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Annual

Approved By:
Marcela E. Rondon, Agricultural Attaché
Prepared By:
Michael David, Senior Agricultural Specialist

Report Highlights:
The Nigeria Senate passed the Biosafety Bill into law on June 1, 2011. However, one year after the President is yet to sign it into law. The law leans heavily on the precautionary approach and requires certification and mandatory labeling for imports of all products of biotechnology. In the meantime, confined field trials are being conducted in the country for transgenic cow pea, sorghum and cassava varieties. Sections I, III and V of the report have been revised.

Section I. Executive Summary:
Nigeria, Africa's most populous nation (167 million), is a food deficit country. Formally a net food exporter, Nigeria's subsistence agriculture can no longer supply the needs of its growing population. According to trade sources, Nigeria imported about $3.9 billion worth of agricultural commodities in 2011. Nigeria is largely a bulk commodity market and imports wheat, soybean products, tallow, rice and high value products. In CY 2011, U.S. agricultural exports to Nigeria reached about $1.3 billion, primarily wheat. Nigeria was the second largest buyer of U.S. wheat in the world in 2010/11.

Nigeria's biosafety bill, in development for nearly 15 years, was finally enacted into law by the Senate on June 1, 2011. However, one year after the passage, the bill is yet to be signed into law by the President. The President raised some issues with the Bill but the Ministers of Agriculture, Environment and Science and Technology have addressed all the issues and it is expected that very soon the bill will be signed into law. In anticipation of the signing of the bill into law, the Biosafety Office of the Federal Ministry of Environment has commenced the drafting of some of the regulations for effective implementation.

Although the law leans heavily on the precautionary principle, it is seen as a major milestone in ensuring the safe application of biotechnology. Specifically, Nigerians expect the application of the technology to agriculture to serve as a tool to achieve food security. The enactment of the law sends a very clear message to the rest of Africa and indeed the world that the most populated country on the continent is prepared to receive, regulate and, most importantly, commercialize biotechnology products.

The biosafety law has provides the legal framework for Nigerian scientists who have done much research to move forward from field trials into commercial testing phases for eventual deployment to farmers. Currently, three biotech crops are undergoing field trials in Nigeria: the Bt Cowpea, bio-fortified sorghum and the bio-cassava Plus. Bt Cowpea and the Africa Bio-fortified Sorghum (ABS) are undergoing trials at the Institute for Agricultural Research, ABU, Zaria, while Bio-Cassava Plus is undergoing trial at the National Root Crop Research Institute, Umudike. The transgenic cassava, named "Super Cassava," which is fortified with vitamin A was developed at the Danforth Center. Also, there is growing interest in the testing and prompt release of insect-resistant, herbicide-tolerant cotton from the private sector. The Federal Ministry of Agric, IAR, Zaria and NABDA are already strategizing to commence field testing of Bt Cotton.

The impending Law calls for the establishment the Biosafety Department under the National Biodiversity Management Agency. The Biosafety Department is expected to be the focal point and authority on biosafety in the country.

According to the Federal Government of Nigeria, the law aims to:

- Define modules of practice of modern biotechnology and the handling of its products (GMOs) to ensure safety to the environment and to human health.
- Guide different segments of society in contributing to safe application of modern biotechnology.
- Recognize the complex issues to be addressed by central authorities in the judicious application of modern biotechnology.
- Ensure that modern biotechnology activities and their products (GMOs) are safe for the environment and to human health.
- Base the deliberate release of GMO on advance informed agreement
- Define responsibilities among designated bodies/institutions.

- Confer powers to authorize release of GMOs and practice of modern biotechnology activities.
- Confers powers to carry out risk assessment/management
- Define offences and penalty for violation of the act
- Cover all genetically modified organisms/living modified organisms, products food/feed and processing.
- Cover socio-economic consideration in risk assessment and labeling of all GM products

The Biosafety Law also defines penalties for not complying with its regulations, and failure to obtain approval or proper permits before importing or releasing GMOs into the environment carry the following stated penalties:

- Individuals can be fined 2.5 million Naira or imprisonment for a period not less than 5 years or both;
- Corporations would pay a fine of not less than 5 million Naira and the directors or officers of the body shall each be liable to a fine not less than 2.5 million Naira or imprisonment for a term not less than 5 years or to both such find and imprisonment.
- False information results in the same penalty as failure to obtain approval.
- Obstruction results in a 2.5 million Naira fine or imprisonment for not less than 3 years or both.

The law contains some clauses that could negatively impact the importation of products derived through agricultural biotechnology. Section 9 (functions of the national biosafety committee) mandates the committee to assess and recommend approval of applications submitted for the import/export, transfer, and transit of GMO products. In addition, Part V (Notification and Authorization) clearly states that importation/exportation and movement of GMO products requires prior approval from the biosafety agency (when established) or the Ministry of Environment. Also, the new law requires mandatory labeling of products derived through agricultural biotechnology.

Section II. Plant Biotechnology Trade and Production:

A. Commercial Production of Biotechnology Crops

Nigeria does not produce any biotechnology crops commercially. At a recent meeting organized by NABDA, key speakers recommended that Nigeria should commence the commercialization of GM crops starting with crops with high industrial uses.

B. Biotechnology Research Efforts

Capacity exists at the International Institute for Tropical Agriculture (IITA) and to some extent at the GON's Sheda Science and Technology Complex (SHESTCO), to conduct and apply basic biotechnology research. Nigerian scientists using the facilities at the IITA have made significant progress in the transformation of a local tomato variety. The institute is doing preliminary work on bio-engineered cowpea. The Bio-cassava Plus undergoing trials was developed in United States by the

Plant Danforth Center, Missouri, while the Cowpea was developed in Australia but in all cases with significant participation of Nigerian scientists.

C. Biotechnology Crops under Development
There is no biotechnology crop under development in Nigeria that will be on the market in the coming year. With transgenic insect-resistant cotton now in commercial production in Burkina Faso, Nigeria farmers have indicated strong interest in commercial production of GMOs crops, such as bioengineered cotton and the genetically modified water efficient corn.

D. Imports of Biotechnology Crops/Products
At present, agricultural products such as soybeans, soybean meal, soybean oil, and corn are freely imported from the U.S., EU, Brazil and Argentina.

E. Food Aid
Nigeria is not a recipient of food aid.

F. Production of Biotechnology Crops Developed Outside the United States
At present, Nigeria does not produce biotechnology crops.

Section III. Plant Biotechnology Policy:

A. Regulatory Framework for Agricultural Biotechnology

I). Responsible institutions involved in agricultural biotechnology in Nigeria:

- **The Federal Ministry of Environment** is the National Focal Point and the competent Authority for Biosafety in Nigeria. It is the regulating body for modern biotechnology activities e.g. provision of the bio- safety/regulation requirements for bringing into the country Genetically Modified Crops for testing and release. This Ministry is the GON's liaison with the Secretariat of the Convention on Biological Biodiversity for administrative functions required under the Cartagena Protocol on Biosafety. The National Focal point is responsible for all correspondences with importers, exporters and applicants on movement of products of modern biotechnology.

- **The Federal Ministry of Agriculture** is in charge of formulating agricultural policy as it relates to biotechnology, promoting and facilitating agricultural activities, implementation of the policies and programs of agriculture. It houses all agricultural research institutes in the country.

- **National Biotechnology Development Agency (NABDA)** was established in 2001 in the Ministry of Science and Technology with the mandate for formulating biotechnology policy in Nigeria, acquiring, deploying, promoting and facilitating biotech activities for indigenous and self-reliant national growth. The agency is active in creating awareness for products of biotechnology. NBDA conducts regular workshops for the major stakeholders in biotechnology.

- GON's **Sheda Science and Technology Complex (SHESTCO)** is a center for research and training in the area of modern biotechnology. It has the mandate to domesticate technologies for the application of modern biotechnology in health, agriculture, and environment.

- **Universities** are involved in research and development aspects of agricultural biotechnology. Most of them have Institutional Biosafety Committees.

ii). Role and Membership of the National Biosafety Committee (NBC)

The NBC serves as the Competent National Authority for biosafety in Nigeria. The NBC is responsible for the safe management of biotechnology activities, including research, development, introduction and the use of LMOs/GMOs. The Committee has 16 members drawn from the Ministries of Agriculture, Science & Technology, Environment, Commerce, Education, Health (NAFDAC), Industry, Foreign Affairs, Internal Affairs (Nigerian Customs Service), Justice, and NACCIMA/Organized Private Sector. The NBC will also include a Biologist, a Physical Scientist, a Social Scientist and a Representative of NGOs distinguished in environmental/conservation matters. The NBC is required to review all applications for the release of products of bioengineering and make recommendations to the Minister of Environment on whether or not to allow such products. The NBC oversees the implementation of the National Biotechnology Program, consistent with the Biosafety Law.

The NBC has also established National Biosafety Technical Sub-committees (NBTS) to focus on sectoral interests such as agriculture, health, industry and the environment. The sub-committees review proposals for research and recommend the conditions under which experiments should be conducted. They are to provide technical advice to the NBC and contribute to its functions in relation to contained use, field trials, release and placement on the market.

All applications for import, field trials, transit and contained use must be routed through the registrar of the NBA. The NBC will meet and direct the relevant NBTS to carry out risk assessment and ensure participation of all relevant stakeholders. Findings of the NBTS are submitted to the NBC and then the decision is conveyed to the applicant by the Registrar of the NBA. A license to carry out event is issued by the Registrar of NBA.

iii). Political factors

The Nigerian government appreciates the potential of biotechnology to improve agricultural productivity. The national biotechnology policy document states that the GON "supports biotechnology because of its immense potential to more rapidly contribute to sustainable food security and economic growth". Government's support for the development of the technology is anchored on the country's need to feed the teeming population with the challenges of global warming and the attendant climate change. The Federal Ministry of Agriculture also supports the application of Biotechnology in Agriculture. This is demonstrated by the action of the Ministry in setting up a Study Group to develop a strategy for the application of biotechnology in Agriculture. The Director General of the National Biotechnology Development Agency is the chairman of the committee.

B. Approval of Biotechnology Crops

Now that the biosafety law has been enacted, the Federal Ministry of Environment, which houses the secretariat of the National Biosafety Committee, has commenced drafting of the operational guidelines.

C. Field Testing

With the approval of the National Biosafety Committee, the National Root Crops Research Institute, Umudike and Institute of Agricultural Research (IAR), Zaria are carrying out Confined Field Trials on transgenic cassava, sorghum and cowpea. The approval was based on the provisions of the National Biosafety Guidelines. The guidelines have a provision for field-testing bio-engineered crops.

I). The Maruca - Resistant Cowpea Field Trial at IAR Zaria

This biotech event was developed by CSIRO Plant Industry Laboratory at Canberra, Australia. The trial is sited on the Research Farm of the Institute of Agricultural Research, Ahmadu Bello University, Zaria. The field trial is to evaluate transgenic events (lines) for their reaction to the legume pod boring insect, Maruca. A line will be considered resistant if it does not sustain damage by the insect. In addition, effect of environment, agronomic performance such as plant morphology, maturity and yield will be assessed. The trial will be replicated four times.

Current status:

- FAS Lagos and USAID officials visited the Institute for Agricultural Research (IAR), Ahmadu Bello University (ABU), Zaria on November 17, 2011 to monitor the progress of work on the cowpea maruca (insect) resistant confined field trials (CFT). Preliminary results show that CFT3 is a very successful trial. The proof of the concept is not in doubt and the data presented showed that the experiment is more than 95% significant in controlling cowpea pod borer (maruca). The physical and biological control mechanisms put in place by the institute to mitigate potential environmental risk conformed to established guidelines. The confined field trial for this event has been successfully concluded.
- The next stage is the multi-location trials.
- This project is funded by African Agriculture Technology Foundation (AATF), Nairobi and aided by USAID and other Donors

II). The Africa Biofortified Sorghum(ABS) Field Trial in IAR, ABU Zaria

The Africa Biofortified Sorghum(ABS) has completed one successful trial and will soon commence the second trial.

III) The Biocassava Plus(BC+) Field Trial at Umudike

The Confined Field Trial for Biocassava Plus is being conducted by the National Root Crop Research Institute, Umudike. The transgenic cassava, named "Super Cassava," which is fortified with vitamin A was developed at the Danforth Center.

Current Status:

- It was established in October 2009 and is funded by the Bill & Melinda Gates Foundation;
- It is presently undergoing the second field trial where the activity carried out on a daily basis is the taking of normal growth parameters. The third trial is expected to commence soon;
- The actual trait of interest is measured at harvest period.

NABDA is collaborating with the research institutes in creating awareness among Nigerian cowpea and cassava clientele, while the Biosafety Office of the Federal Ministry of Environment ensures compliance to Nigerian Biosafety guidelines in the conduct of the trial.

Internationally, AATF provides funding platform, planning, capacity building and linking with other donors such as USAID; the Network for the Genetic Improvement of Cowpea in Africa leverages scientific input of members for planning and linkage, the PBS assists in regulatory compliance capacity building and advice.

D. Participation in Meetings of International Standard-Setting Organizations

Nigeria signed the convention on biosafety in 1992 and ratified the instrument in 1994, and was an active participant in the negotiations leading to the adoption of the Cartagena Protocol. Officials of key biotech agencies such as the Federal Ministry of Environment and NABDA regularly attend meetings of international standard-setting bodies.

E. Stacked events

The NBC does not require additional approval for stacked events

F. Review and Approval Process for Biotech Products for Planting and Import

The implementation guidelines for the new law have not yet been developed. However, the National Biosafety Guidelines adopted by the GON in 2001 has provision for approval for field-testing bio-engineered crops.

G. Coexistence

Nigeria's new biosafety law is silent on co-coexistence. However, there are provisions for monitoring. The relevant portion of the law states, "for the purpose of biosafety, monitoring shall be used as a tool to ensure that the concerns expressed by stakeholders are addressed, ensure compliance with the terms of approval, confirm claims and trace the fate of LMOs/GMOs".)

H. Labeling

The new biosafety law requires the mandatory labeling of all products of agricultural biotechnology in order to protect "consumers right to know." Although not specific to biotech products, existing labeling regulations are being enforced by the National Agency for Food and Drug Administration and Control (NAFDAC), the GON's regulatory body responsible for food product manufacturing, importation, advertisement and distribution in Nigeria. NAFDAC regulations require food labeling to be informative and accurate. FAS Lagos has opened dialogue with NABDA, NAFDAC and the Ministry of Environment on the operational guidelines of the law to ensure that the requirement of mandatory labeling does not obstruct free trade.

I. Biosafety Protocol

Nigeria signed the Cartagena Protocol on Biosafety in 2000 and its instrument of ratification was signed by the President on 30th November, 2002. The protocol came into force in September, 2003. Nigeria, having signed and ratified the protocol, is now under obligation to implement it. The implementation of the protocol is slow and has had no effect on trade.

J. Biotechnology-Related Trade Barriers
We are not aware of any biotechnology-related trade barriers affecting U.S. exports to Nigeria.

K. Pending Legislation
The Nigerian Biosafety Law was enacted on June 1, 2011 and is currently awaiting the signature of the President.

L. Technology Fees
Nigeria does not have any technology fees for bio-engineered crops since there is now legislation in place.

Section IV. Plant Biotechnology Marketing Issues:
A. Market Acceptance
Generally, most Nigerians are not aware of products of modern agricultural biotechnology and the issues involved. Information and discussions on modern biotechnology have been undertaken largely among GON officials, scientists and researchers. Nigerian farmers and the general public will need to be educated about the technology.

Wheat importers in Nigeria favor the precautionary approach to biotechnology. They have learned about bio-engineered food products primarily from the U.S. - EU debate over biotechnology. Overall, Nigerian wheat importers have expressed the opinion that the U.S. should not introduce bio-engineered wheat into the market until all long-term health concerns are resolved. Nigeria was the second largest importer of U.S. wheat in the world in MY2011/12 with imports reaching 3.5 million tons.

B. Focus Group Survey
The results of a focus group survey on the attitude of the public to biotechnology revealed that about 40 percent of respondents would not mind consuming bio-engineered food products. Many respondents especially among those with little education were ignorant of biotechnology and its potential usefulness. While some respondents did express concern about the long-term health effects of consuming such products, these concerns seem to be overshadowed by their basic need for affordable food. The survey also revealed a marked preference for biotech products developed locally to those that are imported.

Another national survey on public awareness of agricultural biotechnology in Nigeria was conducted in May 2004, preparatory to the launch of the Nigeria Agriculture and Biotechnology Project (NABP). Survey results suggest that the Nigerian public is only marginally aware of biotechnology. Those who are aware have heard something about biotechnology through stories in the news media. Most Nigerians do not have a clear understanding of biotechnology and many still confuse the technology with conventional breeding techniques. Nigerians are also not very knowledgeable about national and international policy issues relating to biotechnology. However, Nigerians are interested in the innovation and wish that it could be utilized to address the persisting problems of poverty in the country and one-third of respondents stated that they would be willing to eat genetically modified (GM) food if given the opportunity.

Following press statements by key international and national scientists and a series of workshops conducted by USAID funded NAPB for civil servants, policy makers, legislators and for the members

of the media, the level of awareness of issues relating to agricultural biotechnology has improved somewhat. Most newspaper articles are well balanced and are devoid of misconceptions about biotechnology.

Several anti GMO NGOs are active in the country.

Section V. Plant Biotechnology Capacity Building and Outreach:

A. U.S. Government or USDA Funded Outreach activities

Over the last five years, USDA has helped to fund scientists to work on biotechnology at the IITA, under its technical assistance program. In addition, the Agricultural Affairs Office in Lagos utilized the Cochran Fellowship Program to provide training in agricultural biotechnology in the U.S. for four Nigerian scientists during the same period.

Since 2004, agricultural biotechnology in Nigeria received a boost with two linked initiatives funded by USAID; namely, the West African Biotechnology Network (WABNET) and the Nigeria Agricultural Biotechnology Project (NABP), implemented by IITA. NABP was designed to assist Nigeria in building the framework for decision-making that will facilitate access to the opportunities biotechnology offers and will ensure the safe and effective application of this technology to improve agriculture. A key element of the project is to improve implementation of biosafety regulations; and, enhance public knowledge and acceptance of biotechnology.

The project developed collaborative linkages with and provided facilities to some Nigerian universities/institutes to facilitate implementation; National Biotechnology Development Agency (NABDA) for biotech information dissemination; Sheda Science & Technology Complex (SHESTCO) for training of scientists; National Root Crops Research Institute (NRCRI) for plant genetic transformation; Institute for Agricultural Research (IAR) for tissue culture and University of Agriculture, Abeokuta for advanced biotechnology training.

In early 2009, USAID sponsored a study tour trip to the Philippines GM crop Farms for the House Committees members on Agriculture, Environment and Science and Technology to have a practical experience on GMOs and how they are being regulated as well as the legislation procedure. These activities have assisted in the eventual enactment of the biosafety law.

B. Country Specific Needs

The Agricultural Affairs Office (AgLagos) and U.S. Mission Nigeria Biotech Outreach Program will support the Open Forum on Agricultural Biotechnology (OFAB), organized monthly by the National Biotechnology Development Agency (NABDA). OFAB is a platform that brings together more than 100 stakeholders to discuss biotechnology issues and enables interaction between producers, scientists, journalists, academics, and policy makers.

U.S. Consulate Lagos and Embassy Abuja will assist NABDA to take OFAB to other parts of the country as it has centered its presence/outreach in Abuja, the capital of the Federal Republic of Nigeria, and will sponsor national and international experts on biotechnology to speak on the benefits of

biotechnology as a tool for climate change mitigation and enhancing food security in Nigeria at four OFAB luncheon/discussions as well as support for local and national media coverage. During the June edition of OFAB Nigerian Chapter, which took place on June 28th in Ibadan, Oyo State, AgLagos congratulated the Government of Nigeria for passing the Biosafety Bill last June 2011, and urged Nigerian to use its regional leadership for the development and adoption of agricultural biotechnology as well as the earliest implementation of science-based, transparent and predictable biotechnology regulations.

C. Institutional Capacity building

Local research institutions lack capacity in scientific DNA manipulation and laboratory management. FAS/Lagos proposes short-term training (2-4 weeks) through the Cochran Fellowship Program for two individuals from ABU Zaria and NRCRI would help strengthen local capacity. The training should be organized with US universities that have existing linkages with these institutes.

Section VI. Animal Biotechnology:

There are no new technologies in use in Nigeria that go beyond biotechnology such as: the genetic engineering of agriculturally-relevant animals, animal cloning, plant that produce pharmaceuticals, etc.

Section VII. Author Defined:
Reference Materials

Nigeria Biosafety Guidelines 2001
Nigeria Biosafety Law 2011
Draft National Biosafety Framework
National Biosafety Policy

Copies of these documents are available in the Agricultural Affairs office and the Biosafety Department of the Ministry of Environment.

Post Contact and Further Information

Russ Nicely
Regional Agricultural Counselor
Agricultural Affairs Office
U.S. Consulate General
2, Walter Carrington Crescent
Victoria Island
Lagos, Nigeria
E-mail: AgLagos@usda.gov
Website: http://www.fas.usda.gov

Marcela E. Rondon
Regional Agricultural Attaché
Agricultural Affairs Office

U.S. Consulate General
2, Walter Carrington Crescent
Victoria Island
Lagos, Nigeria
E-mail: AgLagos@usda.gov
Website: http://www.fas.usda.gov

Prof. B. O. Solomon
Director General
National Biotechnology Development Agency
Auther Unegbe Street
Former CAC Building
Area 11 Garki
Abuja
Tel: 234-9-67156910-2, 3145472, 08034049111
E-mail: bosconsult@yahoo.com

Mr. Ademola Usman
Director
Biosafety Office
Federal Ministry of Environment
Garki, Abuja
Tel: 234-8053022205
E-mail: rusmanson@yahoo.com

Mr. Christian Fatokun
International Institute for Tropical Agriculture (IITA)
PMB 5320 Ibadan
Nigeria
Tel: 234-2-2412626
FAX: 234-2-241 2221
E-mail: c.fatokun@cgiar.org

Dr. Godwin H. Ogbadu
Professor/Director
Biotechnology Advanced Laboratory
Sheda Science and Technology Complex
Sheda,
Garki-Lokoja Highway
Abuja, Federal Capital City
Tel: 234-9-523391, 8822151, 804480456
Fax: 234-9-5233919
E-mail: goddyharuna@yahoo.com