove certain products are not biotech. The lab is functional but doesn't meet international standards. Additionally, they are currently researching a coconut disease specified in the Millennium Challenge Corporation (MCC) compact with Mozambique. However, the center is struggling under decaying infrastructure that is affecting the university's ability to do research and testing.

Dr. Neves said Mozambique was an anti-biotech African country for many years. Currently there has been a shift in climate, noting statements from the Minister of Agriculture and from the previous President. Additionally bt cotton and maize have been identified by the government as priorities, but he cautioned that biotech should not be pushed as a miracle cure for food security as the benefits of the technology can be mitigated by poor use and implementation.



FAS/Maputo Agriculture Specialist, Almeida Zacarias, observes Mozambique's only dna/rna testing lab at the University of Eduardo Modlane

Dr. Neves mentioned how in the Council of Ministers, some of Ministers seem uninformed on the benefits of biotech as the Council recently raised concerns about seed use rights. Dr. Neves stated that, for field trial approval, Mozambique needs two things: an infrastructure akin to the South African Stellenbosch University to have a contained greenhouse research facility, and a partner in conducting field trials at a contained facility out in the field.

Dr. Neves stated that one of the problems in Mozambique is the general sense of uninformed opinions on biotech among the population and among regulators. Rubio asked how the USDA could assist via outreach. Dr Neves responded that the stakeholders to address would be the associations of CTA (a Mozambique form of Chamber of Commerce) as businesses with more capital can reach educated consumers. Dr. Neves also thinks USDA should target rural peasant associations of producers or rural communities, particular in the Manica and Sofala provinces. Sofala is a major maize producing province.

In closing, Pickelsimer promoted the Cochran and Borlaug programs, to which Dr. Neves expressed significant interest. He thought the university could benefit from a program on dna/rna lab procedures and management.

Ministry of Science and Technology
Deputy National Director, Dr. Rhoda and Dr. Claudia Baule

FAS/Maputo introduced the FAS/Pretoria team and briefly explained the intended purpose of the meeting with the MST. Dr. Claudia Baule currently serves as the coordinator for the country's

biotechnology program. Joining the meeting was a consultant to the Ministry who has been contracted to organize the business climate for biotechnology, particularly for marine biotechnology.

Dr. Rhoda spoke of the current climate for biotech. The PBS document is currently in public comment and the GIBS is seeking public comments in various provinces of Mozambique. Before the comment period ends, there still needs to be a few large, public comment meetings.

When it comes to the regulatory environment, GIBS was established in 2007 with the idea to deal with all aspects of biosafety. The organization was expanded to deal with all regulations matters concerning biotechnology and genetic resources. However this expansion has not been fully implemented. GIBS has been active with seminars and training programs on the national level to educate stakeholders about biosafety, specifically the handling and transport of biotech crops.

Regarding research, biotech research started at the university but has been constrained by resources. Most of the research is done by students and addresses practical problems relevant to Mozambique. Mozambique also has a team that focuses on plant biotechnology research and genetic resources and biosafety issues. The national directorate on animal health does some complementary work but does not do direct biotech research. The Ministry of Fisheries has a laboratory that does genetic research, particularly for prawns. The National Institute for Health has an immunology laboratory that does research mostly related to HIV research and diagnostics.

Regarding the PBS document and its policy recommendations, the Ministry stated that the adoption of biotechnology will include outreach and training. She does not know what the status of public comments has been, and whether or not they are overwhelmingly negative or passive. However, a lot of educational activities are ongoing and planned to get end users to understand the technology. Zacarias noted that the rural farmer would likely welcome the adoption of biotech if told that the plant is higher yielding and is drought resistant. He felt the policy-maker is often the one who doesn't understand the technology and is the bottleneck to advancement. The Ministry agreed, and thinks outreach needs to take place at all levels including to the decision-makers. Mozambique is looking for a consultant to help develop regulations so as to not reinvent the regulatory wheel.

We asked what segment of the population has provided the most resistance. The Ministry responded that typically the more educated elements of the public, with access to the internet, have been more resistant as they find anti-biotech articles on the internet. Farmers, however, seem to be relatively receptive to the technology.

Regarding the Ministerial climate, the current biosafety law was fully approved by the Cabinet in 2007. Included within this strategy is a discussion of biotech for agriculture where Mozambique has identified the technology as a priority for adoption. Now the Ministry has been working on developing a national biotechnology program. The development of this program was approved in May 2011 by the Cabinet and it lays out the roadmap for adoption. Currently the government is working with consultants to develop the business incentives to get the program and projects off the ground. This will also help identify what projects to prioritize and what revenues to expect.

Pickelsimer raised the business issue of liability as identified by the Cotton Institute and discussed the importance of not placing excessive liability on private companies as these companies have strict

guidelines regarding the use of seed and do not want to be held accountable for the liability outside their control at field trial locations or even after commercialization. This could be the reason why private seed companies have been reluctant to assist in cotton field trials in Mozambique. The Ministry thought the regulatory recommendations were based on other countries frameworks and it's possible this issue was missed or not addressed. They will need to look into this to see if this is something that needs to be addressed.

Pickelsimer discussed biotechnology as a tool for farmers that they can use, or not, depending on the economic benefits it presents to them. He also raised the new school feeding strategy of tying local production to schools as being an excellent opportunity to allow for field trials and commercialization in order to meet the need the new school feeding strategy.

Regarding outreach, Pickelsimer asked how the U.S. Government can support Mozambique in its efforts to develop its regulations. The Ministry responded that the current regulation does not cover all activities in biotech and the umbrella legislation needs updating. The business plan is currently not ready but they will provide the plan to FAS/Pretoria when ready. The Ministry inquired about marine biotechnology and if they can get support from the U.S. on this matter. We welcomed any proposal from the Ministry regarding this topic. For agriculture there is a current lack of resources to provide training and conduct research. This is one level of opportunity for collaboration. Another level is to promote business interest in biotechnology as a form of outreach. IIAM is looking to provide farmers with cultivars that are pest or virus resistant. The Ministry also wants to develop the bio-fertilizer industry. Another area is the range of services concerning livestock protection to support livestock development, treat animal diseases, and diagnostics.

The ministry raised its interest in developing marine biotechnology. The Ministry started this project four years ago with the Spanish government to address marine issues. Mozambique has one of the largest coastlines in the world with tremendous biodiversity. The idea was to utilize marine resources in a sustainable manner. The Ministry has been working on a legal framework to address these concerns. Another priority is to protect the coral reefs. The ministry wants to see infrastructure development that supports the fishing industry and also to conduct capacity building on conservation. For biotechnology, they want to explore algae and other marine products that support human nutrition, and also address fisheries management to avoid resource depletion and to protect coral reefs. The Ministry wants to explore biotechnology as a tool for tapping into the genetic traits of these protected species for pharmaceutical use and the development of artificial cultivation or coral reefs. The ministry has already been in contact with the Universities of Oregon and North Carolina to explore potential collaborative opportunities, along with the governments of Spain and France.

In closing, Pickelsimer stated we would remain in contact to further explore biotech outreach opportunities in the short-term, but in the long-term we would remain in communication to explore opportunities for exchange programs or other capacity building activities.