



B4FA

Biosciences for Farming in Africa

Press Highlights

**Ghana, Nigeria,
Uganda & Tanzania**

2012 – 2014

Foreword

These 100 collected press pieces are a representative sample of the more than 1000 print, online and broadcast pieces that have been produced by the 160 B4FA media fellows since starting their media fellowships, in Ghana, Tanzania, Nigeria and Uganda.

In reality, there are more than 1000 print and broadcast pieces that have resulted, both since many of the fellows publish in multiple channels (a single piece might reach a much broader audience, for example, by being featured in the print edition of a newspaper, on the newspaper's website, in several of the national online news aggregation websites, as well as regional aggregators (eg allafrica.com) and personal blogs). Our count is by piece rather than by channel.

Our figures also omit many of the broadcast pieces that have resulted from our B4FA activity. Media fellows producing feature-length pieces or substantive news items for the radio have often tried to share recordings with us, but this has been more difficult for TV journalists, given the size of the files. Often it has not proved possible to collect short radio news items either (for example, we know that one of our radio news journalists submitted over 20 news stories back to their studio from a conference that B4FA facilitated their attendance of, but we do not have these short pieces archived, submitted, or featured within the count). Some of our B4FA media fellows host weekly programmes that deal with agriculture, science or rural issues, and have featured biosciences and crop improvement on a weekly basis. But again, it has not proved feasible for them to submit each of these shows to us, so they are not featured in the count either.

Finally, whilst we feature some print pieces in local African language, particularly Kiswahili from Tanzania, which some degree of machine translation is possible with, most other local language coverage, especially on the radio, has not been featured or submitted to us.

This collection of 100 stories then – almost all from print media – serves as representative sample of the coverage by B4FA media fellows from all four countries. It includes news and feature items, coverage from a technical, agricultural and political point of view, international and national coverage, controversial and informative coverage.

To find out more, and to see more coverage from B4FA media fellows, please visit www.b4fa.org

Dr Bernie Jones
B4FA Media Fellowship Programme Director

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Food Security Threatened: Stella Danso; 2 October 2012



The lack of linkage between research institutions and Ghanaian farmers has been identified as the major cause of poor farming in Ghana.

Farmers on the continent have failed to adopt new genetic techniques and technologies from researchers to boost food security and economic development.

A report presented to government by the Peasant Farmers Association of Ghana (PFA) in 2011 put the 2011 ratio of agricultural extension officers to farmers at 1: 1,300.

According to Dr. Kenneth E. Danso, Plant Biotechnologist at the Ghana Atomic Energy Commission, research institutions currently face numerous difficulties in getting support from the Ministry of Food and Agriculture (MOFA) due to various reasons.

He said all research institutions in the country are placed under the Ministry of Science and Technology, adding that such situation had created difficulties for a smooth liaison between researchers and MOFA.

Dr. Danso stated that extension officers also face problems in reaching out to all farmers to properly apply agro-chemicals for increased production.

He stressed that the time has come for government to commit more funds into agriculture research activities to enable farmers gain access to the new technologies to enhance their productivity.

Although government is trying to promote agriculture in the country, its failure to adequately resource researchers and agriculture extension officers in the country has hampered food security.

Scientists have noted that through research and the application of existing and available agricultural advice and technologies, productivity in the agriculture sector could double or triple.

The scientists have come out with several new techniques such as tissue culture, a method used to propagate plants, mutation, a situation whereby animals and plants develop new characteristics as a result of natural change in its genes etc.

However such research documents are left on the shelves in the research institutions due to the lack of linkage between research institutions and Ghanaian farmers.

It is on record that approximately 65 percent of Africans rely on agriculture as their primary source of livelihood, and small-scale farmers are responsible for more than 90 percent of Africa's agricultural production.

Nevertheless, poor farming methods, low quality planting materials and depleted soils continue to frustrate farmers owing to the lack of agricultural extension officers to communicate information about the new techniques to them.

Daniel Otunge, African Agricultural Technology Foundation, speaking to **CITY& BUSINESS GUIDE**, called on researchers to institute an alternative platform to educate farmers.

According to him, Africa farmers should be encouraged to adopt the new technology.

Emanuel Chamba, a researcher at CSIR-SARI, Tamale, also in an interview, called on both government and research institutions to prioritize farmers' participation in the research field.

He also stressed the need for government to provide enough funds to agriculture research institutions in order to involve farmers in their various research activities and communicate effectively to them about the new technology.

He said researchers could take the farmers to their fields and allow them to learn the new techniques or adopt demonstration methods.

According to Dr. Chamba, the formation of partnership with seed companies to grow packages and distribute to farmers, who are reluctant to approach them could also be another strategy.

He therefore called on farmers to come together by forming co-operatives and explained that they could secure loans to enhance their productivity.

"Since 40 per cent of the country's Gross Domestic Product (GDP) comes from agriculture and 70 per cent of labour is employed by it, not only would Ghanaian farmers benefit from the new technology but the economy as a whole would also benefit," he emphasized.

By Stella Danso Addai

Ghana to begin GMO testing: Adelaide Arthur; 11 October 2012



Confined Field Trial (CFT) of three genetically modified crops may start next year, according to Senior Research Scientist, Dr. Ibrahim Kwasi Atokple.

Scientists at various Institutes of the Council for Scientific and Industrial Research are expecting permits from the National Biosafety Committee to enable them proceed with the evaluations.

Seeds for genetically modified rice, cowpea and sweet potatoes are to be tested for essential traits that will enhance crop production in the country.

With on-going global debates over the health implications of genetically modified organisms, parliament recently passed The Biosafety Act of 2011 (Act 831) to legalise importation and research into GMOs. Ghana now joins countries like South Africa, Burkina Faso, Egypt and Kenya which are already producing and importing GMOs on the continent.

Genetic modification or genetically modified (GM) refers to the moving of genes between species and varieties using a technique called “gene splicing”, although all methods of breeding modify and exchange genes.

Gene splicing is one of the new methods available to investigate life at the molecular level, which are sometimes referred to under the general term “biotechnology”.

Genetically modified organisms therefore, are those whose genes have been altered by transferring into them external genes with desired traits with the aim of enhancing their performance.

The Confined Field Trials of rice, cowpea and sweet potatoes are expected to last for at least three years to allow scientists to critically analyse the seeds’ integrity and be sure the desired traits are inherent in them before being recommended for commercial production in the country.

Lead investigator for BT Cowpea project with CSRI – Savannah Agriculture Research Institute, Dr. Ibrahim Kwasi Atokple, explained, “Each crop has a peculiar problem or problems. The GM-Sweet potato is addressing the issue of malnutrition within the rural folks by increasing the essential amino acids. For rice, we are developing varieties that are tolerant to drought and salinity with high nitrogen-use efficiencies. This research is justified by the fact that most of the rice fields (irrigated

and hydromorphic) have accumulated salts over the years thus, forcing farmers to abandon the fields.”

Pod-borer, a key insect pest of cowpea, feeds on the tender stems, flower buds, leaves and pods causing damage to the entire plant. This can result in grain quality and yield reduction of between 30 and 80 per cent, according to experts.

Certainly, this is no good news for cowpea production in the country which already records low yields. As such, it has become necessary to control pest infestation of cowpea by developing pest-resistant varieties.

According to Dr. Atokple, “At this point we are just testing the efficacy of the gene conferring the resistance to the insect (Maruca or pod-borer) in the cowpeas. When we get that, then we cross those that have shown resistance with the ones cultivated by farmers. So a cross between the transformed material and conventional ones is what we are going to evaluate for final release –that is, the old commercial cowpea now with resistance to pod borer.”

The project, is still at the research stage and according to experts, materials will not be commercialised until scientists have ascertained that seeds of the new varieties have maintained the product integrity of former commercial varieties in terms of quality, yield as well as acceptability to farmers and consumers.

Dispelling general perception that GM foods may have some health implications on humans, Dr. Atokple stated quality and food safety was foremost in the entire project and that safety precautions were being taken according to the national and international standards of biosafety regulations.

The several biosafety guidelines and regulations in addition to the Biosafety Act are intended to regulate inflows, future researches and production of GMOs to ensure that GM crops that enter the country are safe for use.

According to the Secretary of the National Biosafety Committee and Coordinator for Biosafety activities at the Ministry of Environment, Science and Technology, Eric Amanning Okoree, decisions on GMO test planting will soon be made since all risk assessments have been completed by the Technical Advisory Committee set up to review three Confined Field Trial applications.

The genetically modified seeds for rice and sweet potatoes are to be imported from the United States while seeds for cowpea would come from Australia.

West African scientists reach consensus on GM Cassava: Samuel Hinneh; 15 October 2012



Genetic Modified (GM) cassava which withstands disease and pest resistance would raise the production of cassava to benefit the health of the West African population, scientists have agreed, in a new report.

GM cassava has the potential in solving nutritional problems such as iron, zinc, vitamin A, and protein deficiencies.

Information from the World Health Organisation (WHO) shows that more than 800 million people suffer from micronutrient malnutrition-vitamins and minerals in developing countries with Africa accounting for almost 50% of the children who are clinically or sub-clinically deficient in vitamin A, particularly under five years of age.

This deficiency causes (preventable) blindness in children and confers an increased risk of infection due to immune system impairment. Iron deficiency, which causes anaemia, is also a problem.

According to the United Nations, the prevalence of anaemia in preschool children ranges from 42% to 53% in East and West Africa, respectively.

Cassava, currently plagued by cassava mosaic diseases (CMD) - a viral attacking the product is one of the major sources of farm income and is an important food security crop for the people of Africa. It is the third African major staple food crop after maize and rice, and contributes about 40% of the food calories consumed in tropical Africa.

The report developed by using semi-structured interviews in Ghana and Nigeria found that scientists expressed little or no concern about health risks of GM cassava, but were concerned consumers may express such concerns given limited understanding of GM technology.

The scientists were wary of long-term effects of GM cassava on the environment and lack of a regulatory framework to facilitate the adoption of GM cassava.

The paper examined the perspectives of scientists, on the potential adoption of GM cassava for improving health and food security in Africa as well as issues around the regulatory system and transfer and acceptance of GM cassava among scientists.

Richard Akromah who took part in the research says GM technology is just beginning in Africa and there is little knowledge concerning the pros and cons of the technology.

“I would say it is the fear of the unknown because the technology is new and in some countries the capacity to understand the technology and also to appreciate its benefits and as well as to

understand its dangers have not been well elucidated that is why there is a controversy", said Ankromah, the Dean, Faculty of Agriculture of the Kwame Nkrumah University of Science and Technology in an interview.

The United Nations Cartagena Protocol on Biosafety issues concerning GM outlined precautionary measures that employ countries to undertake in-depth testing based on sound understanding on scientific principles governing modified organisms, environmental impact assessment, health and safety risks as well as benefits and economic benefits before adopting the technology.

Only South Africa, Burkina Faso and Egypt on the African continent have adopted some GM crops such as maize, cotton, however, Ghana is preparing to do confining field trials on GM crops.

"The other countries are following the precautionary principles of UN and that is to say to do national assessment and people are building capacity towards these, you will notice that it only in Nigeria, Kenya, Uganda are the countries that are moving towards confining field trials and have set up these.

"The Crop Research Institute is building the facility, likewise the Savannah Agriculture Research Institute in Ghana to do confining field trial to deploy some GM crops in the future under containment", said Akromah.

He said there is lack of awareness among the general public of the technology due to the media hyped when it comes to GM.

"Some NGOs such as Friends of Earth and opponents of the technology are all always giving one side (disadvantages) of the story without balancing it with the other side (advantages). When we talk about the GM cassava we are saying cassava that is fortified with nutrients and its benefits at the same time we should also be conscious that for it to be deployed in farmers field it has to be assessed for environmental consequences in the long term and not just one year's trials for it to be assessed on health and safety issues", he said.

He said confined facilities, financial support, scientific capacity limited in some countries and unknown price of the technology are some of the limited facilities confronting the technology.

There are many published information coming from NGOs such as Friends of The Earth which are exaggerate in the attempt to discourage the public from accepting the technology without going to the scientific basis of the technology.

On the future of the technology in Africa, he says over the years people are becoming more enlighten and knowledgeable about the technology and how it works.

"The other option is to stay with conventional bred varieties of crops but support it with irrigation to escape rain fed agriculture, support it with in-built resistance in crops and also improve agricultural practices.

"Why the technology may gain grounds is that people are also worried about the environmental impacts of agro chemicals and therefore may opt for in-built resistance genetically modified in-built resistance in crops so that we will not use agricultural chemicals in production", he said.

At the moment there are other genetically modified crops such as cotton which has disease resistance, maize which has insect resistance, the golden rice which has vitamin A.

Ankromah says African countries need to build national capacity of scientists to understand the technology, as well as build capacity to do in-country testing of GM to introduce those genes into locally adapted crop lands and educate the general public to understand the technology.

Walter S. Alhassan Coordinator, Project on Strengthening Capacity for Safe Biotechnology Management in sub-Sahara Africa (SABIMA) in an interview stated that scientists should engage with the farmers, processors and consumers in the design and execution of GM cassava research to avoid rejections of products developed.

"It would seem that most of the GM cassava researches are currently at proof of concept stage and that the foreign varieties in use for initial studies will confirm the genes to be transferred (introgressed) into the favoured local varieties", he said.

Alhassan however, disagrees with the title 'Developing GM super cassava for improved health and food security: future challenges in Africa' citing It could cause anxiety and fear in the uninformed and focuses attention on the process rather than the product.

The Lead author, Ademola A Adenle of the United Nations University-Institute of Advanced Studies says given the high level of poverty, malnutrition, hunger, food security problems, and low agricultural productivity in Africa, advanced technology like GM technology has the potential to offer solutions to some of these problems. However, the controversy over the use of GM technology remains one of the biggest threats in adopting this new technology.

He stated that the current regulatory approaches of the United States of America (USA) and the European Union (EU) can play an important role over adoption of GM technology in developing countries, particularly in Africa.

"For example, the USA can allow commercial release of GMO products based upon standard tests such as allergenicity, digestivity and toxicity without any regulatory barrier, whereas in the EU, GMO products can be stopped based upon scientific uncertainty alone without any associated evidence of risks and sufficient testing according to the so called precautionary principle", Adenle says.

Agricultural Biotechnology Can Lead to Quantum Leap in Food Production: Abdallah el-Kurebe; 5 November 2012



*Dr. Abubakar Lawali, a Plant Breeder is with the Department of Crop Science of Faculty of Agriculture, Usmanu Danfodiyo University, UDU, Sokoto. In this interview with **Abdallah el-Kurebe**, he spoke on plant genetics and the place of biotechnology in the provision of food security. Excerpts:*

For a Nigerian traditional farmer, how would you describe plant genetics?

Plant genetics is used in agriculture to develop new and modern improved varieties through plant breeding. The varieties could be for high yield, improved mineral and vitamin content, early maturing, etc.

How would you relate the political will of Nigerian leadership to the agricultural needs of the nation?

One can conveniently say that it is not there. However, let us wait and see, perhaps with all promises made, something may come out of it.

Recently, the Global Food Security Index of the Economist Intelligence unit ranked Nigeria 80th among 105 other countries on food insecurity. What do you see as the reason for this ugly development?

It is quite unfortunate but the reasons that Nigeria is lagging behind in the provision of food security for the citizenry include inadequate funding and infrastructure for research; lack of adequate link between research and development; funding of development, where available, is not realistic or has been politicized and as such, does not reach the target farmers.

Do you see the current Nigeria's Agricultural policy as truly addressing the problem of food crisis in the country?

Theoretically it can, but it has always been the problem of implementation. You cannot transform Agriculture when the infrastructure is not there; you cannot supply inputs through cell phones in a country where there is no power and literacy level is low.

What do you see could be the role of Agricultural Biotechnology in improving food production in Nigeria and by extension, African continent?

Agricultural Biotechnology can lead to a quantum leap in food production if utilized effectively and efficiently. However, bio-safety regulations must be respected.

Biosciences for Farming in Africa, B4FA has come into the continent with a view to creating awareness on the need for governments and farmers here to wholly adopt biotechnology in order

to increase food production to meet up with the over-growing population. As a plant breeder, how would you advise the FG on this?

Government can adopt biotechnology. There is no problem with that but we must, first of all, place all the bio-safety regulations in place.

Ways for improving food production are by genetically modifying plants as well as genetically engineering crops such that would be resistant to deterring factors like pests and other plant diseases. According to your research and findings, how much of these are Nigerian farmers using?

There is practically none as of now; perhaps in the near future.

If, according to your research findings, no Nigerian farmer on the average is using genetically modified plants and genetically engineered crops, how do we start as a country?

Well you see the way to start even in the countries that have started; the first thing is to put in place, the bio-safety regulations like I said earlier. What are bio-safety regulations? These are regulations to ensure that there are no unwarranted or unwanted transfers of genetic materials to sources that they are not designed for.

If this takes place, then it may lead to the creation or development of very terrible and hazardous threat to the environment. And that is why before you start; make sure that the bio-safety regulations are being observed. To my knowledge, the bio-safety law has been passed by the National Assembly but not sure if it has been assented to by Mr President. Even if it has been assented to, what have we put in place to ensure that these things are working? If we don't ensure that they are working and we just kick-start the project, I assure you that we will be in more trouble than we expect.

You have consistently mentioned the observance of bio-safety regulations as a precondition for Nigeria's adoption of Agricultural Biotechnology. Specifically, which of these regulation are you referring to?

These are regulations as to how and where you practice; how the laboratories will function and even the farmers are going to control, polling transfer and so on. So, these things have to be worked upon by a national committee of experts. We have teeming professors out there that could help in this regard. What remains is for the government to present this document for the experts to do some work on its workability.

How would you assess government's support for research and development, especially in the area of agricultural biotechnology and the application of such research results for national development?

The basic infrastructure for biotechnology is lacking in the country as well as training and retraining. More so, funding for biotechnology research is lacking. We also need to prioritize and focus on certain key crops that will immediately solve the problem of food insecurity and for economic empowerment in order to reduce poverty; provide jobs through value addition to our crops, which in turn will attract international market.

You said there is inadequate link between research and development. Can you explain this?

When you go to the universities and check the shelves of the professors and other researchers in the universities, there are a lot of researches lying with piles of dust. In advanced countries, commercial people and those in the private sector go to the universities, get the researches and mass-produce them.

That is the name; you research and develop them. This is the link between research and development. In our country, the private sector is not so organised to do that as an economic activity.

Biotechnology has the Potential to Solve our Farming Problems: Michael Ssali; 7 November 2012



Farming in Uganda today faces a multitude of challenges. We have a rapidly growing population and our gardens are becoming smaller due to fragmentation. The soil is getting exhausted mainly because of bad farming practices. Our fish stocks are dwindling thanks to pollution of the water bodies, bad fishing methods, and the devastation of wetlands. Most of our farmers lack the knowledge and financial capacity to apply modern farming methods to increase yields. We have a small national budget for agriculture (less than five per cent).

A trip to some of our national agricultural research stations brought me face to face with the men and women who are fighting the diseases and the other problems that have devastated the production of some of our crops such as bananas, cassava, coffee, and cotton. There is an urgent need for policy makers to allocate more money to agriculture, especially agricultural research, for us to overcome the diseases and the pests that have reduced food production and hampered poverty reduction. We need to develop crop lines that are resistant to the new diseases and other emerging challenges such as rising temperatures.

We have to prioritise food security over and above all other issues right now. Otherwise, how can we expect a better future without food?

What scientists are doing

Dr Andrew Kiggundu of Kawanda Research Station is heading an experiment in which green pepper genes are introduced in our local bananas to enable them resist the banana bacterial wilt(BBW), which is fast killing the crop.

However, even if he came up with some BBW resistant varieties tomorrow, he will not just pass them on to the ordinary farmers to plant. We still need a law to guide the implementation of the National Biotechnology and Bio-safety Policy which is yet to be debated and passed.

Secondly, this country is yet to pronounce itself on whether to accept Genetically Modified (GM) crops as if this is still a matter of choice! Our lawmakers must speed up the process of formulating such laws and guidelines. If saving our food crops from extinction requires genetic engineering, which researchers like Dr Kiggundu are doing to our bananas, then, we have no choice but to accept GM food crops.

Fortunately, our scientists and researchers are beginning to open up to the media on saving our crops from disease, increasing farm yields, appropriate seeds to plant, and a whole range of other

issues. Any step they take, any progress they make, and any draw back they get has a direct bearing on our food security today or tomorrow.

But let it not appear as if biotechnology is only about GM food production. It is also about other scientific ways of crop breeding such as tissue culture – the making of clean seedlings from single cells – and the manipulation of pollen to make hybrid varieties, among others. A lot of such crop breeds, branded as improved varieties, have been made available to us by our researchers and we are already using them.

Sometimes though, after they have achieved what is considered a break-through, another problem emerges, as Dr Africano Kangire of Kituza Coffee Research Station once remarked. The coffee wilt disease resistant varieties are now available but a new problem has surfaced – the black coffee twig borer. It is a new problem and it is fast reducing coffee yields.

We should therefore give a chance to biotechnology to protect and improve farm yields.

Don't Keep Seeds from Previous Harvest: Michael J Ssali; 21 November 2012



It is common practice among our farmers to keep part of the harvested grain as seeds for the next planting season. Usually, the farmer keeps the best looking seeds believing that they will grow and provide maximum yields. Some grain varieties are favoured for their taste or for just their colour. Other factors considered in seed choice have to do with quick growth and maturity as well as resistance to disease and drought. Yet another basis for seed selection is the distinct good

performance of the parent stock.

For centuries, farmers have sought to plant the best seeds and have always been keen to try out crop breeds known for optimum yields. For example, a visitor in a fellow farmer's home may admire the performance and appearance of the maize crop there and goes ahead to ask for some of the harvested maize to use at her garden for the next planting season.

This kind of seed exchange is known as the traditional or informal way of seed acquisition by farmers.

The traditional way

About 80 per cent of our people still acquire their seeds that way and indeed most of the crops we grow today trace their existence back to our ancestors' great seed saving skills. This has also been the case for the other sprouting crops such as cassava, plantain, and potatoes among others. It used to be the same story even in other parts of the world before the arrival of seed breeders and commercial seed companies. Anyone who read Daniel Defoe's novel, Robinson Crusoe, probably remembers the chance discovery of a maize grain on the wrecked ship which lonely Crusoe planted on the island and managed to eventually grow his own maize.

However, over time, it has been observed that generally, seeds acquired in this way have tended to be low yielding, genetically weak, and susceptible to disease, which accounts for the general low agricultural production that we are apparently confounded in here in Africa.

Let it not appear though as if poor yields are always due to poor quality seed. We have other factors such as bad weather conditions, poor soils, bad farming practices and pest attack among others. We have to accept that we live in changed times today and we have new challenges, such as a much bigger population to feed amidst other problems visited upon us by the effects of climate change including prolonged droughts, and new crop diseases. We cannot go on turning our backs on

biotechnology and continue practicing agriculture exactly the way it was practiced by our forefathers.

Plant scientists and seed breeders have come up with improved planting material and seed that is guaranteed to multiply and increase yields.

We have hybrid seed that is produced after careful tests by scientists in the field which involve crossing separate and well selected good performing 'parent' plants. When two well selected parent plants are crossed (mated) the resulting child will have all the vigor and strength to grow well and even carry the general characteristics of their parents. Their pollination is directed and somehow controlled by the scientists in the field. These are what we call hybrid seeds.

However, when we save seed from the first generation of the hybrid plant, we run a big risk of getting poor quality plants because when they are in our gardens, they undergo open pollination by wind and insects. Unlike the plant scientists and seed breeders, the insects and the wind don't bother selecting particular parent stocks. So the seed you get may never perform as well as its parent plant.

We now have seed companies that sell their products in farmers' shops in nearly every town. For best results, farmers are encouraged to buy hybrid seeds every planting season instead of saving seeds from previous harvests or just getting them from other farmers. Scientists have also come up with improved planting material of other crops such as cassava, sweet potatoes, coffee (cloned coffee) and other crops, which we should all embrace.

How Africa is entangled in US, Europe's GMOs politics: Polycarp Machira; 28 November 2012



African countries, Tanzania inclusive, are increasingly getting entangled between two conflicting giants on genetically modified organisms (GMO) issues, and now need serious political will to make decisions.

Key development partners of the continent; the US ardently supports the GMOs while Europe vehemently opposes them.

Observers say the situation calls for patriotic African scientists to come up with the truth and help Africans make informed decisions on the matter.

The pro-GMOs group asserts that organisms are a panacea for Africa's current nutritional woes while the critics say they are disastrous if not lethal.

Those in favour of them accuse Europe of hiding the technology from Africa to perpetuate its economic dominance over continent, yet those against them say the GMOs may damage the environment, as they could be risky to human beings, animals and plants.

Tanzanian government has clearly stated that it is not ready to adopt genetic modified foods and the GMO technology.

The statement was stipulated in the Bill proposing for the establishment of The Plant Breeders' Rights Act, 2012 which was tabled and approved in the National Assembly recently.

The Bill was endorsed amid heated debate among Members of the Parliament who feared for it to open doors for multinational companies to come in the country and develop genetically modified seeds and in the process undermine traditional ones.

According to the minister for Agriculture, Food Security and Cooperatives, Mr Christopher Chizza, the Bill aimed at replacing another law enacted by Parliament in 2002: The Protection of New Plant Varieties (Plant Breeders' Rights) Act, 2002.

Mr Chizza said the 2002 law does not attract researchers to examine seeds and that the new law would increase morale by introducing royalty and copyrights.

He said when tabling the Bill in the House for the second time that the government had no intention of opening doors for GMOs, but looking for quality and high yield seeds. "For a GMO to be introduced in the country there are strict liabilities attached under the Environmental Management Act, 2004," the minister said.

He allayed the MPs' fear, assuring the MPs that he and his team were patriotic. He vowed that they would never ever endanger the future of this country.

Experts conducting research on GMOs at Mikocheni area in Dar es Salaam, he said, were cautioned over making dubious recommendations on the sensitivity matter. "The government is committed to preserve local seeds and we will not replace them with foreign seeds," he stressed. But a group of scientist meeting in Arusha recently had advised Africa to adopt new technologies, including GMOs, in an effort to curb food shortage in the continent.

Prof Christopher Leaver, a visiting Emeritus Professor of Plant Science at the University of Oxford, told a group of journalists that the continent has no alternative but to adopt new technologies. He said though there are a lot of negative opinions on GMOs among African leaders, activists, farmers and the common people; the continent needs to go the global way of agricultural production. "The world is moving towards ensuring food availability for all including Africa. The continent, which is mostly hurt by food shortage, cannot afford to lag behind," he cautioned.

Dr Omari Mponda, a senior researcher at Nalindiele Agricultural Research Institute (Nari), attests that improved farming using better seeds have shown better results in Mtwara Region. "The debate on GMOs has been there for a very long time, but Tanzania as a country ought to apply new strategies that will increase food production," he said.

But Prof Delphin Rwegasira from the University of Dar es Salaam's Economics Department observes that since African countries are so dependent on Europe for aid, they pay greater attention to policy preferences of the European countries.

Instead of supporting biotechnology and GMOs, in particularly, the European countries are busy funding anti-GMOs measures on the pretext that the organisms are not safe. Germany international cooperation agency, GTZ, launched a three-year project in 2005 to promote Africa's laws which prevent the approval of any GMO foods and crops.

Prof Rwegasira noted that programmes by European donors to spread caution about GMOs in Africa usually undermine the various moves made by the US government to promote GMOs.

The European style anti-GMO regulations to Africa are also championed through the global project on biosafety regulation run by the UN Environmental Programme (UNEP) and funded by the Global Environment Facility (GEF).

The critics assert that UNEP and GEP train poor African countries with no GMO biosafety rules to adopt the European stance and that the agencies use instruments like the 2000 Cartagena Protocol and others to achieve the goal. The protocol provides African governments with a precautionary regulation dream and lists activities they may wish to regulate. They include contained use of GMOs, field trials, the commercial release of GMOs, the transportation, packaging, labeling and disposal of GMOs.

The UN system has allegedly ensured that African countries do not make progress on GMOs to maintain the current scenario. African countries are also forced to shun GMOs in line with the requirement from international commodity markets which provide huge outlets for Africa's produce.

GM Commercialisation Stalled In Nigeria: Onche Odeh: 2 December 2012



*Photo: One of the sites for Confined Field Trials of maruca resistant cowpea in Zaria
Absence of law threatens Nigeria's environment, food security*

Continuous **refusal** of the government of Nigeria to institute a substantive biosafety law may cause efforts by Nigerian scientists working on some genetically modified products to be in vain, a meeting of media, agricultural and related experts in Abuja, Nigeria's capital has been told.

It also emerged during the meeting that Nigeria currently lacks the capacity to ascertain whether the country's populace is being fed with Genetically Modified foods. This has been made even more difficult by the lack of capacity of agencies expected to decipher what is GMO or not, especially when they are lumped with conventional produced products.

Professor Mohammad Ishyaku, plant breeder at the Institute of Agricultural Research (IAR), Zaria, Kaduna state had disclosed at the media training on biotechnology application organized by the African Agriculture Technology Foundation (AATF) that Nigeria was almost set to release insect resistant cowpeas to farmers in the next three years (2015).

Ishyaku and his counterparts at IAR with assistance from their counterparts abroad have developed cowpeas, through genetic engineering that has shown astute resistance against Maruca, an insect that has been linked to over 80 per cent reduction in yields.

"Nigeria is the highest producer of cowpeas in sub-sahara but we are producing on a national deficit of about 500, 000 which is evident in the less than 400 kilograms per hectare (350 kg/ha), mostly because of the effect of maruca insects," Ishyaku disclosed.

The introduction of maruca-resistant cowpea would have reduced dependence on insecticides, which have been linked to many health and environmental problems. But, this may end up on the shelves of the research institutes again if the country is unable to pass the biosafety law within the next three years.

Responding to this challenge, Ishyaku said, "We have worked on the genes of the cowpeas, tested and seen that they are safe and resistant. 2015 is three years away. We are hopeful that something

will happened towards signing the biosafety law before then,” the principal investigator stated with optimism.

Dr. Rufus Ebegba of the Federal Ministry of Environment, however, thinks 2015 might be way too long for Nigeria to wait. He said “Currently we cannot ascertain whether some of the foods we eat in the country are GM or not since we allow imports from countries where GMO are used and properly guided by law.”

According to him, the authority currently only labels food products from these countries as GM suspects, which is insufficient to ascertain absolute safety or not of the product.

Meanwhile, the Director General of the National Biotechnology Agency (NABDA), Professor Bamidele Solomon, has disclosed that no Genetically Modified product (crops or foods) would be granted permission for commercialisation in the country until the biosafety law is instituted and signed by the President.

He disclosed that three products including the maruca resistant cowpea have gained substantial mileage in progress towards commercial introduction of GM products. He, however, added that these products will never be made available for public use until a biosafety law is instituted.

The Nigerian scientists at the Institute of Agriculture Research (IAR) in Zaria, Kaduna state have announced 2015 as a tentative date for the release of the maruca-resistant cowpeas, which it has been working on, with assistance from scientists abroad. According to Ishyaku, all experiments relating to the maruca resistant cowpea have been confined to the field.

But the NABDA DG said, “All experiments relating to GM going on currently in Nigeria are confined to specific fields. However, commercialization of any of such products will be guided by other requirements.”

He disclosed that locally consumed products like akara, moi moi and others made from the bio-engineered cowpea will be tested on humans and animals.

Solomon also said the products will be tested against non-target organisms, just as a balance the survival of maruca as part of the eco-system and effect on human population would be ascertained.

Meanwhile, Ebegba has said the Biosafety unit of the Federal Ministry of Environment has the competence to address the issue of safety of biotech as used in Nigeria.

Speaking on what is coming from the streets, he said “Data from applicants have shown that they are safe for human consumption.”

He, however, noted that the introduction of the biosafety law would raise the bars for stakeholders, stating that it is to “prevent Nigeria from being a dumping ground for unregulated GM products.”

Ebegba also reminded that Nigeria signed to Cartagena protocol on biosafety, hence failure to sign the bill to law might mean breach of the protocol.

The story behind conventional banana breeding to fight pests and diseases: Lominda Afedraru; 12 December 2012



The origin of all banana species can be traced from the wild in the South East Asia but due to the mutation process and environmental factors, the cooking bananas in Uganda are unique and are referred to as East African highland bananas.

In Uganda farmers grow a number of banana varieties and these include the plantains commonly known as gonja, the sweet banana commonly known as sukari ndizi and bogoya and the East African highland banana commonly known as matooke.

Pests and diseases

Ugandan farmers have been growing these varieties over the years but today they are faced with a pest and disease burden.

According to the leader of the conventional banana breeding team at the National Agricultural Research

Laboratories (Narl), Dr Alex Barekye, in 1993, a number of farmers countrywide were faced with the Black Sigatoka disease, which dries the leaves leading to reduced photosynthetic area resulting into low yields.

They were also faced with the banana weevil, which penetrate the plant and eat it up and the banana nematode pests, which are minute worms that attack the root of the plant causing loss of water and the crop will eventually collapse. The pests and diseases, according to Dr Barekye, caused 37 -50 per cent and 37 per cent yield loss, respectively.

Resistant varieties

The crop scientists were then challenged by their umbrella body, the National Agricultural Research Organisation (Naro) to carry out research and come up with varieties that are resistant to these diseases and pests.

The National Banana Research Programme immediately began the selection process of the different traditional varieties to be crossed to a wild banana, which was imported from India called Calcutta 4 that contained features of resistance to the identified disease and pests.

“There are different East African highland banana species with different clone sets and naturally they are difficult to pollinate, the reason why they are grown using vegetative propagation. We started with the local banana variety called Nakawere, which we crossed to Calcutta 4 to get a variety we named 1201K-1,” Dr Barekye explained.

The team had to further improve this variety because it had the disease resistance but lacked other characteristics like good food taste among others.

Barekye’s team got a male parent called SH3217 from the International Institute of Tropical Agriculture, which they obtained from Honduras. The team finally crossed SH3217 variety with 1201K-1 to obtain the M9 variety, which was first planted in Kawanda for early field trial evaluation.

The seed germination exercise is done in the laboratory where the embryo of the plant is removed and placed on a media culture for it to grow before it is taken to the field for trial.

The same variety was later taken to farmer groups in Nakaseke District for further evaluation. When the farmers approved it, the team then applied to the variety release committee at the Ministry of Agriculture, Animal Industry and Fisheries for permission to release the variety, which was named as Kabana 6H commonly known as Kiwangaazi to farmers in 2010.

Yield potential

Farmers in different parts of the country such as Wakiso, Masaka, Bushenyi, Mbarara and Gulu are now growing this variety. However, the research team now has a challenge of working on varieties resistant to banana bacterial wilt that was discovered in 2002.

When the team compared its yield rate to the traditional one called Mbwarzirume, they discovered farmers were attaining 18 to 22 tonnes per hectare per year although there is a potential to attain 40 to 60 tonnes per hectare per year.

Cassava Breeding, Production Project To Get \$25.2m Fund Boost: Isaac Khisa; 15 December 2012

The EastAfrican

www.theeastafrican.co.ke

IN SUMMARY

- The project dubbed Next Generation Cassava Breeding will be hosted by Cornell University, in the United States, together with five other partner institutions.
- The partners will share cassava data, expertise, and information publicly on a website being developed by Lukas Mueller of Boyce Thompson Institute for Plant Research in New York.

The Bill & Melinda Gates Foundation and the United Kingdom's Department for International Development (DfID) are investing \$25.2 million to support a five-year project that seeks to improve breeding and productivity of cassava in sub-Saharan Africa.

The project dubbed Next Generation Cassava Breeding will be hosted by Cornell University, in the United States, together with five other partner institutions, including the National Crops Resources Research Institute (NaCRRI) in Uganda, and the National Root Crops Research Institute (NRCRI) in Nigeria.

Other partner institutions include the International Institute of Tropical Agriculture (IITA) in Nigeria, Boyce Thompson Institute for Plant Research in New York, and the US Department of Energy Joint Genome Institute of the Lawrence Berkeley National Laboratory in California.

Ronnie Coffman, Cornell University professor of plant breeding and genetics, is the principal investigator of the multi-partner grant.

Yonah Baguma, the project co-ordinator for NaCCRI in Uganda said: "Increased support for strengthening the research capacity in Africa and harnessing novel technologies is critical to improving overall agricultural productivity and food security for poor people."

Uganda is currently working on a number of projects including the development of cassava resistant to mosaic virus disease and cassava fortified with vitamin A.

The partners will share cassava data, expertise, and information publicly on a website being developed by Lukas Mueller of Boyce Thompson Institute for Plant Research in New York.

The researchers will use the latest information from cassava genome sequencing to improve cassava productivity and yields by shortening the cassava breeding cycle from almost a decade to as little as

six years, in addition to training the next generation of cassava breeders, improving infrastructure at African institutions, and holding awareness-building workshops for farmers, scholars, researchers, and policy makers.

Significant plant

According to the United Nations Conference on Trade and Development (Unctad), smallholder farmers in Africa produce more than half of the world's 250 million metric tonnes of cassava per year, a tough woody plant predicted to be one of the few crops that will benefit from climate change.

Currently, some 500 million Africans consume cassava freshly boiled or raw on a daily basis, and the plant also serves as a low-cost source of carbohydrates for animals.

"Next generation cassava provides a great opportunity for us to harness the power of modern science for faster delivery of best-bet cassava varieties for smallholder farmers," said Chiedozi Egesi, assistant director at NRCRI and head of cassava breeding, who works to bio fortify cassava with essential micronutrients to make it more nutritious.

Peter Kulakow, a cassava breeder and geneticist at International Institute of Tropical Agriculture said the project will not only give breeders in Africa access to the most advanced plant breeding technologies to deliver improved varieties to farmers more rapidly, but also ensure that cassava genetic research is at par with other top food crops such as wheat, rice, maize and potato.

Institutes Release Improved Cassava Varieties to Farmers: Akinwunmi Kole Dawodu; 4 January 2013



Cassava Abuja, Jan. 4, 2013 (NAN) The International Institute of Tropical Agriculture (IITA), Ibadan and the Nigerian Root Crops Research Institute (NRCRI), Umudike, have jointly released two improved cassava varieties to farmers. This is contained in a statement issued on Friday by Mr Godwin Aster, Corporate Communications Officer, IITA and made available to News Agency of Nigeria (NAN) in Abuja.

He said that the two cassava varieties were part of the country's effort to maintain its lead as the world's largest producer of the root crop. Aster said the varieties were formally known as IITA-TMS-I982132 and IITA-TMS-I011206, adding that they were to be known as UMUCASS 42 and UMUCASS 43 respectively. He said that the maximum yield of the two varieties was between 49 and 53 tonnes according to pre-varietal release trials that were conducted between 2008 and 2010. He said that local varieties produced less than 10 tonnes.

"The varieties are also resistant to major pests and diseases such as cassava mosaic, bacterial light, anthracnose, mealybug and green mite. Aster quoted an IITA Cassava Breeder, Mr Peter Kulakow as saying that "both varieties performed well in different cassava production regions of Nigeria with high yield and good disease resistance.

"The roots of these varieties are yellow and contain moderate levels of pro-Vitamin A," Kulakow said. Aster also quoted Dr Chiedozi Egesi, an NRCRI Cassava Breeder, while presenting the varieties before the Nigeria Varietal Release (NVR) committee as saying that the varieties had distinct qualities. Egesi explained that the varieties are good for high quality cassava flour; a sought after trait by researchers for the cassava Transformation Agenda in the country.

He said the varieties also had high dry matter which was positively related to starch and crucial for cassava value chain development. Egesi said that it also have high leaf retention which was related to drought tolerance and crucial for cassava production in the drier regions.

He said it also have moderate levels of betacarotene for enhancing nutrition. "Over the years, cassava has transformed from being a "poor man's" crop to now a cash crop and an industrial crop, as cassava is being processed to products such as starch, flour, glucose and ethanol.

"This transition has placed demand on cassava. Researchers say developing new improved varieties is one way that will boost the steady supply of cassava roots to this ever increasing demand," Egesi said. According to Egesi, continuous breeding of such improved new varieties will help in stabilising production, processing and marketing of cassava products. He said that the impact of these efforts would be felt in areas such as rural employment and a virile cassava industrial sector. NAN reports that the NVR committee is the body in charge of releasing crop varieties in the country. (NAN) AKD/AK/MAU

Hybrid plants have been in Uganda for ages: Stella Nassuna; 10 January 2013



In Uganda, the earliest use of hybrid plants dates back about 104 years when the country was under British rule.

Dr. Andrew Kiggundu who has been in the agriculture field for about 17 years now, says that Uganda started breeding plants in 1909, at Entebbe botanical gardens.

The country that was originally known to grow a few indigenous yams, under British rule diversified and started growing cotton, tea, maize, matooke & others.

Genesis of plant hybridisation

Ancient agriculturists about 10, 000 years ago selected seeds of preferred plants to produce each subsequent generation.

This is how plant domestication began. A plant is said to be domesticated when its native characteristics are altered and cannot survive on its own without human intervention.

Though often confused by many, genetically modified (GM) plants are somewhat different. A scientist crosses a specific gene type from a far different plant, for example, a tomato gene with potato gene to come up with a specific variety which is either resistant to disease & pests, or high yielding, & resistant to extreme weather conditions.

What the people say

“The Mpologoma matooke (hybrid bananas) that is bred at Kawanda research Centre is too heavy for the stem to hold it up. As it matures the stem bends, and days later it falls off before fully maturing,” 45 year old Sarah Nakate, a subsistence farmer in Kajjasi.

“Hybrid oranges & lemons of today have their size modified to extra large, but the lemon has lost its true bitter taste to tasteless juice, and the orange has lost its sweet taste, with hardly any juice or seed,” Veronica Nakityo, a lawyer says.

“There is nothing wrong with cross breeding crops to get them resistant to diseases & pests, but there is everything wrong if a few selfish individuals use it to control the world’s production chain by inventing seeds, that die after maturing. A poor farmer cannot keep buying new seeds after every harvest,” Andrew Kalema, a farming journalist says.

It has also been rumoured by people like Mark Okello, a student of agriculture that some genetically modified seeds - terminator seeds - once planted in a particular type of soil, it will reject other seeds and can only accommodate the terminator seeds.

What the scientist say

“Yes it is true that the ‘empologoma’ matooke variety often falls off before fully maturing because its heavy, but it’s a good variety for commercial growers. A farmer growing this variety should always support the stem with poles so that it’s held in place,” scientist Geoffrey Arinaitwe says.

Scientist Andrew Kiggundu says: “We don’t create new varieties for selfish reasons; it’s to help fight diseases and pests that mold with climate change. We also try to bridge the ever increasing food demand caused by the increasing population.”

Kiggundu adds that Uganda has the potential to create varieties; matooke or oranges that have a familiar taste that the locals can identify with, but our only challenge right now is finances and equipment.

Abel Arinaitwe, a plant pathologist and research officer at Kachwekano says that terminator seeds are GMO, and were never approved for global use. GMOs in Uganda are still under research at the national agriculture research centers.

Uganda Scientists Developing Disease-Resistant Pearl Millet: Isaac Khisa; 19 January 2013

The EastAfrican

www.theeastafican.co.ke

Six out of 15 lines of pearl millet obtained from the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in Niger in 2010 for trials, are showing signs of resistance to Ergot disease in the growing areas.

Crop scientists in Uganda are developing pearl millet resistant to Ergot disease. The innovation is aimed at increasing food supply for communities living in semi-arid areas.

The scientists at the National Semi Arid Resources Research Institute, Serere (NaSARRI) told *The East African* that six out of 15 lines of pearl millet obtained from the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in Niger in 2010 for trials, are showing signs of resistance to Ergot disease in the growing areas.

Lead breeder Dr Geoffrey Lubadde, said they had done three trials and the results were promising.

“In the first trial, we planted the seeds for multiplication in 2011; in the second trial, we identified the resistant lines; and now, we have carried out the crossing between the six lines that showed resistance to Ergot and the local varieties,” said Dr Lubadde.

However, Dr Lubadde said the crop is susceptible to leaf rust disease and needs to be addressed in the subsequent research before it is released to farmers in the next three years.

Ergot is a fungal disease that affects pearl millet’s panicle during flowering in a rainy season. The disease is characterised by cream to pink mucilaginous droplets of “honeydew” oozing out of infected florets on pearl millet panicles.

Within 10 to 15 days, the droplets dry and harden, and dark brown to black sclerotia develop in place of seeds on the panicle.

The sclerotia are usually larger than seeds, irregularly shaped and get mixed with the grain during threshing. On the other hand, leaf rust leaves the crop with yellow spots on the leaves affecting yields and the quality of fodder for the animals.

Pearl millet, whose development and structure is similar to sorghum with some exceptions, is grown mainly in semi-arid areas of northern and eastern Uganda for both commercial and home consumption. It yields reasonably well on poor sandy soils on which other crops fail.

The crop is planted on 14 million hectares in Africa and 14 million hectares in Asia with global production of its grain probably exceeding 10 million tonnes a year.

Burkinabe farmers get improved cowpea variety: Abah Anthony John; 23 January 2013



Farmers in Burkina Faso are beginning to heave a sigh of relief with the release of two improved varieties of cowpea seedlings to help them improve yield. The two seed varieties are the, IT99K-573-2-1 and IT98K-205-8, which was developed by the International Institute of Tropical Agriculture (IITA), and have undergone participatory varietal selection with farmers in the central and northern region of Burkina Faso.

Local farmers and researchers selected the varieties from a basket of options after a two-year trial. The varieties are early maturing variety and with a high yielding ability, it is also resistant to Striga—a parasitic weed that limits the yield of cowpea.

“These varieties mature in about 60 days as opposed to local varieties that mature in about 80-90 days,” says Dr Haruki Ishikawa, IITA Project Coordinator for the Appropriate Varieties of Early maturing Cowpea for Burkina Faso (AVEC-BF) project.

Dr Satoru Muranaka, a scientist with the Japan International Center for Agricultural Sciences (JIRCAS), who initiated the project while working for IITA, noted that the improved varieties offer a lot of benefits to farmers. “For instance, because these varieties are early maturing, they will help cowpea farmers to escape from drought. Also farmers now have a crop that they can harvest early, consume, and sell to generate income when other crops are still on the field. Such incomes help farmers to pay school fees for their children. Again, with protein content of about 20 percent, cowpea provides a good option to tackle malnutrition in local communities,”

Cowpea as an important crop in Burkina Faso is providing food and cash for farmers, and fodder for livestock. Most local varieties in the country record a yield of between 400 kg and 600 kg per hectare.

“But the new varieties have a potential yield of 2170Kg/ha,” Dr Ishikawa said.

Farmers love the varieties for their yield, color and cooking qualities and have given the varieties the following local names: Yiis yande for IT99K-573-2-1, meaning a crop that helps farmers to escape from shame arising from hunger; and Niizwe for IT98K-205-8, meaning a crop that has brought an end to hunger.

Burkina Faso’s Research, Science & Innovation Minister, Gnissa Isaïe Konaté, who is also a researcher, said that the physical qualities of the varieties such as color and bigger size were appealing and would make farmers more competitive in the region. “Also these varieties will help

farmers to adapt better with climate change,” he noted Dr. Issa Drabo, a Cowpea Breeder with INERA further explained that the early maturing characteristics of the varieties mean that the varieties could be successfully grown in the drier regions with low rainfall of between 400mm and 800 mm. The AVEC-BF project is a research for development project that aims to disseminate improved varieties. The project is developing new dissemination system for cowpea that combines selection of appropriate varieties for the region, community seed system, and farmer field school activities with the ultimate goal of improving access of farmers to improved varieties and technologies. Japanese Ambassador to Burkina Faso, His Excellency Tsutomu Sugiura also called for the scaling up of the project, having recorded significant milestones in a short period of time.

One Bill too Long Drawn Out: Baraka Bashir; 27 January 2013



According to the agenda of the present administration headed by President Goodluck Jonathan, the bid to transform the economy with agriculture at the forefront is necessary, stating the need to ensure reform in terms of crops, institutional reforms, and international donor support from the Agricultural Transformation Agenda (ATA).

The administration's objective is equally driven to filter corruption in fertilizer distribution and support for seeds and fertilizers among others.

For a fact, it is obvious that before the oil boom in the 1960s, agriculture was Nigeria's major source of revenue with reference to the groundnut pyramids, cotton farming and other cash crops. In an ill-fated twist of fortune, the discovery of oil diverted government attention in that direction and the beginning of an unpleasant story of the agricultural sector.

To this end, some researchers in the Institute for Agricultural Research have developed certain improved variety of crops in collaboration with the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT). The varieties include millet (seven varieties), wheat, (eight varieties in collaboration with the International Center for Maize and Wheat (CIMMYT), tomato (7 fresh market, nine processing and four heat tolerant varieties), onions, pepper, grape vine and kenaf varieties.

However, the Institute of Agricultural Research cries foul concerning what it deems as insufficient government support following years of research despite the claims by the federal government that it is in support of transformation in the agricultural sector.

A researcher at the institute, Dr Usman expressed belief that if the federal government accedes to the 8-year bio tech bill, it will provide a framework to ensure the development and use of Genetically Modified Organisms (GMOs) which do not negatively affect plants, animals and human health or the environment.



In that regard, Mr Rufus Ebegba, Deputy Director, Bio-safety Office, Ministry of Environment, has said that Nigeria will not maximize the economic benefits associated with the practice of modern bio-technology without a bio-safety law.

In an interview with the News Agency of Nigeria (NAN) in Abuja, Ebegba said that in the absence of bio-safety law, the country stood to lose many benefits.

He said it was only when the country had the law that Nigerians practicing bio-technology could safely practice it under a regulated framework.

The deputy director said: “The absence of a law will mean that Nigerian scientists cannot research and bring out their products for use in Nigeria.

“The world is like a global village and modern biotech is a technology that has become globally accepted with its products now generating employment for the teeming youths in developed countries.

“So without Nigeria having this law in place, the country will find it difficult to access the economic benefits associated with the practice of modern bio-technology.”

Tissue Culture: best option for getting disease & pest-free plant material: Michael Ssali; 30 January 2013



Workers care for plantlets in a nursery before being transferred to the field. Photo by Michael J. Ssali.

How does a farmer get good results from the seed he or she has planted while facing the threat of pests and diseases? The option of tissue culture to propagate seed provides the answer.

A prudent farmer setting out to grow any crop will normally make effort to get good seed. Most agriculturists agree that the choice of the right seed increases yields by 30 per cent. Failure to access good planting material has contributed greatly to the overall declining agricultural production.

No guarantee.

Some farmers even plant diseased seedlings while others plant seedlings infested with pests. There are others who merely take seed of a good looking crop in the hope that when it is planted, the resulting crop will be as good.

Often they end up disappointed because there is no guarantee that the plant will be similar to the plant from which the seed was got. This is more or less what happens when a man begets a son. Since some of the son's physical or behavioural characteristics are from his mother he can never be really identical to his father.

A way to get an identical product is by tissue culture—a process by which seedlings are developed in a laboratory from plant cells. Scientists can turn each individual cell into a complete plant. Therefore, it is possible to get identical plantlets from just a part of a plant such as coffee or banana. In Uganda, it has been practiced in agricultural research institutions. However, unknown to most farmers is that Uganda, also has perhaps the biggest private tissue culture laboratory in East and Central Africa—Agro-Genetic Technologies (AGT Laboratories), located in Buloba, Mityana District.

Uniformity in products The laboratory, which has the capacity to produce up to 10 million plantlets every year, also makes plantlets of different crops like pineapples, tea, cassava, yam among others. Erostat Nsubuga, the proprietor, said he is considering to set up another laboratory in Kigali, Rwanda, soon because of the response of the market there. "Some farmer organisations and

individual farmers have placed orders for plantlets.” He added: “But if all our farmers understood the importance of planting clean and disease-free seedlings, our overall agricultural production would greatly improve. There is also the need for uniformity of our products so that we are in a position, for example, to maintain a standard taste of mangoes, bananas, pineapples by growing only desirable lines whose plantlets can be produced through tissue culture or cloning.” He observed that due to commercialisation, the cultivation of traditional banana lines—whose taste is otherwise very good—is neglected because they are not large enough to attract good income in our markets.

Nsubuga said most orders placed so far are for the large type of bananas, mainly Mpologoma and Kibuzi. The good news for coffee farmers is that AGT was contracted by the Uganda Coffee Development Authority to produce two million wilt-resistant plantlets. “We expect them to be ready for passing on to the farmers by the end of this year or early next year.”

Good care Nsubuga, who is an agricultural research scientist by training and a former telecom executive, said he has acquired more land near the laboratory where he is going to build an agricultural academy. “It will serve as a demonstration garden and a training institution for farmers who buy our plantlets in good agronomical practices,” he said. “For some farmers, the training will involve insight into what actually takes place in the laboratory while for others, the training will be about how to nurture the plantlets once they are planted in the field.” He believes that after planting the right plantlets the farmer must take good care of the crop to come up with the best results. So far, AGT has established nurseries and demonstration gardens in various districts and farmers who purchase the plantlets are encouraged to visit the demonstration gardens to see how the plantlets are expected to perform with good agronomical practices

Two Global Agricultural Organisations Invest \$109 Million in Seed Banks: Samuel Hinneh; 8 February 2013



Two of the world's leading agriculture organizations, the Global Crop Diversity Trust and the CGIAR Consortium have provided US\$109 million to maintain 706,000 samples of crop, forage and agroforestry resources globally.

The five year programme to be implemented through the CGIAR Research Program for Managing and Sustaining Crop Collections, would maintain samples of crop, forage and agroforestry resources held in “gene banks” at 11 CGIAR research centres around the world. Gene banks help preserve genetic material, be it plant or animal. In plants, this could be by freezing cuts from the plant, or stocking the seeds.

The seed banks house the world's largest and most diverse collections of wheat, maize, rice, potato, banana, sorghum, forages, beans and many other plants. This diversity is viewed as essential to providing farmers with new crop varieties critical to overcoming an array of weather- and pest-related threats. Over the last ten years alone, CGIAR gene banks have distributed more than one million samples to plant breeders and crop researchers—a process that has saved millions of lives globally through the development of new, resilient crop varieties.

“With climate change greatly intensifying demands on plant breeders to develop new heat-, drought- and flood-tolerant crops, it is particularly important for the samples conserved in the CGIAR's gene banks to be readily accessible and in optimal condition,” said Åslaug Marie Haga, incoming executive director of the Global Crop Diversity Trust.

“This particular program underpins global agricultural research; it builds a foundation for all of our other research programs to succeed. Ultimately, the seeds and vegetative material stored and maintained in the gene banks are the lifeblood of the crop improvement research being carried out across the CGIAR Consortium. If our gene banks suffer, our research suffers,” said Dr Frank Rijsberman, the Chief Executive Officer of the CGIAR Consortium.

“That's why we continue to work with the Trust, an organization dedicated solely to protecting crop diversity, to put these gene banks on a more firm financial footing and ensure they will be maintained and improved for generations to come,” Dr Rijsberman added.

Maintaining the hundreds of thousands of crop varieties held throughout the CGIAR network presents a complex challenge. Seeds and vegetative material must be collected, cleaned, stored and rejuvenated when aged. They also must be tested periodically for health and viability, safely duplicated and exchanged. And each of these steps must be carefully recorded and catalogued.

Gene banks must also dedicate funds and research to find better, cost-effective ways to conserve crops that do not produce seed or whose seeds are hard to store—like potatoes, cassava and bananas.

In addition to lacking funding for basic maintenance costs, crop diversity collections are threatened by political unrest and weather disasters. For example, the gene bank at the International Centre for Agricultural Research in the Dry Areas (ICARDA), and its valuable collection of cultivated and wild relatives of wheat, barley, lentil, chickpea, faba bean, peas and forage crops, was recently threatened by conflicts around ICARDA's headquarters in Aleppo, Syria, and had to be rapidly replicated or relocated to other CGIAR gene banks, national partners and the Svalbard Global Seed Vault in Norway.

Beyond maintaining the vitality of the existing collections, the CGIAR Consortium partnership with the Trust envisions adding some 56,000 new samples or “accessions” to the gene banks by 2015, including a large number of wild relatives of cultivated crops.

Wild relatives often contain important traits, such as drought tolerance or disease resistance that can be hard to find in cultivated varieties. New plant breeding technologies are making it easier to borrow traits from distant wild relatives and use them to improve the productivity or fitness of a cultivated crop.

More recently, the seed collections maintained by the International Crop Research Centre for the Semi-Arid Tropics (ICRISAT) and the International Centre for Tropical Agriculture (CIAT) have been mined to help farmers in the drought-stricken horn of Africa switch to more drought-tolerant varieties.

The CGIAR's gene bank collection is intended for everyday use by plant breeders and crop researchers. The collection is safely duplicated in the Svalbard Global Seed Vault on a remote island near the Arctic Circle. With the government of Norway, the Trust established the Svalbard facility as a back-up seed collection built to stand the test of time and to protect the world's crop diversity from natural or manmade disasters.

The new partnership between the Trust and the CGIAR Consortium will allocate the US\$109 million over the next five years to fund crop preservation and collection work at the CGIAR gene banks and ensure their crop samples are still widely shared. During that time, the CGIAR Consortium and the Trust will work with donors to secure a more permanent endowment to fund the gene banks in perpetuity.

“Given all of the turbulent issues surrounding agriculture and food today, from high commodity prices to threats from weather extremes, I think the international community is waking up to the enormous value of preserving crop diversity,” said Margaret Catley-Carlson, outgoing chair of the Trust's executive board and former president of the Canadian International Development Agency (CIDA).

“We see opportunities with this new program to knit together a global community committed to crop biodiversity that extends beyond CGIAR gene banks and allows funds to be invested more wisely,” said Charlotte Lusty, a scientist with the Trust who is working on the partnership with the CGIAR gene banks.

Tissue culture may save Tanzania: Leonard Magomba: 11 February 2013



MOROGORO, TANZANIA - Tanzania has been urged to transfer Banana tissue culture technology to small-scale farmers, if they want to overcome the challenges that deteriorate the agriculture industry as well as boosting productivity and production.

Agricultural scientists have singled out Banana tissue culture technology as the only option that if could be exploited efficiently in the agricultural sector, could save commercial farming and hence boost the country's forex earnings.

Speaking to East African Business Week in Morogoro recently during the journalists' familiarization tour which was organized by Biosciences for Farming in Africa (B4FA), the Programme Coordinator for Africa, Mr. Bernie Jones said; "In order to move local farming into commercial one, Tanzania has to transfer Banana tissue culture technology to small-scale farmers."

According to Jones, studies done in Uganda indicate that by using tissue culture banana planting materials, the gross gain from bananas increase to Ush3.5m (\$1,315.798) per hectare per year as opposed to using suckers with a gross of Ush2.3m (\$864.6885) from each hectare per year.

Tissue culture is a biotechnological tool which uses fragments of tissue from animal or plant in a culture to multiply, change size, form, or function.

The technology is used for mass production of planting materials, production of virus-free plants, plant breeding purposes, conservation, and multiplication of crops and livestock.

A Laboratory Technologist at Sokoine University of Agriculture, Ms Hellen Mdiye explained that a single Banana tissue which takes up to nine-week to mature is able to produce about 60 Banana plants at a time.

Ms Mdiye said that what farmers can produce from Banana tissue culture plants are huge and healthier compared to local plant which most of the time are weak against disease and harsh climate condition.

The region is struggling to modify its farming method into commercial and or in a modern way, however poor farming knowledge, lack of technology, diseases, harsh climate condition which caused by the climate change stand as a hindrance to most farmers.

Small-scale farmers in Tanzania which account for 75% of the country's population rates are the most victims of these challenges. An analyst says if the government would be able to transfer the technology to small-scale farmers, will be a big step for the farming industry.

The Director General of the Tanzania Commission for Science and Technology (COSTECH) Dr Hassan Mshinda was recently quoted by local media as he says that the government should put more funding for research in the agriculture sector.

Mshinda singles out tissue culture as a good example of a simple technology that could be put to better use to enhance the prosperity of the country.

Laws on biotech & biosafety: how will farmers benefit? Lominda Afedraru; 20 February 2013



Research in Uganda on genetically modified (GM) crops and the use of biotechnology begun more than 20 years ago and the scientists are hoping to release some of these varieties in 2014. But the biggest challenge for all the stakeholders is the safety measures and how to maintain the quality of these varieties for better output. But for the scientists to release some of these varieties as planned by 2014, it is necessary for the National Biotechnology and Biosafety Bill to be debated and passed into law.

Stakeholders input Biotechnology refers to any technique that uses living organisms or substance from living organisms to modify a product, improve plant, animal breeds or micro-organisms for specific purpose and biosafety means the safe development, transfer, application and utilisation of biotechnology products.

Biotechnology, according to experts, has been used in Uganda for many years by a number of industries processing wine and beer, producing of cheese and yoghurt and leavening of bread, among others. But modern biotechnology, which involves techniques to transfer genes or modify living organisms, is relatively new. The Bill, which was drafted more than eight years ago, is now at Parliament for public debate and all interested stakeholders are invited to add in their input.

Heavy penalties Ms Susan Nakabuye, a State Attorney at the Ministry of Justice and Constitutional Affairs, in a presentation about the Bill during the Open Forum on Agricultural Biotechnology, in Kampala, said scientists, seed dealers and other stakeholders will have to observe safety issues because the Bill has stringent clauses on crimes and imposes penalties for those who will fail to follow the safety guidelines. The offences range from crimes committed by those engaged in research of genetically modified crops and animals releasing their varieties without submitting them to the approval committee. These face a jail term of five years or penalty of 120 currency points, which amounts to Shs2.4m or both.

Health and environment A person who fails to disclose information about his or her research will be liable on conviction to a fine of not exceeding 48 currency points (Shs960,000) or imprisonment not exceeding 24 months or both Other punishments range from those using a GM product in a manner, which contravenes the legal procedures under the specific Act and those who use them to harm or injure human health and the environment. Other offences are committed by individuals and some by corporate authorities, who will face the same crime penalties as prescribed by the required clause. Much of the confidential business information including research procedures will be

regulated by the biosafety committee, which is hosted by the Uganda National Council for Science and Technology (UNCST).

Approvals In terms of laboratory tests, scientists will be required to follow the set stages which include, laboratory experiment, and tests done in green houses, field testing and testing for safety and risk assessment and for each stage an approval permit has to be sought from the biosafety committee. According to Ms Nakabuya, the Bill provides for export, import and transit approval of GM products and a person who imports, exports and transits a GM product without approval will face jail term not exceeding five years and fine not exceeding 120 currency points (Shs2.4m) or both.

International requirement “For these rules and regulations to work efficiently, those who drafted the bill gave a provision for investigating and inspection personnel to be part of the team in order to carry out their duty at any one given time. This therefore requires the general public to actively participate in scrutinising the contents of the bill for purposes of making reasonable additions as well as subtract what they think is irrelevant,” she said. Dr Lastus Serunjoji Katende, an advisor with Cotton Development Authority, says it is important for Uganda to have this bill passed into law because it is an international requirement for all countries conducting research on genetically modified organisms (GMOs) to have the biosafety law in place for purposes of regulating the products. “Since the Cartagena protocol to which Uganda is signatory specifies it clearly that countries involved in conducting research using modern biotechnology mechanism should make sure they pass a biosafety law to regulate the product, the National Council for Science and Technology which handles research aspects of modern biotechnology had to constitute the Biosafety Committee to oversee the research process beginning with the mandate of scrutinising research applications for possible research permit,” he said.

Benefit to farmers To him, the Bill will directly benefit farmers in one way or the other in that they will be able to access varieties, which are resistant to pests and diseases as well as tolerant to drought, and also growing varieties with nutritional value. “Scientists use biotechnology for modifying agricultural products ranging from crops, poultry and animals and in the health sector, it is used for making drugs and vaccines. This therefore means the farmers will be able to access clean seedlings, which are resistant to pests and diseases leading to increased output. For the consumers, farmers will be able to supply them with fortified food like in the case of the vitamin A and iron-rich banana where research work is going on at Kawanda,” Dr Serunjoji elaborated. In the case of farmers who use farming material multiplied using tissue culture, he said this will enable rapid multiplication of seedlings, which can be accessed by farmers throughout the country as well as in the East African region.

Concerns Citing the cotton variety where research is being conducted by the National Semi-Arid Resources Research Institute in Serere and at the Mubuku irrigation scheme in Kasese, he is of the view that farmers will not spend time weeding because of the herbicide tolerance of Bt cotton, for instance. Secondly, the Bt cotton farmers will not spend time applying pesticides to control bollworm because the genes in the cotton variety already contains the bacteria to kill the pests. However, farmers will be faced with the challenge of consumers accepting these varieties because already there is controversy surrounding GM products globally. In Africa, including Uganda, many people are asking about the health impact it will create on human beings consuming these varieties. But scientists are optimistic that with the stringent regulations in the bill, safety issues will be tackled at the safety assessment stage meant for their team to release varieties, which are safe for human health

Biosafety law and GMOs: Nigeria's Loss, Ghana's Gain: Mohammed Kandi; 26 February 2013



The need for the federal government to sign into law the Biosafety bill that would facilitate the development of Genetically Modified Organisms (GMOs), which has long been passed by the Senate, has re-emerged.

This is coming in the assertion made by a Biotechnologist and Plant breeder, who specialises in Cowpea and other crops at the Institute for Agricultural Research (IAR), Ahmadu Bello University, Zaria, Prof. Mohammed Ishiyaku, who said if the country must solve its problems of hunger and food security, it must institute a law enabling the commercialisation of GMOs.

The Plant breeder, who made the assertion at a media training on biotechnology application for journalists, organised by an NGO, Biosciences for Farming in Africa (B4FA), expressed optimism that failure for Nigeria to establish such law that would favour the commercialization of the GMOs would be great advantage to Ghana, its close neighbour and other African countries as the increasing demand for GM food is gradually clutching the continent.

Meanwhile, it would be recalled that the Senate had in June, 2011 agreed that the bill should be harmonised with a version passed by the House of Representatives in July 2009.

However, despite intensive efforts made by supporters of GM crop technology in the past, expressing concerns that their efforts to get the bill passed was becoming elusive, particularly as the government has turned deaf ears to their proposition.

Prof. Ishyaku also informed that the institute, through partnership with some international organizations had developed and set to release insect resistant cowpeas to farmers in the next three years (2015).

According to him, the partnership resulted in successful development of cowpeas that has shown astute resistance against Maruca, an insect that has been linked to over 80 per cent reduction in yields, through genetic engineering.

"Nigeria is the highest producer of cowpeas in sub-sahara but we are producing on a national deficit of about 500, 000 which is evident in the less than 400 kilograms per hectare (350 kg/ha), mostly because of the effect of maruca insects," Ishyaku stated.

The expert admitted the institute uses the meagre resources it gets from the government to procure material for research but was quick to say those researches became successful with the support of foreign partners while calling on the federal government to establish an act commercializing the GM products as well as quickly assent the biosafety bill before it.

Ishiyaku therefore warned that if the country is unable to pass the biosafety law within the next three years, their efforts may not transcend beyond the shelves of their laboratories.

He laments that without a law supporting the development of GM groceries in the country, no breeder or farmer is allowed to commercialise the products, saying “it means the demand for GM food and the copious economic benefits that follows will definitely go to our African neighbours.”

“The introduction of maruca-resistant cowpea would have reduced dependence on insecticides, which have been linked to many health and environmental problems,” he said.

He said: “We have worked on the genes of the cowpeas, tested and seen that they are safe and resistant. We are hopeful that something will happen towards signing the biosafety law before then.”

The breeder therefore called for more awareness, enlightenment and education of farmers and consumers to accept the GM food so as to achieve food security as fast as possible.

Nsubuga Stretching Wings to Fly: Henry Lutaaya; 28 February 2013



When Erostat Nsubuga opened Agro Genetic Laboratories Ltd, Uganda's first commercial tissue culture laboratory ten years ago, it was a very ambitious venture.

But Nsubuga had learnt the lessons of the telecom boom in Africa, only a couple of years passed.

Whereas the richest corporations and business people in America and Europe would not dare dream of investing their money in Africa to provide things like telecom services to the poor, Mo Ibrahim, an African of Sudanese origin, took the plunge when he launched Africa's first mobile telecommunications company Celtel.

Not only did Mo's audacious business acumen pay off handsomely, it took the whole global business community by storm. It opened many people's eyes to the huge untapped potential in Africa. Ever since, many global business companies and multilateral agencies have had to rewrite their business prospects for Africa.

Over the past decade, Africa has witnessed the arrival of huge amounts of capital from other continents meant to build masts laid cable, drill oil wells and provide other services. And hooray!, they have turned in millions of dollars in revenue.

Erostat Nsubuga was right there when African's telecom revolution was beginning to evolve, and not just as a spectator but as Ericsson AB Telecommunications Sales and Marketing Manager for Africa - one of the leading suppliers of telecommunication's equipment.

Nsubuga recalls: "When I used to come here in the 1990s, I used to tell the rich business people to get telecom licenses because of the great potential the sector had. They didn't believe me. Now they must be regretting why they didn't because foreigners have come and gotten billions of money."

It has to be said that the potential he witnessed while marketing telecoms in their early days opened his eyes to so many areas of untapped potential on the continent.

Armed with his agriculture degree from Moscow University and little savings, Nsubuga decided to venture into agriculture by opening AGT laboratories at Buloba, about 12 kms from Kampala off Mityana road.

Nsubuga says: "I knew that over 90 percent of banana plantations, which provided the bulk of the food in Uganda, were diseased. And millions of farmers were struggling to find not only clean material, but also, it was almost impossible to find the quantities [of planting material] needed for any serious commercial garden."

With tissue culture, Nsubuga knew that with Tissue Culture, he could multiply tens of thousands of plantlets out of a single leaf at a relatively low cost because the technology uses locally available materials like soil and plant leaves but also it takes only a few weeks to have the product on market.

His initial and enduring focus for his tissue culture business has been bananas both for cooking and as fruit bananas, as well as coffee. With the exception of pineapples, whose multiplication he has ventured into lately, Nsubuga targeted bananas and coffee for their longstanding central role both as a food source as well as source of revenue for majority of households in Central and South Western Uganda.

Nsubuga reveals: "We came to solve three primary problems that farmers were facing; provide disease free planting material, in the needed quantities and of the same varieties."

Like all new technologies, farmers took a bit of hesitation to adopt tissue culture banana plantlets. He recalls that some farmers thought the small size of the plantlets would render them susceptible to vagaries like drought and cause them to die in the fields. This is because farmers had traditionally gotten used to planting shoulder-high suckers.

Also, others thought Nsubuga was distributing the controversial Genetically Modified bananas that had received a lot of negative commentary both locally but more so internationally.

But with his marketing tactics intact, he rolled out several tricks including entertaining visits and conducting lengthy sensitisation sessions for the sceptical farmers in his laboratory about the basis of the science, benefits etcetera.

He also launched several ambitious outreach programmes by helping to support the establishment of demonstration farms by farmers themselves as well as teach them about good agronomic practices like mulching that had also contributed to the decline in agricultural production in the country.

Nsubuga managed to get the farmers to understand that tissue culture was not harmful. But more importantly, he succeeded in getting them to understand that his products had greater potential for higher yields and better market simply because they were disease free but also because one had the potential to produce bananas of the same quality and taste.

It was not long before the business picked up. Orders started to come in mostly from individuals and farmer groups not only from Uganda but also from across the East African region.

The government's efforts through the National Agricultural Advisory Services (NAADs) initiative to support farmers by enabling them access seeds and other inputs, created an even bigger market for Nsubuga. District, sub-county farmer groups placed orders for supply of disease-free banana and coffee seedlings.

And to supply the ever growing market, Nsubuga expanded his capacity to the extent that his laboratory can now supply up to 200,000 plantlets in one planting season.

There is no doubt that his works have brought him a lot of wealth as well as national and even regional recognition.

Currently, he has a contract to supply Uganda Coffee Development Authority (UCDA) with two million seedlings of coffee every year for five years.

In addition, he has an order from the government of Rwanda to supply banana seedlings worth half a million dollars.

The substantial orders have enabled him to expand and modernise his laboratory in order to be able to meet the demand.

Besides providing both skilled and semi-skilled jobs for dozens of Ugandans, Nsubuga's AGT has proved to become an attraction for high ranking political dignitaries like African presidents.

President Museveni has visited AGT twice along with some of his counterparts. Nsubuga has also served as chairman of the Presidential Investors Round Table on Agri-businesses in Uganda between 2007 and 2010.

Expansion

Apart from the recently established Bio Crops firm a Kawanda research that will try to replicate the same tissue culture technology, Nsubuga works more or less as a monopoly.

The national research institutes mostly engage in research and if they succeed, pass on the technology to private firms for multiplication and distribution purposes.

With those successes in hand, it appears Nsubuga is now ready to fly, so to speak. He has acquired more land in Buloba where he wants to expand his laboratory and nurseries. He has also plants to start a training institute that will provide both short and medium courses to students as well as to farmers.

He says: "My interest is to train farmers to obtain skills not only of doing some of what I do, but also to learn better farming practices."

Nsubuga has also ventured into value addition for bananas. Through his AGT Foods, he has obtained equipment that peels green banana fingers and packs them in a vaccume container ready for distribution in supermarkets.

"Until I started packing Matooke, no super market used to stock it despite the fact that it is the number one staple food in Uganda," he reveals. He also packs unpeeled matooke and exports it to Canada. He says AGT foods will create a market for matooke farmers.

Nsubuga seems confident that greater things are yet to come for him and others who invest in Agriculture.

He says that whereas the last few decades belonged to those who invested in information and Communication technology, the coming decades will belong to smart farmers and investors in the food sector.

With the rapid increase in the world's population, Nsubuga says: "Now I can tell you; the next big business is food."

He argues though that for farmers to be able to cope, they will have to adopt new technologies including GM (genetically modified organisms) to be able to adapt to new pressures arising from climate change and pests. And hopefully, Nsubuga will join the leagues of Mo Ibrahim for his pioneering move.

Bananas Facing Extinction: Christopher Bendana; 9 March 2013

THE New Vision
UGANDA'S LEADING WEBSITE

14 SATURDAY VISION, March 9, 2013

Bananas facing extinction

BY CHRISTOPHER BENDANA

APPLE bananas and bogoya are eaten in different forms which include dessert, *katogo* and sometimes they are mashed. Matooke is one of the staple food crop across Uganda.

Although enjoyed by many, matooke is threatened to extinction by pests and diseases. It is common to see banana bunches yellowing before they mature. Although the effects begin with a few bunches, in extreme cases, the plantation is destroyed if infected by both pests and diseases.

HOW BANANAS ARE ATTACKED

Dr. Geoffrey Arinaitwe, a genetic engineer and banana molecular breeder at the National Agriculture Research Laboratories (NARL) Kawanda, explains how each of these diseases is threatening the banana.

Banana weevils

These attack the base of the banana plant, creating small multiple tunnels or holes in the corm. It makes the banana plant weak and in case of strong winds, the plant breaks at the base. When weevils attack young banana plants, in most cases they die. If they manage to grow to maturity, the bunch is very small.

Nematodes

These are very small worms that eat the root of the banana plant. They cause the plant to lose hold in the ground. The roots pull out of the ground and the plant falls.

Bananas bacterial wilt

This manifests itself by premature yellowing of the banana fruit, oozing of pus-like fluid from brown stems when cut, yellowing of young leaves and often looks like it has been burnt by fire. This limits the amount of photosynthesis necessary for the plant and the fruit cannot be eaten.

Dr. Arinaitwe says the bacteria are transmitted by insects that visit the banana flowers and move from plant to plant. The bacteria disease is also transmitted by farm tools.

Black Sigatoka disease

This manifests itself with black spots on the leaves, making them dry. Like the banana wilt, sigatoka makes the plant unable to absorb sufficient light for photosynthesis.

Fighting diseases and fight

Now, banana geneticists and breeders at NARI-NARO Kawanda are using modern biotechnology to fight these diseases.

Dr. Arinaitwe says they are breeding bananas for resistance to devastating pests and diseases so that millions of Ugandans who depend on bananas are not threatened. He says through conventional breeding, the banana programme has released

a banana hybrid called Kiwagazi (or Kabana 6H) that is resistant to diseases and pests. Kiwagazi was generated after more than 10 years of conventional breeding, selection and evaluation.

Bananas have their wild species that are resistant to pests and diseases, but are not edible because they produce seed.

How breeding is done

In conventional breeding they get pollen from flowers from the male bud of the wild banana parent which is then pollinated on to the local matooke to produce a hybrid banana.

The breeder then looks for banana seeds in the first hybrid. However, the limited number of seeds that are obtained do not germinate when planted directly in the soil. Scientists at NARO use a technique called embryo culture to germinate the seeds in laboratories in order to get the first generation hybrid plants.

The first hybrid is again crossed with the local matooke up to the third cycle. At each stage, the breeders study the traits of each clone group to look for the ones with the strongest resistance to pests and diseases. These are the ones they select for the next stage. "We look for resistance," he points out. "We study different clones because each seed is different," Arinaitwe explains.

In order to multiply the plants at each stage of selection and evaluation, scientists use the technique called tissue culture. It is by these techniques that Kiwagazi was bred. However, he points out that Kiwagazi is resistant to Banana Weevil, Black Sigatoka and Nematodes, but not to the banana bacteria wilt.

On pest and disease resistance, and their re-emergence, this happens after a number of years as pests and diseases adapt to the environment. This is well explained by Noel Kingsburg in his 2009 book, *Hybrid: The History & Science of Plant Breeding*. "Pest and disease resistance has continued to be of huge importance in plant breeding. Breeding for resistance is a constant struggle; most pests and diseases are capable of adapting, so the breeder and the pest are involved in a constant 'arms race'.

Viability of hybrids

Many resistant varieties are expected to be commercially viable for about 10-15 years. The constant need to be a step ahead of pathogens makes the availability of genes originating from land races and crop wild species a vital resource for breeders.

The banana breeders explain that for a crop like banana which does not produce seed, but is vegetatively propagated, improvement for some traits requires importing some genes from non-relatives of the plant.

Dr. Priver Namanya, a genetic



One of the doctors at Kawanda Research station carrying out an experiment on the pests and diseases



A banana plantation attacked by diseases and pests

engineer and specialist in plant tissue and cell culture at Kawanda, says they strive to make use of genes derived from plant species. To achieve this, they use advanced plant biotechnology techniques such as genetic engineering and tissue culture. This type of crop improvement through biotechnology is called molecular breeding.

Enhancing vitamins in bananas

Scientists at Kawanda are also enhancing nutrients like Vitamins and iron in the bananas, using molecular breeding.

"We are also enhancing important micro nutrients in our bananas especially those associated with diseases that affect human beings, for example the lack of Vitamin A and iron," Professor Wilberforce Tushemereirewe, the Team Leader of the banana scientists at Kawanda, points out.

This enhancement is being achieved because of the recent advancement in the field of biotechnology. Plant geneticists and plant

breeders are now able to get genes containing the traits they are interested in from other crop and plant species with precision. The genes are introduced into banana cells through genetic engineering and tissue culture to generate improved plants.

Arinaitwe says the major micronutrient deficiencies in Uganda are Vitamin A, iron deficiency anemia and iodine deficiency. He says according to the 1994-99 national nutrition survey, over 50% of pregnant women had iron deficiency anemia.

Namanya adds that the genes they are using for the enhancement of Vitamin A were derived from a red banana variety Asupina, which has high levels of Vitamin A and is found in the Micronesian islands in the Pacific.

"Asupina is not boiled like matooke but it has the high value vitamin A we need. We use tissue culture techniques to support the breeding process by generating and multiplying the improved plants," she says.

"We have not released any genetically modified bananas in this country. The only genetically modified bananas we have are under experimentation and they are at the station," she explains, to allay fears of the public on the effects of GM.

Safety measures

On safeguards against breeding dangerous bananas, Dr. Namanya says they use two approaches to breed improved bananas; conventional and molecular breeding. She adds that before any new variety is released to the farmers, the hybrids go through multiple evaluation cycles, selection and testing stages, both on station and with the participation of farmers on the fields.

All this evaluation is carried out under the supervision of the Ministry of Agriculture and the national biosafety committee of the National Council of Science and Technology. And lastly, the selected hybrid with the desired characteristics goes through the regulations of the variety release committee of the ministry, which grants permission for release.

"There are regulations and checkpoints. Ugandan scientists cannot intentionally generate harmful food for the people," she argues.

What farmers say

For Paul Katende, a farmer in Ggolo, Mpigi district is all praise for the FHIA hybrid banana. "This is a sayour. One bunch can feed my family," he says, referring to the breed the village farmers called FHIA.

"The problem is that if you want to cook the FHIA banana, you have to mix it with the local breed. On its own, the taste is not like our local bananas," he added.

Ronald Mukasa, a resident of Mbalala, Mukono with a few plants behind his house, grades the hybrids in three groups, the apple banana, the FHIA 1 and FHIA2. He says he prefers the FHIA 2 which he says is not difference from the local matooke in taste.

Dr. Namanya says FHIA is not meant to be cooked because it is a dessert banana that was introduced in Uganda by NARO through the Ministry of Agriculture for evaluation, due to its resistance to black sigatoka.

Feature

PICTURE BY CHRISTOPHER BENDANA

Hybrid cashew nut crop lifts farmers income in Naliendele: Finnigan Wa Simbeye; 12 March 2013

DAILYNEWS

TANDAHIMBA is one of the poorest districts in the country but to some people that may be generalisation which is far from the truth.

“I have eight hectares of cashew farm which is planted with hybrid seedlings developed by Naliendele scientists which has made me rich,” said Mr Ephraim Nandonde, a retired civil servant who has dedicated his final days on earth to farming.

The cashew, scientifically called -- *Anacardium occidentale* -- is a tree in the family Anacardiaceae. Its English name derives from the Portuguese name for the fruit of the cashew tree, caju.

Originally, the tree is native to Northeastern Brazil, but it is now widely grown in tropical climates for its cashew apples and nuts. While native to Northeast Brazil, the Portuguese took the cashew plant to Goa, India, between the years of 1560 and 1565. From there it spread throughout Southeast Asia and eventually Africa.

The cashew nut is a popular snack, and its rich flavour means that it is often eaten roasted, on its own, lightly salted or sugared, or covered in chocolate. Cashews, unlike other oily tree nuts, contain starch to about 10% of their weight. This makes them more effective than other nuts in thickening water-based dishes such as soups, meat stews, and some Indian milk-based desserts.

Many southeast Asia and south Asian cuisines use cashews for this unusual characteristic, rather than other nuts. The shell of the cashew nut is toxic, which is why the cashew is shelled before it is sold to consumers. Mr Nandonde who worked as a clerk in Lindi and Mtwara rural districts between 1977 and 2008, said he is regretting because he wasted so much time earning income from peanuts.

“I wish I had started cashew farming over 20 years ago when I was still young and energetic,” said the 61-year-old father of six whose income is on average 40m/- per annum from cashew nut alone. Experts at the Naliendele Agricultural Research Institute (NARI) in Mtwara Region where Nandonde got his hybrid seedlings, said a hectare of land supports about 30 trees which in turn yields approximately 4,500 kilogrammes of raw nut.

According to Mr Noel Kingsbury, author of a book titled, “Hybrid, the History and Science of Plant Breeding,” hybrid is cross between two separate species having very common features or belonging to the same species for the purpose of improving quality and quantity. “On average, I get between 115 and 140 kgs per single tree,” Mr Nandonde pointed out which then approximately translates into 36,000kg or 36 metric tons.

At a minimum price of 1,200/- per kilogramme, the Tandahimba farmer earned 42.2m/- last season. “Now you can agree that my 380,000/- per month salary as senior district clerk while working as a

civil servant was a waste of time,” he said while extending a smile as he sat on his newly acquired Massey Ferguson tractor which he bought on credit at over 30m/-. Farmers who have chosen Mr Nandonde’s path are among the highest earners in Tandahimba where per capita income is estimated to be around 350-400,000/- against the national average of over 900,000/-.

Naliendele is Africa’s centre of excellence on cashew nut breeding after a successful over 3.19 million US dollars cashew nut improvement project funded by Common Fund for Commodities (CFC) between 2002 and 2010. “After concluding our research on how to improve cashew nut seedlings to curb insect pests and diseases, we went to farmers and introduced demonstration plots to teach them how to cultivate the new seedlings,” said Dr Louis Kasuga, Country Coordinator of Regional Cashew Improvement Network for Eastern and Southern Africa (RECINESA).

The CFC funded project’s overall objective was to raise incomes and living standards of resource-poor farmers while at the same time enhancing environmental wellbeing by promoting the soil fertility of the land cover by cashew trees which are known to contribute to carbon sequestration and soil conservation.

Furthermore, the project aims not only at enhancing production through better planting material and plant husbandry practices but also improving the quality of products through better quality control systems and the adoption of a regional quality standard compatible with international market requirements, the project’s documents said in part. Dr Kasuga said NARI scientists have been working on developing a hybrid cashew variety since late 1970s when the crop was badly affected by pests and diseases.

With the support from the World Bank and the British government, Dr Kasuga’s research work in cashew nut improved has assisted raise production from 16,000 metric tons in late 1970s to over 120,000 tonnes last season. “We got cashew nut seedlings from all over the world and started researching on how best we could come with a high quality pest and disease resistant variety suitable for our people,” said Dr Kasuga while taking a team of journalist from Bioscience for Farming in Africa on an inspection tour of nurseries and the cashew nut farm at NARI.

Scientists grafted a scion of local cashew nut seedling with different species from Asia and finally managed to come up with the hybrid variety which is not only popular in the country but also in Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Tanzania and Uganda. “We took several years of observation, two weeks after grafting we moved the seedlings to a nursery where after two months they transplanted the same to a farm,” said Dr Kasuga.

Farmers buy a hybrid seedling of NAR at 500/- each. Naliendele which is recognised by CFC and other stakeholders as a centre of excellence for cashew nuts has not only assisted farmers in Tanzania improve their incomes and standards of living but also many others in Africa. In Uganda, 67-year-old Erukana Emuron is also a successful cashew nut farmer who is minting money out of the Naliendele developed hybrid seedling.

Mr Emuron who is an agriculturalist specialising in animal husbandry himself, joined cashew nut farming in 1996 with 17 trees he had inherited from his father. He is now a proud owner of more than 600 trees of cashew nuts and targets to have 1,000 trees in the next six months.

“Today, I am not only able to meet the economic demands of my family but I have also been identified as a model farmer from whom others can learn from to help revamp cashew nut farming in the region under NAFORRI (the National Forestry Resource Research Institute),” he wrote in a recent statement.

The Ugandan farmer earns 10 million Ugandan shilling annually from his cashew nuts. But despite such a successful cashew nut hybrid seedling development, Naliendele cannot patent its new variety because it was done under internationally funded project which targets to improve incomes of farmers in developing countries.

“Plant traders can come and get our approval to reproduce the hybrid variety and make it available to farmers,” said NARI’s acting Zonal Director, Dr Omari Mponda. Patenting the new hybrid variety would have enabled NARI to earn revenue from commercialization of its discovery.

Author Noel Kingsbury defines the patent as protection of investors and developers of new products and to stimulate the process of invention. Patent law was first developed in the late 19th century but the United States first Plant Patent Act of 1930 which was championed by Luther Burbank.

Why Africa should adopt genetic engineering in agriculture: Alex Abutu; 21 March 2013



Because of the situational challenges it faces, Africa is often described by many commentators as the dark continent, the hungry continent, the disease plagued continent among others derogatory appellations..

The stereotypes are further reinforced by statistics produced by global bodies such as the World Health Organisation and UN Food and Agriculture Organisation, which rate as

the continent with the highest disease burden and mortality from malnutrition, absence of protein and non-availability/shortage of food.

In most parts of the continent, farmers are witnessing a rapid decline in crops yield and this is attributed to over use of the soil, pest and other infections that have drastically affected the ability of the crops to produce more.

Recent development in technology, especially genetic engineering, has made it possible for the inclusion of desired traits in staple foods that are common to the average Africans. The introduction of yellow cassava fortified with vitamin A, vitamin fortified Sorghum and Maruca-Resistant Cowpea are expected to assist farmers to get bumper harvest as well as improve their health conditions. Genetically Modified Organisms (GMOs) since its debut in 1996 has sparked a lot of controversy championed by lobbyists. This has pitched scientists against activists and even against each other. Steadily a controversy is building up around the adoption of the technology which the promoters say could contribute significantly towards ending hunger in Africa. They argue that GMOs have not only come to stay in the United States of America but has also played a significant role in the ability of the USA to attain self sufficiency in food production.

According to Prof. Walter S. Alhassan, a consultant on biotechnology and biosafety policy issues for the Forum for Agricultural Research in Africa (FARA), biotechnology represents a powerful tool that augments conventional approaches to tackling the future challenge of food security. As of today, GMO research is being carried out in Nigeria but without biosafety law to facilitate commercialization of the end products, while South Africa, Burkina Faso, Kenya and Ghana already have in place laws that allow the introduction of GMO products into their food supply chain.

Professor Muhammad Faguji Ishiyaku, a plant breeder and Principal Investigator for the Maruca-Resistant Cowpea project at the Institute of Agricultural Research (IAR), Ahmadu Bello University, Zaria, said recently that the application of science and technology on agriculture has the potentials

of solving the problems of food security in Africa. “There is the need for Africa to keep its citizens from hunger against the ever-growing population.”

According to him, there are immense opportunities in biotechnology for the benefit of mankind. “Unlike what we now have, chemicals are used to control pests and diseases of plants. These are unsafe for consumption and not environmentally friendly, aside from being expensive.” “But with science and technology, host resistant plants are now bred. We have worked on the genes of cowpeas, tested them and seen that they are safe.

He said the need for introduction of GMO in Nigeria can no longer be over emphasised considering that “the national cowpea deficit for Nigeria is put at 500,000 tones. It is cultivated in cereal-based system and grown everywhere, mostly in the Savannahs. Cowpea is used traditionally and at low-level industrial levels.”

Despite the potentials and economic viability of cowpea, they are prone to diseases such as bacterial blight, dumping off, septoria leaf spot, scab, rust, ashy stem blight and aschochyta blight. Insect pests also serve as constraints against cowpea and this, scientists says can be perfectly tackled by genetic engineering.

Christopher J. Leaver, Emeritus Professor of Plant Science, University of Oxford, noted that the major challenge for the future “is to feed a predicted world population of 9 billion by 2050, 80 per cent of whom will live in developing and transition countries with the majority living in an urban environment in mega-cities. Each hectare of land in 2050 will need to feed 5 people compared to just 2 people in 1960. To feed this number, food production will have to increase by at least 70 percent on essentially the same area of land with less available water. This will require ‘sustainable intensification – growing more from less’ by using land and resources more efficiently with the aim of meeting the current needs while improving the ability of future generations to meet their own needs. In addition we must conserve natural resources and preserve ecosystem function while minimizing, adapting to and where possible, reversing the affects of climate change. Experts argue that to address these challenges, genetic engineering and other technologies must be allowed to play a crucial role.

Leaver said: “during the last 25 years there has been a revolution in plant science and the skills of the plant breeders have been enhanced by two new technologies, marker assisted plant breeding and genetic modification (GM). These developments have depended on our increasingly detailed understanding of the information content of plant genomes and how cells and organisms function at the molecular, biochemical and physiological level, linked to our ability to use this information to select for, and modify, important agricultural and nutritional traits.”

As with many new technologies, people are keen to embrace the benefits but are concerned about the potential risks. In Europe the manner of introduction of these new technologies coupled with a lack of coherent political policy has led to loss of community confidence which has been exploited by global pressure groups and activists for their own political ends. This has resulted in developing countries being denied access to the science where it has the potential to contribute to the improvement of food security and help alleviate poverty.

But Leaver warns that GM crops are not a 'silver bullet' and cannot on its own solve the global food challenges. He is of the opinion that all available technologies must be evaluated and, subjected to appropriate and realistic evidence-based biosafety regulations and in combination with conventional approaches, deploy those which are most effective and sustainable.

Dr Ibrahim Atokple, a Senior Research Scientist at the Savannah Agricultural Research Institute, Tamale, Ghana, and the principal investigator for the Maruca-Resistant Cowpea project in Ghana, said that Africa cannot be left behind on the global drive to take advantage of bioengineering. "All the argument we are hearing against GMO are based on personal opinion and not science." Njoku D, N and other scientists from the National Root Crops Research institute, Umudike in Nigeria said recently: "one major solution to reduce Vitamin A deficiency in Sub-Sahara Africa is to develop improved cassava varieties that are adoptable by farmers and other end users.

Corroborating Njoku and colleagues Prof. Eric Danquah, a plant breeder and head of the West African Centre for Crop Improvement (WACCI) located at University of Ghana said that the continent's agricultural system was being challenged by the changing climates hence the need to integrate conventional plant breeding and biotechnology approaches to develop new crop varieties. The emergence of multi-national supermarket chains in Nigeria and countries across the continent is a pointer to the fact that yes the world is a global village and we can no longer live in isolation. Therefore, the time has come for African countries to open up to the technology as presently there is no scientific evidence that shows that the technology is dangerous to human or the environment.

Institute Releases 8 Improved Varieties Of Cocoa Seedlings: Akinwunmi Dawodu; 21 March 2013



NAN-H-2

Cocoa

Abuja, March 21, 2012 (NAN) In its effort to bring back the lost glory of cocoa as one of Nigeria's main export crop, the Cocoa Research Institute of Nigeria (CRIN) released eight improved varieties of cocoa seedlings.

Mrs Anna Muiyiwa, Head of Crop Improvement at the Institute, disclosed this on Wednesday in Abuja at a Media Fellowship Training for Journalists organised by Biosciences for Farming in Africa (B4FA).

She said the new varieties of cocoa seedlings could mature in 18 months and would help to improve farmers' yield.

She said that farmers had been coming to the institute to collect the seedlings.

"It is this improved variety of cocoa seedlings that the Federal Government distributed to farmers free last year," she said.

Muiyiwa said that the institute had dispatched extension workers to farmers to monitor the growth of the seedlings on their farms.

She said that the institute had also undertaken research on the latest technique of 'top crafting' that would produce a variety of cocoa seedlings that could mature in nine months.

The News Agency of Nigeria (NAN) reports that the six-month programme for journalists was launched in 2012.

It is aimed at bridging the gap between science and the public by promoting better understanding and dialogue on developments in agriculture and biosciences throughout Africa.

It is also aimed at encouraging dialogue and promoting better understanding of the available options for improving agricultural productivity in Ghana, Tanzania, Nigeria and Uganda. (NAN)
AKD/AEA/NOL

Scientists work to save the Irish potato in Kabale: Christopher Bendana; 23 March 2013



The potato (Irish) that has fed the people of southwestern Uganda (Kabale) for generations is being threatened by several pests and diseases, including the potato bacterial wilt. These are affecting potato production as plants dry up or produce small tubers.

Abel Arinaitwe, a plant pathologist at Kachwekano Zonal Agricultural Research & Development Institute (KAZARDI) located 8km from Kabale town, says the potato bacterial wilt makes the plant sag. He discloses that this can be transmitted through infected seeds and soils, especially during the rainy season.

Arinaitwe says it can be managed by spraying with fungicides.

He adds that apart from the bacterial wilt, potatoes are also attacked by other diseases such as the late blight. This is a fungal disease that makes the leaves brighten with blotches, the stems turn brown and black and then the leaves collapse.

Arinaitwe discloses that late blight sometimes attacks the tubers, causing them to rot. This especially happens during the rainy season.

KAZARDI is one of the 14 institutes of the National Agricultural Research and Organisation (NARO) spread across the country. It spearheads research and development programmes aimed at increasing agricultural production in the southwestern highland agro-ecological zone.

Development of new breeds

Because the local breeds are susceptible to pests and diseases and crops lose their resistance over time, plant breeders are ever developing new varieties.

Arinaitwe says they import new varieties from South America, the epicentre of potatoes. The varieties are then cross-pollinated to get varieties that can adapt to conditions in Uganda. This process is what is termed as conventional. Sometimes, a system called tissue culture is used to multiply the new potato plants, which are then used to generate the seed potato.

Arinaitwe explains the process of cross-pollination as a controlled pollination between varieties a researcher is interested in. It is usually a cross between a variety which may be a landrace (local variety) with another variety which may be imported that has traits a plant breeder is interested in.

After pollination, the breeder collects the potato berries which are germinated in the soil to produce seedlings. These are evaluated for performance in the field and the best ones are selected to produce the seed potato.

Arinaitwe emphasises that each potato seedling produced from this type of pollination is unique. "Each seedling has a potential of becoming its own," he points out.

The breeder, therefore, grows many and looks for the traits he is interested in.

For multiplication of plantlets using tissue culture (growing of plants in test tubes), Arinaitwe says they integrate these approaches though much emphasis is put on tissue culture because of its advantage.

With tissue culture, seedlings are produced at a faster pace in small space. Also, each plant can produce many plantlets. For example, one potato plant gives over 4,000 plants in three months.

According to Arinaitwe, there are several rooms at the main lab where tissue culture is carried out. The rooms are cleaned to be free of any micro-organism. There are machines that keep the plants at a required temperature for growth and machines that pump in air free of any micro-organism.

During the process, cleaning of specimens is done in a separate room, preparation for nutrients to form a medium to grow the plants is also done in another room, transfer of medium into test-tubes is also done in a separate room and there is a growth room at the other end. The medium is a plate where plantlets or cells are placed to germinate into seedlings in which nutrients are placed to support growth.

At Kachwekano, the researchers are making headway on developing varieties resistant to diseases, to the late bright. "We may release a variety that is late bright resistant next year," Arinaitwe says.

Potato planting material (seed potato)

Potato planting material referred to as 'clean seed' are free of pests and diseases. Agriculturists say this is the first step in getting good yields. At KAZARDI, clean seeds are produced in partnership with an association of farmers called the Uganda National Seed Potato Producers Association (UNSPPA). Other farmers with interest in seed potato multiplication are being trained by KAZARDI, with sponsorship from ASERECA and other donors.

Production of quality/clean seed potato that is free of pests and diseases starts at KAZARDI. At the institute, small plantlets are grown in test tubes and later transplanted in clean soil in a screen house to produce small tubers called minitubers.

This technique has of recent been improved with the help of the International Potato Centre, which enabled KAZARDI to build a special screen house that allows the minitubers to be produced without soil. The plantlets from the lab are planted in raised and darkened boxes, whereby roots hang in the dark air space. Nutrients to support plant growth are supplied in form of liquid.

This is known as aeroponic production of clean seed potato, and it produces much more tubers from one plant compared to those grown in soil. It minimises soil-borne diseases and seed degeneration and, hence, increases seed and ware potato productivity.

Like other seed tubers, mini-tubers are allowed two to three months to sprout and then planted in a field at Kalengyere Station, which has suitable conditions for generation of pre-basic seed that is also planted in another season to produce foundation/basic seed.

It is the basic seed that is availed to UNSPPA or its equivalent farmers for growing it once more to produce commercial seed potato that is availed for ware potato farmers.

Potato varieties released from Kazardi

Over 10 potato varieties have been released. They include Victoria, Nakpot1, Nakpot2, Nakpot3, Nakpot4, Nakpot5, Kachpot 1 and Kachpot2 and Rutuku/Otankubuura. Each variety has its advantages and disadvantages.

Victoria is adaptable to both cold and warm areas and has a good texture when boiled or chipped.

Nakpot5 yields better in cool areas, has big oval tubers, yields high and makes good chips.

Kachpot1 has a relatively lower yield compared to Victoria but is the best for making crisps, while Kachpot2 is good for chips. These are the main varieties promoted by KAZARDI.

Farmers embracing new varieties

Juliet Akankwansa, a farmer at Kalandagasi in Kabale, is enthusiastic about the new varieties and agronomy training from KAZARDI. On her plot overlooking Lake Bunyonyi, she carries out potato seed spacing, application of fertilisers and harvesting. She is also aware that after some time, the potatoes lose their ability to resist pests and diseases. "After five cycles, they can also get infected by diseases and pests," she notes.

For planting, Akankwansa buys a sack of potato seeds at sh100,000 from Kachwekano. She plants on a 100 by 100 foot garden. After a season, she harvests between seven and 10 sacks of seeds which she sells to farmers at 120,000 a sack.

Towards the harvesting time, Akankwansa cuts the outer part of the plant, leaving only the seeds (tubers) in the soil. She says this helps the seed (tubers) to harden their skin in the soil. She reveals that potato farming is good business.

Recommending the seed potato from Kachwekano to other farmers, Akankwansa says they are free of diseases unlike those from other areas which might be infected with pests and diseases.

Examining benefits and safety of genetically modified crops: Kayode Olaitan; 31 March 2013



A farmer's son once narrated a story: "My father has been growing maize for the past 13 years with unimpressive yields that are even diminishing in quantity over the years. We could not make ends meet and we are economically threatened; is farming profitable at all?"

In contrast, a farmer from Ghana told a success story of his farming activities:

"I started farming with low-scale cultivation of maize but now,, I have high-quality maize and I even sell maize in large quantities. To me, farming is quite interesting and profitable"

The two contrasting stories somewhat reflect the difference between conventional and modern-day farming of the 21st Century.

The rationale behind the success story of the second farmer is that he planted selected varieties of maize which, in turn, enabled him to have improved yields.

However, the farmer did this via a natural selection process, in which particular seeds with high yields are selected after harvests and re-planted at the beginning of a new planting season.

According to agriculturists, such activities reflect a simple hybridisation process, which entails a simple selection of good seeds for seeds' or plant breeding.

The experts underscore the need for farmers to exploit the use of all crop modification processes to enhance their yields and, in essence, boost the food security of their communities.

They particularly stress the need for the introduction of modern farming technologies in Africa to boost food security, fight hunger and enhance the people's nutrition on the continent.

Some agricultural scientists, however, insist that structured plant breeding remains the most outstanding revolution in agriculture, as it is capable of eradicating hunger and poverty across the world, whose population is expected to peak at 9 billion by 2050.

Nevertheless, plant breeding which relates to the alteration of crops' genes is facing some challenges, particularly those relating to widespread misconceptions about the suitability of Genetically Modified (GM) foods and crops for human consumption.

The critics of GM foods and crops have raised doubts about their safety, stressing that GM crops could even "contaminate" organic and conventional crops being cultivated near them.

For instance, the Catholic Medical Association of Nigeria is at the vanguard of the campaign against the adoption of GM foods in Nigeria.

The association insists that the GM foods could be injurious to the people's health, calling on President Goodluck Jonathan not to give assent to the Bio-Safety Bill.

Another obstacle in efforts to garner public acceptance for GM foods is the widespread speculation that GM crops have been widely rejected across Europe because of some uncertainties regarding their safety for human consumption.

In an apparent reaction to such challenges, Indian Prime Minister Manmohan Singh recently observed that contentious issues regarding GM crops and the use of to boost food security could not be resolved through faith, emotions or fear but via structured debates.

Supporting a scientific approach to unravel the controversies, Singh called for greater investments in utilising science to help establish an inclusive society that aimed at solving major social problems through scientific applications.

His words: “Complex issues, be they GM foods or nuclear energy or exploration of outer space, cannot be settled by faith, emotion and fear but by structured debate, analysis and enlightenment.”

Sharing similar sentiments, an American agronomist, Dr Michael Murray, noted that with modern genetic engineering techniques, changes could be made in all crop cultivation processes.

He, nonetheless, conceded that there were much greater manipulation options in GN technology, including moving genes within or between species.

Irrespective of the criticisms, advocates of bio-fortified foods insist that the adoption of GM technology remains the best option of boosting of food production, in line with current global practices.

The argument in support of genetic engineering of food is that while the world population continues to expand, the lands available for food production remain finite.

The advocates argue that as the world’s population continues to increase, food production ought to correspondingly increase; stressing that the adoption of GM crops will boost the food security of the ever-increasing world population.

However, agriculturists believe that “agriculture is all about is growing different crops and processing different crops without mixing them up”.

They, therefore, stress that in as much as hybridisation ensures improved cultivation patterns and yields, it is somewhat logical for people to strive to acquire an appreciable knowledge of the all plant-breeding processes.

They also stress that efforts should be made to enhance the public acceptance of GM crops and foods, particularly at the grassroots level.

At a recent media training fellowship organised by Biosciences for Farming in Africa (B4FA) in Abuja, experts observed that Nigeria had the potential of boosting its food security if it adopted GM crops.

For instance, Mr Adeolu Adebayo, a genetics lecturer at Ladoké Akintola University, Ogbomosho, said that Nigerians could identify some maize genes that had resistance to fungi pathogens for breeding.

“Then, the inbred lines could be used as parents between six and seven generations and then, we select good ones among the seeds and later crossbreed them to produce the first generation of maize population.

“We continue the breeding and evaluation processes until we get the desired hybrid,” he said.

In her discussion on cocoa breeding, Dr Anna Muiyiwa of the Cocoa Research Institute of Nigeria (CRIN), Ibadan, noted that improved breeding processes had engendered a more viable cultivation of cocoa, resulting in high yields for farmers.

She said that a new variety of cocoa, which could mature in nine months, was under observation, adding that if the project was success, the emerging variety could replace the present variety that required 18 to 24 months to mature.

However, most of the workshop's participants underscored the need for President Jonathan to sign the Bio-Safety Bill into law so as to promote the cultivation GM crops in the country.

However, Mr Rufus Ebegba, a Deputy Director at the Federal Ministry of Environment, gave an assurance that efforts were underway to ensure the signing of the bill into law very soon.

All that same, the participants noted that the ongoing plans to ensure the viability of GM crops in Nigeria notwithstanding, the government ought to demonstrate a strong political will by encouraging the new method of farming.

They, however, stressed that need for the creation of a good quarantine service, while horticultural specifications were made via legislation to control the quality of GM crops that would be cultivated.

Besides, the participants said that the media and other stakeholders should make tangible efforts to publicise the economic and health benefits of GM foods.

They also resolved that the establishment of more crop-breeding institutes such as the International Institute of Tropical Agriculture (IITA) in Ibadan should be encouraged, as part of efforts to promote GM crops' cultivation.

They particularly urged the media to explain the scientific terminologies used in news bulletins so as to enhance the people's understanding of the salient themes of the public awareness campaign on GM crops and foods.

The participants also emphasised the need to train farmers in GM crops' cultivation applications, as part of efforts to boost Nigeria's food security and promote the wellbeing of its citizens.

Maximising Bio-Science Potentials in Africa: Kenneth Azahan; 2 April 2013



With poor yield, disease, burden and other factors militating against farming activity, KENNETH AZAHAN suggests the adoption of biosciences by African countries to boost crop yield and improve productivity.

As the population of Africa is projected to rise to an exponential level (over one billion) by 2050, the need to adopt a quick fix approach in the continent's food security drive has become imperative. Interestingly, maximising biosciences could promote a better understanding of the available options for improving agricultural productivity in this part of the world.

It is important for African countries to leverage on the opportunities derivable from biosciences with a view to improving agricultural yield that will invariably boost the profit margins of farmers, who are largely small-holder farmers. It is pertinent to point out that action equal out come. For instance, the current poor state of agriculture in most countries on the continent is a clear manifestation of neglect of the sector. Promoting maximum application of biosciences in agriculture would provide a soothing relief to the excruciating pains being experienced by farmers. At the moment, most farmers are recording poor yield, disease burden and a host of other factors that make business miserable for them.

Traditionally, in most parts of Africa, farmers rely on the rain-fed system of farming, which is becoming unreliable because of the ever-changing weather patterns. This makes the use of drought-resistant seeds very crucial to food security as well as making farming more profitable. In any case, bioscience holds the key to unlocking the full potentials of farmers in the continent.

In Nigeria, where it is said that over 50 million of her population are engaged in various forms of agricultural activities, farmers lack inputs to grow their businesses. This has left the nation plagued with endemic poverty. As a consequence, the situation has made farming very unattractive to many.

While science has made it possible to have a wide variety of seedlings that encourage all year planting, Nigeria, and Africa in general, is yet to adequately feel the benefits of this scientific feat as most farmers on the continent today still rely on their traditional seedlings that often time do not give good commercial yield as well as withstand diseases.

The good news, however, is that some Nigerian scientists and government agencies such as the National Institute of Oil Palm Research (NIFOR) have shown interest and indeed declared for the benefits that are inherent in the application of bioscience, especially what it holds for the Nigerian agricultural sector. Through bioscience, developing improved varieties such as date palm has become a reality. Other agencies have also developed other improved varieties of soya beans, maize, cocoa, and sorghum amongst others which are drought and disease resistant and have over the years grown and yielded abundantly under hostile conditions in America and other countries of the world.

Nigeria's agricultural potentials have not been realised, despite attempts by successive governments to restore the country's lost glory in agriculture. In this vein, pundits are of the view that technology, if fully utilised or made affordable to farmers by the government as well as the governments of other African countries, will solve the problem of food crisis. It will also have a multiplier effect of creating job opportunities for many, with the issue of unemployment being one of the Nigeria's most biting social problems.

As a demonstration of commitment in countries where there is full utilisation of technology in agriculture, their governments play a vital role in the form of subsidising farm inputs. Unfortunately, this kind of political will is grossly absent in Nigeria and other parts of the world where farmers largely do not have access to modern inputs because they are completely unaffordable to them. This is largely due to neglect of the sector by various governments in Africa and ignorance or lack of zeal for some farmers to transit from their traditional to modern or mechanised agriculture. The end effect has been low productivity and crop harvest which is invariably unable to stand up to the competition in the international market. Therefore, farmers in Africa largely do not make much profit as those in the developed world.

The Nigerian agricultural sector has suffered from insufficient funding. Many are not at ease with the stern reality that the sector has a paltry two percent bank lending compared to six percent in Kenya. Other mind-boggling issues include excessive risk, complex credit assessment procedures and high transaction costs amongst other debilitating issues that inhibit agricultural development.

However, there is some ray of hope for Nigeria, given the renewed policy direction of the present administration and the commitment of the country's Minister of Agriculture and Rural Development, Dr. Akinwumi Adesina, a renowned agricultural economist and academic, one-time senior scientist for the Rockefeller Foundation.

The minister has repeatedly stated his commitment to changing agriculture from the perceived view of being a development to a business. "The key for successful reform is to turn agriculture into a business that makes money, with a focus on investment, as opposed to aid and development. We need to move towards focusing on particular value chains in which we have a traditional comparative advantage. Our resolve is strong as ever that we will transform Nigeria's agriculture.

Together, we can make Nigeria a food breadbasket for Africa and the world," the minister affirmed.

The poor financial status of most farmers in the country re-enforces the need for government and other stakeholders to provide aid to farmers with a view to accessing improved varieties of seedlings. Farmers can also better their lot by forming corporative as a platform to engage in self financing, access soft loans in addition to other forms of facilities they can leverage on to improve their businesses. Meanwhile, governments at all levels have to play a leading role in ensuring that only genuine seedlings are on offer in the market.

Besides, the media have a role to play in holding government accountable, just as the agricultural ministry, its agencies as well as Nigerians Farmers Association amongst others must rise up to the

challenge of getting presidential assent to the bioscience safety bill passed by the National Assembly.

It is common knowledge that some interests are opposed to biosciences for reasons they may have advanced. However, the Nigerian government and her people must know that the benefits derivable from the passage of this bill clearly outweigh whatever concerns that may have been raised by the opponents of biosciences.

The Nigerian government and farmers, now conscious of the benefits of biosciences, should jump at this opportunity without hesitation as this innovation presents an excellent escape route out of the poor state of agriculture in the country. This is more so now that the world is embracing the era of GM seeds, which gives farmers the guarantee for a bumper harvest at each harvest season. This is indeed the most reliable avenue to ensure food security in Nigeria and agricultural advancement that will invariably lead to wealth creation.

Stakeholders brainstorm over drought tolerant maize: Onche Odeh: 9th April 2013



Researchers, policy makers and other stakeholders, working under the Drought Tolerant Maize for Africa (DTMA) project, recently met in Ibadan to develop work plans towards the rapid dissemination and adoption of drought tolerant maize.

The researchers from Mali, Benin and Ghana joined their Nigerian counterparts on the campus of the International Institute of Tropical Agriculture (IITA), in a meeting that ended at weekend with a resolution to make a difference in food security using the new varieties of maize.

Addressing participants at this year's annual planning meeting, Dr Tsedeke Abate, Coordinator of the DTMA Project, reminded stakeholders that the project provided a platform for researchers to demonstrate to donors and policy makers in Africa the benefits of research.

"This is an opportunity for us to show our policy makers that with the right kind of approach, we can make a difference," Dr Abate added.

According to him, increasing the cultivation of drought-tolerant maize varieties in Africa will bring the necessary transformation and the needed boost for maize production in the continent.

Other drivers of adoption of drought tolerant varieties, he noted, include increasing the participation of women in maize projects and also the creation of new/strong partnerships.

Dr Abate said that the focus on women was strategic considering their invaluable contributions to agricultural development in Africa.

Dr Ylva Hillbur, IITA Deputy Director General (Research), commended the researchers for their efforts in developing and dissemination of DT maize.

She noted that the DTMA project is important to Africa as it is addressing one of the most important constraints (drought) to maize production in the continent.

Launched in 2007, the DTMA project provides insurance against the risks of maize farming, using conventional breeding to develop and disseminate varieties that can provide a decent harvest under reduced rainfall.

Dr Baffour Badu-Apraku, IITA Breeder who is also the West Africa Coordinator of the DTMA project said that the project had so far recorded impressive milestones, mostly through the development of new varieties. For instance, between 2007 and 2010, Nigeria released 18 drought tolerant maize varieties while Ghana released 13 under the same period.

Dr Badu-Apraku is hopeful that regional governments would support efforts to make these varieties available to farmers.

To effectively make the varieties available to more farmers, they proposed the strengthening of community seed producers to complement efforts of seed companies in the region.

“We cannot but bring in the community seed producers if we want more farmers to have access and adopt drought tolerant maize,” the Acting Director General, Nigeria Seed Council, Dr Olatokun Olusegun said.

Implemented by CIMMYT, IITA and national partners in 13 African countries of sub Saharan Africa; the third phase of the DTMA project will end in 2016.

April 9 2013

GM crops or not? Farmers undecided as the debate on Biotech Bill heats up: Lominda Afedraru; 10 April 2013



MPs and other stakeholders at a Bt cotton field trial in Kasese. Cotton is one of the crops in which biotechnology mechanisms have been used to deal with the problem of pests. Photo by Lominda Afedraru

In the face of most local varieties losing their productivity and a number facing extinction, the appeal of better performing GMOs is obvious. But concerns and controversy is making the choice uncertain for the farmers

As the public debate continues about the Biotechnology and Biosafety Bill, which is before Parliament, representatives of farmers' groups are in dilemma over which option to take. Some see adopting improved varieties over the traditional ones as a better choice, while others are uncomfortable with the idea of adding a clause on labelling genetically modified crops as it will drive consumers from purchasing their products.

Some experts feel the bill needs to be passed into law but admit the draft bill needs to be improved upon because it has loopholes.

Genes and patents

Dr Chris Bakuneeta of Makerere University, while presenting a paper, "What are GMOs?" to members of Southern Africa Small Scale Farmers' Forum-Uganda (ESAFF), said, "There is no problem for scientists to improve crops, animal and poultry using biotechnology but the challenge is, is it going to have negative effects on human health or not?"

He added if the bill is to contain that component of GMOs, then it should be owned solely by Ugandans including the farmers. This is because multinational companies want to control the patents of these products by owning them.

"These companies are free to give us genes to improve our crops but should not say Uganda's cassava, banana, sweet potatoes, maize and rice varieties belong to them by patenting it for the farmers to keep buying the seeds," he asserted.

But Ms Eleanor Kambuga, a Luweero-based farmer, said convincing farmers not to grow improved varieties is a waste of time because it is becoming difficult to access seeds of local varieties as their yield is very low.

“These discussions are good but traditional seeds are no longer seen in the market especially for maize, rice and ground nuts. Others may be vegetatively propagated crops like banana and coffee where propagation is done using traditional methods,” she observed.

Farmers are interested in income generation to improve their livelihoods and so if the improved crops are high yielding, it will be hard not to grow them. But she has a problem with labelling GMO products saying it will drive away consumers from purchasing these products and the farmer will be the loser.

Royalty-free

Dr Giregon Olupot, also from Makerere University, said the bill lacks a number of factors in favour of the farmer. A case in point is the penalties described in some clauses, which he described as minimal to those involved in the GM product development.

The regional coordinator for the Bio-safety System programme in Uganda, Dr Thereza Sengoba said Monsanto, a company engaged in producing and providing a number of genes for scientists to improve these crops, is interested in important global crops like soy bean, cotton and maize among others.

“Everyone is aware of the high yield potential of GMOs and returns in terms of income. In the case of Uganda where research work is going on in cotton and maize where Monsanto has interest, there is an agreement to get these genes royalty-free meaning after release, farmers will be able to acquire the seeds at the usual price like any other seed purchased as public good,” she explained.

Sengoba added though Monsanto has interests in GMOs, it is also interested in the traditional staples consumed in Uganda, so the company will not override the national interest. On the penalties, she agreed it has to be discussed and reviewed for a consensus.

As the debate on the biotechnology and biosafety continues, opinion remains divided into for and against. For the farmers, it is likely to remain a dilemma of choice of which is better suited to meet their needs.

Director advises Nigerian breeders to produce hybrid seeds: Salimat Garba; 10 April 2013



NAN-H-99

Breeders

Abuja, April 10, 2013 (NAN) Mr Olusegun Olatokun, Coordinating Director, National Agricultural Seeds Council (NASC), has advised Nigerian breeders to produce more of hybrid seeds instead of focusing on the Open Pollinated Varieties (OPVs).

Olatokun told the News Agency of Nigeria (NAN) in Abuja on Wednesday that hybrid seeds would help the farmers to produce more.

He said that they would also make Nigerian agriculture to become a business venture.

NAN reports that hybrid seeds are derived through seeds hybridisation, which means the process of combining different varieties of seeds organisms to produce a better crop.

Hybrid seeds are usually uniform in appearance and behaviour; they enable farmer to treat and harvest crop at the same time.

These types of seeds have marketing advantages when sold to buyers with strict quality standards.

They have vigour, which makes them more competitive with weeds; they are high yielding and have improved grain quality.

A particular hybrid could be selected for specific pest and disease-resistant or drought-tolerant.

NAN further reports that OPVs are pollinated by natural mechanisms like insects, birds or wind.

They are produced through closed pollination, which is one of the many types of self-pollination.

Olatokun advised that Nigerian breeders could get hybrid seeds from their counterparts in Kenya, India or South Africa.

He said that they could combine its inbred line with Nigeria's local varieties to ensure that quality seeds were produced.

Inbred line is the process of reproducing through the mating of parent crops that are closely-related genetically.

He observed that Nigerian breeders did better in the past years than what they were doing now.

Olatokun said: "Breeders should be less theoretical and be more practical.

"As at 30 years ago, breeders came up with hybrid maize that would yield six tonnes per hectare but nowadays we are still struggling with 2.5 tonnes per hectare."

Noting that the standard of production of crop is dropping, Olatokun pointed out that, "most breeders are producing Open Pollinated Varieties (OPVs) instead of hybrid seeds".

The coordinating director expressed regrets that the drop in standard of production of crop was not improving agricultural activities in the country.

"Nigerian breeders should compete with breeders across the world so that we can stop spending so much money on importation of hybrid seeds."

Olatokun encouraged breeders to be committed in their researches, adding that a good variety of seeds entails good research.

He urged breeders and researchers to produce quality seeds so that farmers within and outside the country would patronise them.

"It is the farmers, who determine what happens to your products as a breeder," he said. (NAN)

SOG/MOL/NO

GMOs good for Africa's development, says Harvard don: Francis Kagolo; 21 April 2013



SUNDAY VISION - Biotechnology and genetic engineering have the potential to do for agriculture what mobile technology has done for the communications sector in Africa, a renowned Harvard University scholar, Prof. Calestous Juma, has said.

Prof. Juma, who was in the country for a meeting with President Yoweri Museveni, advocated for the adoption of Genetically Modified Organisms (GMOs) saying they would boost food and income security.

He however, cautioned that it would be detrimental to adopt GMOs without clear flexible and supportive biotechnology regulations, asking Parliament to pass the Biotechnology Bill.

He was speaking at a public lecture organised by the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) at the Kampala Golf Course Hotel.

Prof. Juma has authored several books on Africa's development, including *The New Harvest*, which is arguably today's most authoritative scholarly work on agriculture in Africa.

At the public lecture he emphasised the role of technology in transforming livelihoods, insisting that if Africa didn't embrace GMOs in agriculture, the problems like climate change, pests and diseases that have dogged the sector over the years would devour production to shocking levels.

He cited the Banana bacterial wilt which has devastated banana growers in Uganda, saying the problem would be deterred if farmers planted GMO banana varieties that are resistant to the wilt.

He decried the phenomenon of resisting new technologies, saying it won't help Africa to develop. On the safety of GMOs, he likened the current debate to the rumours that were circulated during the early days of mobile technology that the phones would cause brain cancer.

He said instead of focusing on rumours that discredit GMOs, it was prudent for governments to empower institutions to effectively check the safety standards of each product introduced on the market.

He said biotechnology had caused a 24% increase in cotton yield per acre and a 50% growth in cotton profit among US smallholder farmers between 2006 and 2008. It raised consumption expenditure by 18% during the period.

He cited another report which said GMO crops that are pest-resistant had suppressed pests even beyond gardens where they were planted to assist farmers who don't grow GMOs.

"Biotechnology and in particular GMOs are not per se more risky than conventional plant breeding," he asserted.

Prof. Zerubabel Nyiira, state minister for agriculture, said while science and technology were the tickets to economic development, genetic engineering would spur food and nutritional security.

Dr. Andrew Kiggundu of the National Agricultural Organisation (NARO), said they had began using biotechnology to produce drought, pests and disease resistant crop varieties.

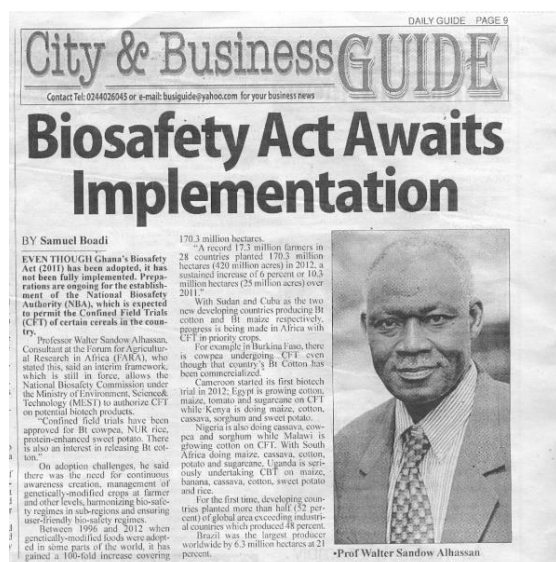
He explained that genetic engineering would make agriculture more attractive and reduce the number of youth running away from rural areas.

Vision Group boss Robert Kabushenga who was the master of ceremonies expressed discontent over the delay to pass the Biotechnology Bill yet parliament gets time to debate minor issues like miniskirts.

Biosafety Act Awaits Implementation: Samuel Boadi; 29 April 2013

DailyGuide

Ghana's Favorite Newspaper



Even though Ghana's Biosafety Act (2011) has been adopted, it has not been fully implemented. Preparations are ongoing for the establishment of the National Biosafety Authority (NBA), which is expected to permit the Confined Field Trials (CFT) of certain cereals in the country.

Professor Walter Sandow Alhassan, Consultant at the Forum for Agricultural Research in Africa (FARA), who stated this, said an interim framework, which is still in force, allows the National Biosafety Commission under the Ministry of Environment, Science & Technology (MEST) to authorize CFT on potential biotech products.

'Confined field trials have been approved for Bt cowpea, NUR rice, protein-enhanced sweet potato. There is also an interest in releasing Bt cotton.'

On adoption challenges, he said there was the need for continuous awareness creation, management of genetically-modified crops at farmer and other levels, harmonizing bio-safety regimes in sub-regions and ensuring user-friendly bio-safety regimes.

Between 1996 and 2012 when genetically-modified foods were adopted in some parts of the world, it has gained a 100-fold increase covering 170.3 million hectares.

'A record 17.3 million farmers in 28 countries planted 170.3 million hectares (420 million acres) in 2012, a sustained increase of 6 percent or 10.3 million hectares (25 million acres) over 2011.'

With Sudan and Cuba as the two new developing countries producing Bt cotton and Bt maize respectively, progress is being made in Africa with CFT in priority crops.

For example in Burkina Faso, there is cowpea undergoing CFT even though that country's Bt Cotton has been commercialized.

Cameroon started its first biotech trial in 2012; Egypt is growing cotton, maize, tomato and sugarcane on CFT while Kenya is doing maize, cotton, cassava, sorghum and sweet potato.

Nigeria is also doing cassava, cowpea and sorghum while Malawi is growing cotton on CFT. With South Africa doing maize, cassava, cotton, potato and sugarcane, Uganda is seriously undertaking CBT on maize, banana, cassava, cotton, sweet potato and rice.

For the first time, developing countries planted more than half (52 percent) of global area exceeding industrial countries which produced 48 percent.

Brazil was the largest producer worldwide by 6.3 million hectares at 21 percent.

Uganda will definitely grow GM, why waste time? By William Odinga Balikuddembe; 30 April 2013



Uganda's Genetic Modification (GM) story is some version of teenage courtship. When the boy winks, the girl, a virgin in this case, looks away. She is simply naïve, no idea when or how to say yes or no.

GM is one of the hugest tests of our time. Yet this is only about "time" – say YES and you are in. Say NO and stay on the waiting list. Fortunately the GM bus will not stop doing the rounds. When you finally make up your mind you board – but be reminded that "for latecomers, the bones."

Through GM, scientists change the genes of an organism such as a plant or animal, using modern biotechnology, to make useful products. Biotechnology, as defined by the UN Convention on Biological Diversity, is "any technological application that uses biological systems, living organisms or derivatives thereof, to make or modify products or processes for specific use." The main focus of this article is agricultural biotechnology.

My first encounter with this subject was 10 years ago when, on top of reading from the GM lobby and the anti GM groups, I interviewed Mr. Peter Chase who then was the US Department of State's special negotiator for biotechnology.

A young environment reporter then, I was, like many others in the civil society, suspicious of the US intentions in promoting GM. There were fears of the impact of GM on human health, the environment, and seed dependence. It was argued that companies like Monsanto would monopolize the seed industry and make poor farmers dependent on bought seed – in essence the multinationals would be in control of global agriculture.

While the European Union (EU), the chief campaigner against GM, would in 2010 publish that it had found no environmental or health problems with GM, I had learned from Chase that although multinationals were investing in research and development in this area, for profits, biotechnology was not their monopoly. This is a "technology" that humans around the world can explore in the face of agricultural challenges including pests, diseases, droughts and inferior yields. The multinationals have no ownership over the technology. They have rights to what they produce with the technology and if you don't want them in your country you can stop them.

The Ugandan Parliament has been presented with the National Biotechnology and Biosafety Bill, 2012. This, if passed, will regulate the use and management of GM in Uganda. Again, GM is getting the stick, especially through the media, on the same arguments previously stated. Many journalists, perhaps in their quest to "balance the story" have continued to quote people with no substantial knowledge about GM, effectively misleading some sections of the public.

It is only prudent for us to support the regulation of GM and invest in our scientists to enable them develop essential bio products which we too can patent and sell to others. It is important to separate the technology from Monsanto, Syngenta or Dupont.

Instead of burying our heads in the sand, or behaving like goats which drag their feet while they are being taken to graze, let us open our minds and think of the best ways to benefit from this technology.

Confined trials of GM bananas are on at the National Agricultural Research Laboratories (NARL) in Kawanda and imagine what difference it will make when they develop varieties that are resistant to banana bacterial wilt disease. This is a disease, for example, that has wiped out entire plantations of *Kayinja* and made *mwenge bigere* (banana wine) extremely scarce and expensive.

There are GM trials in rice, maize, potatoes and cotton at different research centres in Uganda. The aim is to produce varieties that are more nutritious, tolerant to droughts, and resistant to insects and diseases.

Trends show that since 1996 when GM was commercialized in the US the adoption of the technology has only been growing because people see the benefits.

Last year developing countries even surpassed developed countries in growing GM crops. The Global Status of Commercialized Biotechnology/GM 2012 report indicates that developing countries had a share of 52%.

Globally, over 170m hectares of GM were grown in 2012, an increase of 6% from the previous year. By 1997 GM only covered less than 20m hectares.

While Uganda still debates whether to regulate GM, South Africa, which exports agricultural produce into Uganda through its supermarkets, is number five among the top five growers of GM in the developing world. China, India, Brazil and Argentina lead respectively.

The anti GM group is not only fighting a losing battle but also delaying Uganda's opportunities to reap from this technology. The battle was won 30 years ago when science tested the technology and found it working. When something is good you can't stop people from using it. The farmer continuing to use hybrid seed today has been convinced by the yields – nothing else. Many technologies have been questioned and in the end we have found ourselves basking in them.

When mobile phones were introduced we claimed they caused cancer and impotence. Now some people carry on them more than two sets.

Sir Prof. Robert Edward's *In vitro* fertilization (IVF) first baby Louise Brown was a controversial entrant into our world in 1978. Over five million babies worldwide have since been produced with IVF. Edwards died on April 10, 2013, and it does not seem he has ever been part of a controversial history – not many even noticed his passing.

For GM, like Sir Prof. Brian Heap, the Programme leader of Biosciences for Farming in Africa (B4FA) said recently: "Those who will be around 20 years from now will look back and ask themselves 'what was all the fuss about?'"

Uganda missed the "green revolution" which occurred between the 1940s and 1970s and transformed several economies including Mexico, India and the Philippines through improved agriculture. As we listen to GM critics, another opportunity is passing under our armpits. South Africa, Egypt, Burkina Faso, Sudan are already growing GM crops. When we finally open our eyes we shall understand why we have always been among the last – Fear!

The writer is the Chairman, Uganda Science Journalists Association (USJA)

New Cassava Varieties Give Farmers Hope: Christopher Bendana; 4 May 2013

THE New Vision
UGANDA'S LEADING WEBSITE

NEWS FEATURE

SATURDAY VISION, Saturday May 4, 2013 7

New cassava varieties give farmers hope

BY CHRISTOPHER BENDANA

VANGI Ekirapa, a farmer in Tororo, has for long been struggling to increase yields in her cassava garden. But with the introduction of NASE 14, a hybrid cassava variety, Ekirapa has a reason to smile because she is able to harvest about 12kg of cassava from each stem. NASE 14 was developed at the National Crop Resources Research Institute (NaCRRI), Namulonge.

Cassava production in Uganda is largely affected by Cassava Mosaic Disease (CMD). Cassava mosaic affects mainly the leaves, which turn yellow consequently affecting the photosynthesis of the plant. This leads to poor yields. CMD affects the roots turning them brown.

Experts breed varieties

Currently, geneticists and plant breeders are breeding new cassava varieties. The new variety is a cross between a breeder's two desired varieties each with traits a breeder is looking for. The traits include drought and water resistance, pests and diseases resistance and high yielding traits.

For pollination to take place the female part of the cassava is covered to stop fertilization by its male counterpart of the same variety. The female is monitored before it opens up for pollination. The breeder then introduces a desired male cassava variety, which he pollinates manually in a process called controlled pollination.

Controlled pollination has been going on for many years at the National Crop Resources Research Institute (NaCRRI), Namulonge. So far, 19 new varieties from NASE have been bred.

Why is breeding vital?

According to William Esuma, a research assistant at NaCRRI, cassava breeding is aimed at solving the problem of low yields, pests and diseases by introducing improved varieties, especially those from the International Centre for Tropical Agriculture (IITA).

"We aim at increasing cassava yields, varieties that are resistant to pests and diseases and are high in nutrient composition, especially proteins and vitamin A," Esuma explains.

According to the World



A farmer showing a cassava plant destroyed by pests and diseases. Cassava production is largely affected by Cassava Mosaic

Health Organisation, lack of vitamin A, especially in children is the major cause of blindness across the globe.

"We also want to get cassava varieties that mature early and have a long life span. This will increase market opportunities for farmers," he adds.

How it is done

The breeding process involves selection of a desired cassava variety that has one or more of the desired traits like resistance to drought, pests and diseases and high yields. It is then pollinated with another that has other desired traits.

Anthony Pariyo, a breeder

at NaCRRI, says the local landraces, which they have been improving include Kakwele and Bamunanika. They are crossed with varieties like TME14 from IITA to create the desired

breeds that are high yielding and resistant to pests and diseases. Cassava breeders say the local breeds are famous for their root quality, while the TME 14 is well-known for its high yields, disease and pests resistance.

The breeding process involves four stages, which include: evaluation of the seed produced between landraces and an imported variety. Cloning, where the stem of the new variety is cut into 10 pieces, planted and evaluated for

uniformity in the plants.

Then there are preliminary field trials and on farm evaluations in different locations in the country.

During the trials, breeders look for strong and weak points caused by the difference in environment and the role of heterozygous in the breeding of cassava. It is common for one cassava clone to produce 10 different offsprings/varieties.

Pariyo says the institute has so far released 19 varieties, which are tolerant to Cassava Mosaic, but susceptible to CMD.

"Our focus now is on CMD. We are carrying out field trials and the results

are promising. In the next three years, we are likely to get a resistant variety," he notes.

Commenting on concerns that the landraces face extinction, Pariyo says all landraces have been kept in the germplasm. A germplasm is a seed bank where seeds are kept for future use.

"A breeder's biggest asset is having a diverse germplasm," he says.

Farmers tipped

Experts say there are a number of interventions that farmers can put in practice. First, planting clean seedlings would increase yields by 13% and improving soil fertility would push it by 17%.

Others are control of pests and diseases, which improves yields by 16%, control of soil erosion by 11% and weeding by 9%. They also say intrinsic yield potential where the role of the breeder is paramount accounts for 19%.

Pariyo says with good management practices, farmers can harvest between 30-40 tons per hectare against the current national average of 14 tons as reported by the Food and Agricultural Organisation.

He says about 60% of farmers are now planting improved cassava varieties.

Pariyo recommends planting seedlings one metre apart for optimum performance.

Cassava takes between 10-12 months to mature. According to ASARECA, an agricultural research association in Eastern and Central Africa, about 80% of Ugandans depend on cassava for their livelihood. Cassava is the second staple food after maize in Africa.

IN NUMBERS

19 Types

The number of cassava varieties at Namulonge

12kg

The amount of cassava harvested from each stem

60%

Farmers planting improved varieties



Breeding new varieties helps increase yields and disease resistant cassava



Experts say control of pests increases cassava yields by 16%

Fear of the unknown a persistent challenge for biotechnology: Samuel Hinneh; 6 May 2013



The fear that biotechnology crops or genetic modified crops pose adverse health effects without scientific evidence remains a big challenge to adoption and acceptance of the technology which has high ability to addressing global food insecurity.

The top challenge now in Europe is the fear of the unknown and that is really affecting everything, so the regulators and politicians are afraid, however, not so much of consumers to be honest, says Carel du MarchieSarvaas, Director of Green Biotechnology Europe at EuropaBio.

'This is affecting the food industry, so food manufacturers, producers are all afraid and is driven by news stories which are not really true' he said, in an interview.

EuropaBio represents all the big producers of biotech seeds around the world. There are same types of the organisation around the world, in Asia, Latin America. In Africa, the organisation works with different units and depends on the market and agriculture sizes, some of the focus countries in Africa include Nigeria, Kenya, Uganda, Egypt and South Africa.

'The untrue stories are given lots of publicity and have been allowed to live for ten to 15 years mainly due to the fact that the issue of biotechnology is more technical so people find it difficult to judge what is true or not true', Mr. Sarvaas emphasised.

According to him, EuropaBio have spent a lot time educating people on what the technology is all about, as well as the benefits in the media and campaigns geared towards creating a better understanding of the technology.

In Africa biotechnology is just beginning and there is little knowledge concerning the pros and cons. As a result some non-governmental organisations have embarked on negative campaigns about the technology without providing balanced information on the technology and the media also gives it headlines.

'I would say it is the fear of the unknown because the technology is new and in some countries the capacity to understand the technology and also to appreciate its benefits and also to understand its dangers have not been well elucidated that is why there is a controversy', says Richard Akromah, Dean, Faculty of Agriculture of the Kwame Nkrumah University of Science and Technology in Ghana.

'Some NGOs such as Friends of Earth and opponents of the technology are all always giving one side (disadvantages) of the story without balancing it with the other side (advantages)', he said.

Carel Sarvaas noted that in Africa the worse negative influence of biotechnology is on media reportage; the Seralini report (a French professor who consistently attacked GMOs to be harmful but was untrue) got lots of media headlines because the media do not understand the science or too scared of the science. 'Hence, the media report untrue stories and that have had negative effects in Africa. The Kenya government admits it was affected the report, and same can be said in Asia, and Latin America'.

The new Global Status of Commercialized Biotechnology crops 2012 report has found that the African continent is making giant strides in cultivation of biotechnology crops. Sudan joined South Africa, Burkina Faso and Egypt, to bring the total number of African biotechnology countries to four.

Another obstacle is the European regulatory system which is complex; thereby getting a product unto the market is very complicated and expensive. 'As a result multibillion companies are even questioning if it is worth all the time and money to invest in a biotech product', Mr. Sarvaas says.

EuropaBio collaborates with the African Seeds Association, which is actively involved in biotech programmes in Africa. One of the projects deals with creating good regulatory frameworks in Africa.

'One of the problems is putting in place good regulatory framework which takes a lot of time and money as well as technical know-how. Even in Europe, we don't do it at the national level, but we do it with 27 member states of Europe.

'So one of the things we are trying to promote in Africa is that there is pooling of resources from different countries so for example we look at the approval of seeds, maybe 15 countries together or all of Africa so that there is regulatory convergence'', he stated.

He is optimistic that agriculture in Africa is becoming much more efficient. 'Sub Saharan Africa with the right technology and logistics can become the bread basket of the world, the region has the right land and water'.

However, the problem is changing the culture of African farmers who are mostly seed keepers, so introducing a new approach where they have to buy new seeds every year is a new tradition to African farmers especially smallholder farmers.

'Smallholder farmers are not used to this, the problem is how to keep many labourers on the land, this calls for creation of structures of lands that are both cooperative and individual in nature'', Mr. Sarvaas adds.

The Starvation of Transformation: Hassana Salisu Abubakar; 7 May 2013



Broadcast in Hausa – translation by the author

Nigeria was agricultural giant in before the oil boom on the 1960s. Agriculture was Nigeria's major source of revenue with reference to the groundnut pyramids, cotton farming and other cash crops. In an ill-fated twist of fortune, the discovery of oil diverted government's attention from that direction and the beginning of an unpleasant story of the agricultural sector began.

Agricultural policies aimed at providing adequate food for the citizens were enrolled. In 1976 on assumption to office, Obasanjo introduced Operation Feed the Nation (OFN) while Shagari introduced the Green Revolution programme to foster the use of mechanical machinery in farming. This favoured large scale farmers in order to produce mass food products.

This was at the time when the nation's population was not near to what we have today. Through to the present administration of Goodluck Jonathan, so much have been put in terms of policy formulation in order to produce food for the people.

However, agricultural mechanization, use of fertilizers, insecticides and pesticides has been the major means of agricultural production.

Now biotechnology has been introduced in Africa and Nigerians are asking for its application so that farmers can produce enough food for the big population. On the other hand, President Jonathan has put the Agricultural Transformation Agenda (ATA), which is aimed at ensuring food security for the nation through mass production of food by use of modern means of farming.

This time around, government has put in place viral institutions in place towards ensuring that Agriculture regained its place of pride in the provision of food for the ever-growing population. These include research institutes across the nation as well as the National Biotechnology Development Agency, NABDA.

In other to regulate the application of biotechnology, The Nigeria National Biosafety framework was developed and the Biosafety Bill was passed by the National Assembly and is still awaiting Presidential assent.

These research institutes have developed certain improved variety of crops in collaboration with the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT). The varieties include millet (seven varieties), wheat, (eight varieties in collaboration with the International Centre for Maize and

Wheat (CIMMYT), tomato (7 fresh market, nine processing and four heat tolerant varieties), onions, pepper, grape vine and kenaf varieties.

Prof. Sir Brian Heap, Project Leader of B4FA said Agricultural Research cries foul concerning what it deems as insufficient government support following years of research despite the claims by the federal government that it is in support of transformation in the agricultural sector.

Dr. Moses Adebayo of LAUTECH expressed belief that if the federal government assents to the biotech bill, it would provide a framework to ensure the development and use of Genetically Modified Organisms (GMOs) which do not negatively affect plants, animals and human health or the environment.

That Nigeria cannot maximise the economic benefits associated with the practise of modern biotechnology without a biosafety law, according to Mr. Rufus Ebegba, Deputy Director, Bio-safety Office, Ministry of Environment, means that Mr. President should hasten the assenting to the Bill.

Nigerians stand the risk of losing the benefits of biotechnology in the absence of biosafety law. “The absence of a law will mean that Nigerian scientists cannot research and bring out their products for use in Nigeria,” Ebegba said.

The Senate passed the Biosafety Bill since June 1, 2011. Mr. President should dust out the bill and signed it into law for the overall benefit of the people of Nigeria.

Is Uganda missing out on the global market for biotech crops? Lominda Afedraru; 15 May 2013



In Summary

For the first time, developing countries have surpassed industrialised countries in growing GM crops as their commercial value keeps increasing. While there are trials in Uganda, there is no mechanism under which the crops can be commercialised.

If Ugandan farmers are to benefit from the global commercial value of improved crops grown using biotechnology in different parts of the world, this could be the right time. The 2012 figures show that these crops have been rated at a market value of \$14.8b (Shs38.3t) up from \$13.3b (Shs34.5t) in 2011 and a global seed value of \$15b (Shs38.8b). This is according to an annual report by the International Service for the Acquisition of Agri-Biotech Applications (ISAAA), which also indicates that improved crops are being grown on a total of 170.3 million hectares of land.

Being adopted

Of the 28 countries that have adopted GM crops, 20 are from the developing world with Brazil in the lead. And while these 28 countries planted commercialised GM crops, an additional 31 countries have granted regulatory approval for growing the crops for import, food and feed.

In Africa, Sudan became the fourth country to plant GM cotton after South Africa, Burkina Faso and Egypt. For the first time, developing countries grew more biotech crops in 2012 than the industrialised countries. They accounted for 52 per cent of the global total. This is contrary to the prediction of critics, who prior to commercialisation in 1996, declared that GM crop would only be grown in industrial countries

In Africa, the technology is slowly being adopted by countries such as Uganda, Kenya, Malawi, Nigeria and Cameroon. In these, there are ongoing field trials in different crops, ranging from banana, cassava, cotton, maize, rice to cowpea, tomato, sweet potato, sorghum and sugarcane, among others.

Increasing demand

In Uganda, scientists from National Agricultural Research Organisation (Naro) are conducting field trials on banana, cassava, cotton, maize, rice and sweet potatoes to address food insecurity, pests, diseases and drought.

Dr Yonna Baguma, a senior researcher at Naro, said there is an increasing fear among Ugandan scientists working on improved varieties about the increasing demand of food in both national and international markets. Therefore, the need for farmers to grow more of the improved varieties to meet the demand.

Quoting statistics from Peer Review Survey, carried out in 2010, on the positive impact of GM crops, Dr Baguma said the number of food sellers in Uganda is less than the buyers simply because most farmers are engaged in growing traditional varieties for home consumption rather than for commercial purposes.

The statistics indicate that only 12 per cent of rural household farmers are significant food sellers in both the national and regional market compared to the buyers, who comprise 66 per cent.

Farmers' incomes

Dr Arthur Tugume, a plant virologist at Makerere University, while providing an overview of the status of biotech crops in a recent presentation, said there is a growing importance for farmers to adopt this technology in order to feed a growing population.

But in the case of Uganda, he added, farmers may be in dilemma on whether to adopt genetically modified (GM) crops due to increased negative activism yet it would lead to improved farmers' incomes.

Some of the countries that have adopted biotechnology include US, which is leading by producing 69.5 million hectares planted with maize, soybean, cotton, canola, sugar beet, alfalfa, papaya and squash. In the same year, there is Canada, which grew a record 8.4 million hectares of GM canola.

Brazil, which is majoring in soy bean, maize and cotton on 36.6 million hectares, followed by Argentina and India covering 23.9 million hectares and 10.8 million hectares for soy bean, maize and while Canada and China are producing canola, maize, soy beans, sugar beet, cotton, papaya, poplar tomato and sweet pepper on 11.6 million hectares and 4 million hectares respectively.

Compelling testimony

The economic benefits for developing countries were at over \$10b in 2011 exceeding the industrialised countries that attained \$9.6b in economic gain.

A case in point is most countries involved in growing Bt cotton, which increased their income significantly by up to \$250 (almost Shs650,000) per hectare and halved the number of insecticide sprays, therefore reducing exposure to pesticides.

The statistics states that the most compelling testimony to biotech crops is that during a one year period, millions of farmers in the mentioned countries made more than 100 million independent decisions to plant and replant an accumulated land of more than 1.25 billion hectares for sustainable socio-economic and environmental benefits.

MPs voice support for GM after visit to research station: Henry Lutaaya; 17 May 2013



"NOT DANGEROUS": MPs on the agriculture committee during a visit to the GM Cassava field trial in Namulonge

(UPDATED) "When we were coming on the bus, every one of us was very biased against biotechnology. But having listened to the experts and learned that we can have our organic fields along with GM is good," these were the words of Margaret Kibojana, a member of the Sessional Committee on Agriculture of the Parliament of Uganda, after she and five of her committee members visited GM experiments at Namulonge research station this week.

Similar expressions of support for one of the most contested issues in the country today, were voiced by other MPs during the visit to the National Crop Resources Research Institute (NaCRRRI) in Namulonge. Scientists informed the visiting MPs that Genetic Modification of organisms offers great opportunity for improving Uganda's agriculture and hence reduce poverty levels among majority of Ugandans who face challenges of crop pests, poor soils and harsh weather conditions.

Before the experts explained the science and benefits of modern biotechnology, Masaka Woman MP Freda Mubanda and a well-known banana farmer, had reacted angrily towards Dr. Andrew Kiggundu after she learnt that he has spearheaded the development of GM banana at Kawanda. She said of Dr. Kiggundu: "This is the person I need to kill for trying to destroy our families," Mubanda jokingly said.

After the explanations from different scientists on the benefits as well as myths about the technology, Mubanda said she was 99 percent convinced that biotechnology offers potential for tackling challenges faced by Ugandan farmers.

Aleru Huda, the Woman MP for Yumbe district, who had earlier castigated scientists for introducing crop varieties which she said are more susceptible to pests and have as a result driven her people deeper into poverty, at the end of the field visit for genetically modified cassava, she expressed a sea-change shift in attitudes in favour of modern agricultural technology.

It was an encounter that had scientists hold their nerves as they carefully waded through lots of negative perceptions, lies that were held by the influential legislators. Most of these negative and sometimes misleading views about biotechnology have been cultivated and spread in recent months by non-governmental organisations such as Karitas and Action Aid, which have erroneously claimed that food from GM crops causes diseases or that GM seeds cannot germinate and will enslave poor farmers to seed-producing multinational companies.

The meeting came at a crucial point when Parliament is expected to start debating the highly contentious Bio-technology and bio-safety bill 2012, which seeks to regulate the commercialisation of Genetically Modified organisms in the country. If the bill becomes law, Uganda will become only

the fifth country in Africa after South Africa, Kenya, Burkina Faso and South Sudan to commercialise GM crops.

However, whereas the apparent dramatic change of views held by MPs may have brought smiles on the cheeks of most scientists, they also reflect major challenges for supporters of the technology especially considering that so many people, including decision makers, are still ignorant about modern biotechnology.

Scientists used the interface as an opportunity to appeal to legislators to pass the bill, saying the technology offers them ability to respond to Uganda's major problems such as frequent outbreak of crop diseases, loss of soil fertility and climate change.

Dr Yona Baguma, a Senior Research Scientist at NaCRRI told the MPs that Uganda has built substantial physical and human potential to effectively manage the technology. He cited the establishment of different modern biotechnology laboratories that have enabled researchers to successfully conduct trials on at least seven crops including bananas, cassava, rice using genetic engineering to control diseases and soil nutrient deficiencies.

While in the field, he beseeched MPs to touch the GM plants as evidence that they are normal plants and that eating GM food does not cause harm, as has been widely noted by the anti-GM campaigners.

Dr. Andrew Kiggundu, on the other hand told MPs that ongoing research using GM is being carried out by Ugandan scientists working on Uganda's unique crops and pests, contrary to claims spread by most NGOs that the technology is being imposed on Ugandans by foreign multinational companies like Monsanto.

Dr. Anthony Bua, the head of Cassava research programme at Namulonge, who also happens to be an uncle-father of MP Hamson Obua, who chairs the Parliamentary Committee on Science and Technology that is currently analysing the bill, cited what he referred to as high professional and ethical standards of Ugandan scientists.

Dr. Obua said: "We [agricultural scientists] are very nationalistic. We produce these technologies for our environment, our neighbours and ourselves."

Herbert Oloka from the Programme for Biosafety Systems, debunked myths that seeds from GM crops cannot be replanted, and that Uganda will lose a lot of revenue from the export of organic foods to Europe when the country adopts GM technology. But Oloka noted that Uganda gets only about US\$ 4 million from exports of organic products.

The legislators pledged to support the passage of the bill, but they also challenged the scientists to reach out to the society more regularly to interact with the ordinary people so as to ensure that people know their work.

It is however too soon to celebrate or commiserate about the future of the bill. As MP Kibojana noted, MPs can always change their positions. What is clear though is that many legislators still remain ill-informed about the technology whose future and potential rests in their hands.

Improved seeds turn into fortune: Polycarp Machira; 18 May 2013



Mr Mbise in his banana plantation. The farmer's use of improved banana seeds has improved his harvests significantly. PHOTO | POLYCARP MACHIRA

IN SUMMARY

Currently, the family farm has over 560 plantlets ready for sale, which translates to Sh1,120,000 or about \$700. The

increased family income, mainly through improved banana seeds, according to the farmer, has enabled him to venture into goat and poultry-keeping.

Dar es Salaam. For many years Mr Wilfred Mbise, a farmer in Situa-Mbogo Village in Arusha District, has been relying on cultivating traditional coffee and dairy farming as the source of income for his family.

The 56-year-old father of five children had for years struggled to pay school fees for the four children who are already in secondary school, and one who is still in primary school.

But lured by a ready market and better returns, the family has shifted to farming tissue culture bananas which grow faster and give increased yields compared to the traditional species.

Speaking on the benefits of the new mode of farming, Mr Mbise says now he can easily pay a total of Sh3 million (\$1,875) per year in school fees for the children. The money is income from the farm. He now smiles all the way to the bank because the harvest is now earning him much more than any other crop that the family has been planting in a region which is mostly semi-arid.

His wife, Mrs Regina Mbise, says: "Had we started this type of farming many years ago we would be economically stable right now."

Mr Mbise, the pioneer farmer of tissue banana in the village, simply says that what the family gets from the farm was not possible three years ago before they ventured into improved agricultural technology. He started with only 20 plantlets on a one and half hectare farm that he bought about three years ago.

"My plantlets are now mature and produce more than three times without a halt...I sell the new plantlets to other farmers," he said with a smile. The initial 20 plantlets, according to the farmer, produced four plantlets each after four months, giving him 80 new ones. The number doubled

several months later and he managed to sell 400 plantlets at a cost of Sh 2,000 or \$ 1.5 each to other farmers, earning him a total of Sh 800,000 about \$500 in return.

Currently, the family farm has over 560 plantlets ready for sale, which translates to Sh1,120,000 or about \$700. The increased family income, mainly through improved banana seeds, according to the farmer, has enabled him to venture into goat and poultry-keeping.

From the initial income earned from the sale of plantlets, Mr Mbise bought two dairy goats at Sh110,000 each. The goats have reproduced several times and he sells the young ones to other farmers at Sh150,000 each. The family links their success to advice given by the Research on Community and Development Association (Recoda), a local non-governmental organisation.

The NGO aims at bridging the technology gap in development through research, consultancy, capacity building and facilitating community-based projects geared towards poverty alleviation.

But for Yohana Amrose, one of the farmers in the village who has not adopted the new technology, the harvest is not good at all. He said: “After seeing improved life for Mr Mbise, I have enrolled this year in the programme and hope I will see positive change too.” Currently, about 50 farmers in the village are working with Recoda to increase their incomes.

Recoda executive director Dominic Ringo told this reporter that through the Rural Initiatives for Participatory Agricultural Transformation (RIPAT) programme, the organisation has been able to reach many rural farmers.

CHANGAMOTO
Panapofuka Moshi Pana Moto

Google machine translation from the original
Kiswahili:

There are many types of science and technology that can be used in agriculture to increase productivity in the industry and changing the lives of farmers in general. Some of these technologies is the use of planting and growing fertilizers , improved seeds that can withstand drought and diseases, pesticides , the use of oxen and machinery such as tractors to

Aside from these challenges there are also a major problem of farmers not using improved seeds, there are many factors that contribute to this problem , one is the lack of access to bulk seeds, so our farmers have to use seed from the harvest of their crops , which often do not have the productivity and capacity diseases and drought tolerant . Another reason is the low productivity of seeds here in the state contributes to rely on importing seeds sold so expensive and many farmers are unable to afford them kumuudu .

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To tackle this problem , scientists in the agricultural sector in the country right now have started producing seeds with the capacity to withstand disease, crop yield and drought tolerance in the laboratory using a technology known as tissue (Tissue Culture) .

Here in this method for seed production is carried out in laboratories and research institutions and seed production some of which are Sokoine University of Agriculture (SUA) , the Center for Research Mikocheni (MARI) and Crop Bioscience Solution Limited located in Arusha which private enterprise to mention some. Some crops whose seeds have started to be produced in this way is Banana , Cassava and sweet potato nutrition vitamin A and protein . Seed production through tissue involves taking a cell (tissue) of the plant as cassava , plantains or potatoes that are washed well and placed in special laboratory to kukirutubisha time certain .

The tissue after fertilization through the continents may hacking to produce other substances that are sown the seeds of their own and provide relevant. Later tissues grown professionally from time to time to produce games where after maturity is taken into special blocks (green house) so promoted after which it is ready to be planted field.

According to Dk.Joseph Ndunguru , Head of the Research Center Mikocheni (MARI) seed production using the technology of tissue (Tissue) or cell is a simple way that provides seed production in the long term . He said that the technology for seed production through seed tissue obtained supports the ability to withstand disease and insects , thus providing high yields and that its institutions often produces seeds that have been selected by farmers . " Sort of seeds produced are those that already have chosen farmers in these areas are normally yao.Pia seed protection against diseases Brown spots and streaks , which greatly affects the production of cassava " he said. Dk.Ndunguru noted that the difference between seed produced tissue laboratory technology and the farmers is that farmers' seed susceptible to the disease when the technology for laboratory produced treasure diseases and also have the ability to endure when zinaposhambuliwa diseases and pests.

Dk.Ndunguru statement is supported by the Chief Executive Officer of the company Crop Bioscience Solutions Limited of Arusha Wilfred Mushobozi who said the use of science and technology in seed production will increase production and quality of crops in the agricultural sector. He said that seed production through tissue will enable farmers use improved seeds that will be able to cope with disease and weather especially this time of climate change as well as using small area produce higher yield and quality . "The population is increasing , the ability to produce food is going down, so we can continue using the old techniques must increase the use of science and technology especially in improved seed production , " said Mushobozi . CEO 's of the Crop Bioscience Solutions Limited said seed production of banana and cassava through tissue enables obtained seeds and better for a short time where he said that the tissue one can produce up seedlings 2000 which has the ability to fight disease and climate . He said that the technology for seed production also uses a separate small area and produce seeds for planting ground where 2,000 seedlings should be accessible to produce a large area of land . " Cassava is cultivated their most places but vulnerable to the disease, but this method of production using tissue we offer many seeds that have no diseases, " said Mushobozi . He said that , apart from producing seeds for cassava and Banana through the tissue , the company expects to begin producing coffee seeds using the method , in order to produce improved seeds for a short time. For his part researcher crop wheat in Research center Selian in Arusha Abraham Mamuya explained that the main problem of the farmers in the seed and that seed production using

technology as tissue and others will be able to improve the lives of farmers and make them be rid of poverty . He said that, even a farmer plowing with a tractor and put manure but if he used the non-seed quality , can not get a productive harvest and even to different losses and seed produced by technologies like tissue gives the farmer to get the guaranteed yield and productivity.

Despite all that, Dk.Joseph Ndunguru , said that the use of science and technology in agriculture in the country is still low due to various reasons . He named some of these reasons that include lack of expertise , laboratory equipment , limited budget and limited awareness of farmers about the technology . Dk.Ndunguru noted that , in order to accelerate the use of science and technology in agriculture, there is an urgent need to develop an understanding of the various stakeholders on the use of science and technology and its importance in improving agriculture , improve infrastructure such as research laboratories and capacity building for researchers through training . Similarly, the media should be used to spread the results of tissue and other technologies to farmers and other stakeholders to advise the Government improve regulations governing the use of science and technology in order to facilitate decision- researched and well to bring productivity to the country.

Nigeria: Biotechnology Enhances Rice Production: Hope Abah: 20 June 2013



Makurdi — Rice is a staple food in Nigeria. Consumers of rice in the country would be happier to patronize the locally produced grain if the variety is improved to meet international standard such that can compete favorably with the highly celebrated foreign rice.

Even farmers in Nigeria who have long cultivated rice with very little income to show for it after each harvest season would now be certain of making more money by producing a generation of high-yield transformed local rice of export value.

Importers of rice as well would no longer have a tough choice to support the federal government's transformation agenda which seeks to end the importation of rice as it plans to evolve massive production of the grain to address poverty, unemployment and national food security in a few years.

The possibility of realizing this lofty dream is already in place and here with us following Nigerian scientists' determination to regenerate the local rice through the application of improved variety seeds made possible by Genetically Modified Organisms (GMO).

It is also worthy to note that the mere introduction of high yield rice seeds for Nigerian farmers is not enough to ensure the production of rice of international standard. Other requirements like farm inputs capable of enhancing high variety rice, standard commercial rice processing and milling industry are all required to ensure that rice produced locally in the country meet international standard.

Already, some researchers at Sheda Science and Technology Complex (SHESTCO), Abuja have developed the improved transformation of the local crop and awaiting opportunity to domesticate the idea such that small scale farmers can benefit when it is transferred from laboratory work to the community farms.

Plant scientist, Andrew Ilo said the research was developed by his boss, but it was stalled due to the absence of the bio-safety act which is yet to be signed into law by President Goodluck Joanthan.

Ilo believes that if the federal government accedes to the bio-safety law that has been passed by the National Assembly, it will provide a framework to ensure the development and use of GMOs for food productivity and other health purposes for the maximum benefit of the people.

Corroborating the scientist, Rufus Ebegba, Deputy Director, Bio-safety Office, Federal Ministry of Environment, Abuja added that the bio-safety law would open the door to Nigeria's safe modern biotechnology activities for national development in all sectors, adding, "the absence of the bio-

safety law will mean that Nigerian scientists cannot research and bring out their products for use in Nigeria."

Ebegba in a lecture titled, "Status of Bio-safety in Nigeria" delivered at a workshop organized by Bioscience for Farming in Africa, expressed optimism that the law would enable the safe consumption of GMO products in the country.

If this lofty goal is realized, Benue State for instance stands a chance of transforming its economy as nearly all the 23 local government areas of the state have arable land for rice growers which is produced in commercial quantity at; Naka-Gwer West, Kwande, Oju, Ushongo, Buruku, Kastina-Ala and Agatu local government areas respectively.

It also means that the state would reduce its large unemployed force and its official rating as the 8th poorest in the federation of 36 states and the Federal Capital Territory with the types of rice grown in the area mainly known as swamp, upland, and floating rice.

The generation of this crop would further promote a resistance trait that can wither drought storm and also minimize the application of fertilizer which are usually difficult for farmers to obtain at minimal cost as those of them who cultivate modern transgenic and hybrid seeds would harvest high yields as compared to those inclined to conventional farming practices that do not yield much.

To this end, rice specialist and chairman of Rice Farmers Association (RIFAN) in Benue State, Fidelis Iyörungwa Akosuss, admitted that the 2000 registered rice farmers of the association have been exposed to this modern technology and needs a bit of government's attention to feed the country and Africa by extension.

Similarly, the Benue chairman of All Farmers Association of Nigeria (AFAN), Aondona Hembe Kule believed that the federal and state governments can increase funding in the agricultural sector to meet the rice needs of the country.

"The farmers need adequate tools to supplement high quality production. Government has to come up with deliberate policy to encourage more farmers in the production of rice. If government would look into the challenges of providing more tractors to supplement production, provide loans for farmers and construct good roads from the hinterland to available market places, there would be visible improvement not just in production but in income a few years ahead," added Kule.

Greengrams; a drought resistant substitute for beans: Henry Lutaaya; 21 June 2013



Beans are the biggest source of proteins for majority poor in Uganda, not to mention the millions of children in boarding schools.

But due to challenges posed by climate change such as prolonged dry spells, bean producers are facing more challenges arising from harsh weather conditions.

Scientists have however discovered that Greengrams, known as Choloko in Eastern Region where they are commonly grown, can withstand drought much better than ordinary beans grown in central and western parts of the country.

In an experiment at the National Semi-Arid Resources Research Institute (NaSARRI) in Serere, Scientists have succeeded in showing that Choloko does better than beans during periods of water scarcity.

A field experiment showing performance of greengrams and beans against drought conditions that is being carried out by NaSARRI scientists has clearly shown that greengrams - certainly a less known legume in Central and Southern parts of Uganda but known as Choloko, in the eastern parts, beats by far when it comes to withstanding water scarcity brought about by scorching sun.

As Robert Amayo, the Head of the Dryland Legumes Programme at NaSARRI, narrated, they were excited to see greengrams progress into flowering and even bearing fruits, during last month's very dry conditions.

"We planted the two legumes; greengrams and beans at the beginning of May. And for the rest of the month, we received no rain. We were excited however, to see that greengrams thrived where beans have failed. As you can see, beans have been scorched, but greengrams are lush," Amayo said while pointing to the field trial, [shown in photo above].

Emmanuel Mbeyagala, the plant breeder in the Dryland Legumes programme at NaSARRI told a group of visiting journalists doing a fellowship with Biosciences for Farming in Africa (B4FA) that their research has proved that Greengrams can grow in drier conditions.

He added that the fact that the legume can thrive in other parts of the country is a big source of hope that Ugandans have a crop that can help cushion families against the effects of drought.

NaSARRI scientists however acknowledged that early shattering of dried pods in greengrams has limited their commercialisation in Uganda. Because of this handicap, scientists are trying to cross different varieties of greengrams in the hope of getting one that shatters less. Using conventional breeding means like crossing, they are trying to select greengrams that produce pods above the

canopy. They are also looking for varieties whose fresh pods can be eaten as fresh vegetables the way french beans are.

Major handicap

NaSARRI scientists however expressed deep frustration about the lack of modern research facilities that would enable them to accelerate the discovery of varieties with the desired characteristics.

For instance, in the absence of modern research laboratories, most researchers say they are left with no option but to use conventional techniques especially crossing of planted varieties that are time consuming.

As Amayo noted, if only they had modern plant breeding facilities, they would be able to identify the desired characteristics much faster and as a result would be able to respond to such challenges as early shattering much faster.

Other programmes

Under the same legumes programme, the scientists have also developed a faster maturing variety of pigeon peas (Enkolimbo in Luganda), which can supplement families protein needs but also withstand dry spells because of its hardy nature.

According to Mbeyagala, the scientists have successfully tried a new variety of Pigeon Peas that can mature in 70 days compared to the traditional variety that matures in 120 days and beyond.

Mbeyagala adds that they are trying to collaborate with private companies to develop composite foods from green grams for added nutritional advantages for children, pregnant mothers who need special enhanced foods. He said for example that if green grams are added to flour made from cow peas or pigeon peas, they can make protein-enriched products crunches like Bagiya and hence help to improve the uptake of proteins.

Composite foods are made from mixing of different processed food. In Uganda, several companies like Maganjo grain millers are producing composite foods by mixing rice, maize, oats and millet flours to make highly nutritive porridge substance.

Importance of GMO biotechnology in Tanzania: Leon Bahati; 23 June 2013



Translated from the Kiswahili original by the author

One of scientific discovery is expected to revolutionize agriculture in a positive Biotechnology and modification of Living Organisms (GMO) .

Along with the beauty these technologies have been appropriately vague for many people , thus providing opportunities for some vested interests distort the truth by claiming these options are harmful to humans and the environment .

To educate Tanzanians on these technologies , scientist researcher of the Institute Mikocheni Agricultural Research (MARI) , Dr Emerald Mneney explains the meaning , benefits and opportunities of the technology in the country.

" GMO is the scientific method used in crop production around the world . Information from the World Health Organization (WHO) , indicate that foods GMO crops latika existing market, they do not have any side effects that have proven to consumers and governing bodies subject to the safe use of GMO in that country . "

Anafanuaa that biotechnology is a profession of using biological processes of living organisms to create products or to obtain services for various applications . " Biotechnology can contribute to sustainable economic development and social sectors of Health, Agriculture , Industry and Environment in the country. " In the health sector biotechnology drugs and vaccines used to create various , recognizing illnesses and make nutritious foods and to deal with problems of malnutrition. " In terms of environment, Dr. Mneney says this technology can be used to clean up the environment , for example , to remove residual toxicity of industrial and domestic waste . " In addition , this technology can reduce the use of pesticides and thus contribute to protect and preserve the environment and human and animal health , " says Dr. Mneney .

He says the use of this profession in the Industrial Sector and produce various products such as renewable energy such as bayogesi , manufacture animal foods , medicine items (soap and spray cleaning toilets and sanitation of the house) , a plastic that can decompose and various cosmetics . in Agriculture Dr. Mneney says in agricultural use of biotechnology has many benefits : " One is to increase productivity by producing a variety of crops with drought tolerance, disease resistance , antagonism against insects and viuamagugu , more nutrients , features a longer stay would decay and loss taste, reduce natural toxins , for example in tobacco and cassava. "

Another advantage is mentioned that it is able to identify and distinguish plant and animal genetic resources to efficiently and effectively as well as preserving plant and animal genetic resources .

He also said other benefits of biotechnology are producing abundantly Discount seedlings yields and free of disease through tissue.

Proponents of the technology

Dr. Mneney says: " Proponents of this technology have been in doubt in the following main areas : food safety for humans and animals to the negative impact on the environment, economic and trade, ethical , customs and traditions. "

Dr. Mneney says reports from various international organizations indicate that there is no any harm to humans, animals or the environment , which have ever been possible in producing GMO crops .

Four African countries , namely South Africa, Sudan , Burkina Faso and Egypt , already have adopted the use of GMO . Major world nations that use the same technology is like the United States and China .

Dr. information Mneney says the World Health Organization (WHO) indicate that foods GMO crops that are in the market do not have any side effects that have proven to consumers and governing bodies subject to the safe use of GMO in that country . " In addition , no information from the GMO crop growing country showing that its citizens have been hurt health from these products , " says Dr. Mneney .

GMO Tanzania

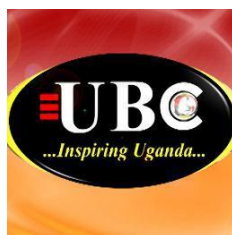
Dr. Mneney says to realize the importance and role of biotechnology , the Government began the process to ensure the nation enjoys a scientific discovery and promotion of the use of biotechnology in the country. In doing that , he said, Tanzania ratified the United Nations to join and develop the technology that governs the International Centre for Genetic Engineering and Biotechnology (ICGEB) in 2002 . " Haikuishia there, Tanzania formed a Committee of the National Advisory Bioteknoloja (BAC) in 2002 and also ratified the Cartagena Protocol to the Convention on Biodiversity (CPB) in 2003 , " says Dr. Mneney .

In the Cartagena protocol , says the agreement was granted the flexibility Animation Biological Biological (CBD) for the purpose of preserving the environment .

In a matter of preserving the environment , says Dr. Mneney is to focus on safety in the transportation and consumption of organisms resulting from modern biotechnology that can not affect biodiversity or human health.

Considering this strategy, he said in 2005 Tanzania formed a system of National Bio-safety Management of Biotechnology (NBF) to comply with the Environmental Policy of the Year 1997 and the Environment Act of 2004

Serere Biotechnology Research: Sarah Mawerere; 24 June 2013



Serere Biotechnology Research.mp3

Audio story and its script from Serere Semi Arid Research Institute.

Serere Biotechnology

24/6/2013

News Hour Presenter's Intro

Farmers continue facing problems which include pests, diseases, weeds and harsh conditions that affect their crops and yields. Scientists continue to carry out research and develop alternatives to enhance plants so as to combat the problems.

National Agriculture Semi-Arid Resources Research Institute (NaSARRI)-Serere is has for time developed seed varieties that can tolerate diseases, pests and harsh conditions. The institute however is facing a lot of challenges. Sarah Mawerere visited Serere where she compiled this report.

Cue in: The Biotechnology.....

Cue out:Sarah Mawerere UBC

Duration: 4'53''

Narrator [Sarah Mawerere]: Biotechnology has helped to increase crop productivity by introducing new varieties that are resistant to diseases and drought. It provides farmers with tools that can make production cheaper and more manageable.

Director National Agriculture Semi-Arid Research Institute (NaSARRI) located in Serere, Dr. Beatrice Akello Omonuk says the institute has made a major contribution to combating the challenges like pests and diseases and the harsh conditions that have affected farming.

Cue in: These varieties.....

Cue out:..... to go as a country.

Narrator [Sarah Mawerere]: The application of biotechnology in agriculture has resulted in benefits to farmers, producers, and consumers. It has helped to make pests and diseases manageable while safeguarding crops against disease and harsh climatic conditions.

However, the tools developed from the biotechnology have not benefited some farmers especially the women who have not yet accessed such developed technology. Margret Saimo Kahwa says the new technology developed by the scientists should be localized for people to be able to use them. She says at times the women miss out on such technologies that would otherwise benefit them more.

Cue in: We as women.....

Cue out:.....most of the agriculture.

Narrator [Sarah Mawerere]: The technology that is developed at NaSARRI in Serere is adaptive to the Semi-Arid areas of Uganda especially those in the Eastern and Northern parts. They include oil seeds like; ground nuts, sunflower and simsim. There are also dry land cereals like; sorghum, peas and millet.

An agronomist at NaSARRI -Pius Elobu says more research is required to ensure that the changing conditions that do not favour crops continue to be tackled.

Cue in: What we are involved in.....

Cue out:..... growing that seed.

Narrator [Sarah Mawerere]: While it is useful to note that the biotechnology developed is used to improve productivity, farmers face other challenges with getting the right planting materials from those mandated to multiply them.

Cue in: My names are Wamalwa Joseph.....

Cue out:.....you will not be with food.

Narrator [Sarah Mawerere]: The technology developed at NaSARRI has contributed more to profit making by increasing crop quality and yields. Director NaSARRI Dr. Margret Akello Omonuk says much as the technology developed has made a break through, the institute requires more funding to bridge the gaps they notice.

Cue in: All the research we do.....

Cue out:....to produce massive seeds.

Outro [Sarah Mawerere]: Biotechnology crops can make farming more profitable by increasing crop quality. This however requires persistent and adequate funding for research to continue taming pests, diseases and the harsh conditions that affect crops. **Sarah Mawerere-UBC.**

Farmer's Diary: Why we should embrace GM crops: Michael Ssali; 26 June 2013



The impending debate in Parliament about the Bill on Biotechnology and Bio-safety has sparked off a public discussion. Some support the adoption of genetically modified (GM) crops and while others are opposed to it. However, we expect the MPs to be diligent and to consider all the issues facing crop production today and how adoption of modern biotechnology can help overcome them.

The issues include climate change whose effects are already upon us in form of prolonged droughts and new crop diseases; some of which are brought about by pests that were until recently unknown in the regions where they have spread.

Some rivers and lakes are drying up. Forests and wetlands are invaded to create space for human settlement and economic activities.

Cheaper and easier We have a much bigger population to feed and food prices keep rising because food production is not keeping pace with population growth. Our conventional means of increasing agricultural production have not succeeded in overcoming food insecurity.

So, there is an obvious need for us to resort to new crop improvement technologies, which are also designed to reduce overhead costs, increase yields and improve incomes. Biotechnology has led to the discovery of pest-resistant cotton which our farmers could grow without spending money on pesticides.

Insects and droughts are known to reduce yields but insect-protected maize or drought-resistant maize would make the crop production a lot cheaper and easier, even in situations of low rainfall.

Need to save Apart from being expensive, the use of pesticides and herbicides has its ill effects on farmers' health and the environment. Herbicides kill the target pests as well as the "innocent" insects in the ecosystem besides endangering the health of farmers who usually handle the chemicals unprotected.

Some diseases responsible for reduced banana production, such as the Banana Bacterial Wilt (BBW), cannot be treated chemically and there are no known banana varieties resistant to it. Ugandan scientists are trying to make GM banana, which is resistant to BBW. But if our MPs are opposed to GM crops then we stand to lose the crop. The other staples such as cassava are under attack. We will still need biotechnology to save them.

Is Biotechnology The Answer To Our Agricultural Problems?: Christopher Bendana; 29 June 2013



Science makes life easier. From the discovery of the telephone, to motorised transport and the internet, the ability of scientists to innovate is the hallmark of human civilisation. Now that the parliamentary committee on science and technology is receiving views on the Biotechnology and Biosafety Bill 2012, the debate on the technology to improve on seed breeds is raising dust.

The Biotechnology and Biosafety Bill is aimed at regulating biotechnology activities, including the safe development and use of biotechnology to establishing a national biosafety committee and regulation of biotechnology research and matters relating to the release of genetically-modified organisms, among others.

Using biotechnology to fight resistant pest and diseases Several crops, including bananas, cassava, maize and potatoes, are being ravaged by pests and diseases. Researchers say biotechnology can be used to breed resistant varieties.

Bananas resistant to the bacteria wilt are under trials at the national Agriculture Research Organisation (nARO) in Kawanda. Breeders used genetic engineering to transfer genes from sweet pepper to the bananas. Genetic engineering is advanced biotechnology, where genes even from a non-relative species are introduced in an organism.

Theresa Sengooba, a senior consultant for the Programme for Biosafety System and a former director at nARO, says scientists carry out research using available technologies to provide solutions to farmers' needs.

From their coffee being attacked by pests in Buganda, to their maize failing because of drought in Kasese, to the banana bacteria wilt attack in Bushenyi, research is done as a solution to the cries of the farmers, Sengooba explains.

"it's the farmers who make the call," she explains. "After the call, we put the technology in the basket for the farmers to choose."

Prof. Zerubabel nyira, the state minister for agriculture, believes biotechnology is the answer to many of our agriculture problems. "it's a tool for solving problems, one of which is the banana bacterial wilt. if there are other methods, they should be applied," says nyira.

However, Morrison Rwakakamba, the CEO of the Agency for Transformation (AT), believes otherwise. “Diseases like the banana bacterial wilt can be fought using sanitary methods. For example, Ethiopia successfully used them in 1973,” he said. The agency is involved in community agriculture and environment advocacy.

Rwakakamba calls biotechnology bad science and he wants a law, which can punish those engaged in genetic engineering research.

“We are for good science. We think GM is bad science. My fear is the distortion of the natural process. New varieties get attacked after a few years. Let us promote both conventional and organic methods as only 40% of our arable land is under agriculture. We need to improve our efficiency,” he explains.

Breeders agree that after sometime, improved varieties become susceptible as pests and diseases adapt to the environment. This is well explained by Noel Kingsburg in his 2009 book, *Hybrid: The History & Science of Plant Breeding*. According to the book: “Pest and disease resistance has continued to be a big problem in plant breeding. Breeding for resistance is a constant struggle; most pests and diseases are capable of adapting, so the breeder and the pest are involved in a constant ‘arms race’.

Many resistant varieties can only be expected to be commercially viable for 10 to 15 years. The constant need to be a step ahead of pathogens makes the availability of genes originating from landraces and crop wild species a vital resource for breeders.”

Distortion of the seed system Seeds produced using advanced biotechnology (genetic engineering) only have the traits a breeder is interested in from different species. This helps a breeder to avoid picking unwanted traits as in hybridisation. Breeders add that if you want to maintain the strength of the improved variety, you need to get traits from both parents each time a breeder wants a seed.

This is, however, not true for cross-pollinated crops like maize, as they can easily be pollinated by other varieties and import the unwanted traits that make them susceptible to pests and diseases. Sengooba says there is no need for farmers to buy seedlings every planting season for vegetative self-pollinating crops.

However, she adds that farmers should buy seeds every planting season for cross-pollinated plants since the improved seeds can easily be pollinated with other varieties, making them susceptible to pests and diseases.

However, Rwakakamba believes biotechnology will kill local seeds.

“It will put agriculture and food science in the fangs and teeth of global corporate interests, who wish to colonise and destroy our seed system and make our small farmholders slaves to multinationals. The ability to produce and preserve seeds will no longer be in the hands of farmers,” he points out.

Prof. Samuel Kyamanywa, the acting principal of the college of Agricultural and Environmental Sciences at Makerere University, says many of the seeds considered local, like maize and beans, were introduced by the moving Europeans and promoted by WHO to fight malnutrition. Potatoes and cassava are also foreign.

Recently, Dr. Giregon Olupot, a soil scientist at the college of Agricultural and environmental Science at Makerere University, told farmers in nakifuuma, Mukono that genetic engineering is meant to finish the black man.

The raging biotechnology debate has a clear map. Those who argue for it are scientists in the relevant courses. And those who are against it are activists from all range of disciplines.

Judging by this, there is a group pleading that we should let science work because its relevance is in improving human life.

What we need in Uganda is a good regulation to govern what science is doing, not the general fear of interfering with nature for the good of mankind.

As Anywar says, we should support biotechnology.

GM crops excite Nigerian scientists: Kenneth Azahan; 5 July 2013



Agricultural scientists in the country have expressed excitement on the benefits inherent in the use of Genetically Modified, GM, crops saying it can be applied to ensure food security.

According to a team of Engineers lead by the Acting Executive Director, National Cereal Research Institute, NCRI, Badegi, Niger State, Dr. Mark Ukwungwu who spoke on Wednesday when Bioscience For Farming in Africa, B4FA led journalists to the institute, besides ensuring food security, GM foods can be leveraged on to improve farmers economic wellbeing, in the sense that GM crops requires less inputs to achieve higher yield. Lacks of fertilizer, improved seedlings amongst other factors have been militating against the ability of farmers to produce in commercial quantity in Nigeria and other African countries. Commenting during an interactive session, the duo of Dr. Samuel Agboire and Dr. Maji Alhassan Tswako, Director and Head, Research Support Services Department, and Plant Breeder respectively highlighted some advantages of GM crops to include, flourishing with less fertilizer, draught and insects resistant amongst others.

Giving credence to calls that Nigeria should embrace GM crops, the scientists explained that science was evolving and better discoveries are being made stressing that with Uganda and Ghana experimenting the crops, many more countries will follow suit soon. On whether Nigeria will adopt the use of GM crops, they averred that the country will embrace any technology that will lead to food sufficiency but said government would put in place legislation that will ensure safety. Noting that the institution which is about the oldest research centre in the country, has developed 62 varieties of rice, 8 varieties of soya beans and sugar cane but noted that there was need to improve the infrastructure in the sector adding that no country that has attained rice sufficiency grows it with rain fall. "The Agricultural Transformation of the present administration has done a lot in terms of provision of inputs but more still needs to be done to improve the infrastructure. We need to improve on our irrigation system, access road..., No country that has attained rice sufficiency grows with rain fell condition", the scientist noted.

Interview with Mark Lynas: Isaac Khisa; 1 August 2013

The EastAfrican

www.theeastafrican.co.ke



Interview with Mark Lynas, Anti GM activist turned Pro-GM supporter.

The fear for consuming genetically modified foods in sub-Saharan Africa is being imported from abroad, Europe in particular. Billions of dollars are now going in funding NGO's engaged in promoting fear and superstition about GM foods. **ISAAC KHISA and STEVE MBOGO** caught up with Mark Lynas during his tour in Kenya, Uganda, and

Tanzania under the auspices of Open Forum of Agricultural Biotechnology to give lectures on GM foods and here are the excerpts:

Presently many African countries do not allow growing of GM crops except South Africa, Burkina Faso, Egypt and now Sudan, citing lack of legal frameworks. What needs to be done to necessitate easy adoption of the GM crops?

There are two things that need to happen. One is that regulatory frameworks need to be established, like the Biosafety Bill now being considered by Parliament in Uganda. This would give the scientists the legal context they need to proceed with their important work, rather than being in a state of constant political uncertainty.

The second thing that needs to happen is for the general public to be better informed about the technology - all the lies about GM crops making you sterile, incorporating genes from pigs and so on need to be more aggressively confronted. People need to understand that these crops are identical to others except for the single genetic change which scientists are aiming for, such as resistance to diseases or drought. The misconceptions must be tackled.

There have been views by a section of people proposing the GM foods be identified with labelling as it is demanded by some countries in Europe. Do GM and non-GM foods differ in appearance or taste? What is your comment on this?

I visited the GMO cassava which is in field trials at National Crops Resources Research Institute in Namulonge - the cassava is identical to any other, except that it is much healthier because it seems to be successfully resisting the disease. People should go and see this for themselves. The same goes for the banana, although I cannot say for sure because you are not allowed to taste them yet! I ate some GMO papaya recently in the US and it was the nicest I have ever had - even better than the paw paw here in Uganda!

As to labelling, I think that would be completely unworkable here in Uganda, where 80 percent or more of food is sold in open air markets. Once the food is assessed as safe, people should just treat it like any other and stop listening to scare stories.

As you have clearly stated that they look and even taste better than organic crops, why have people especially in Sub Saharan African continued to fear consuming GM foods?

Because this fear is imported from abroad, Europe in particular. There are billions of dollars now going in funding to the NGOs which are promoting fear and superstition about GM foods. Being an NGO activist is a lucrative professional career choice, which can make more money than going into business. NGO people claim to be 'instant expert' and to be always included in major decisions as 'civil society'. I would question the legitimacy of many of these organisations. Also this is a great waste of talent, because there are real challenges that these NGOs should be focusing on - like protecting forests and biodiversity, reducing the terrible traffic pollution that is causing cancer and so on.

What are the likely consequences if developing countries failed to move faster and adopt the growing of GM crops?

Clearly GM crops are not the single solution. They may not even be the most important - farmers need to have irrigation, fertilisers and better roads so they can take surplus produce to market without it being spoiled and wasted. But if GM banana and cassava are prohibited, for example, then it is likely these crops will be lost from much of eastern and central Africa because of the bacterial and viral diseases that are affecting them - they simply will be wiped out, removing a major staple food source for tens of millions of people. There are no naturally resistant banana varieties to the bacterial wilt disease, so they will all die. This would clearly be very bad news for food security.

Over the years, you have been renowned anti-GM activists, an environmental writer, who even went ahead to form a movement against the GM crops. Why have you changed your mind now? Have you been bribed or what informed your decision?

I am always asked this because people want an excuse to try to attack me personally rather than to engage with the science or my arguments. I have never received any money from any company involved in the GM business, and I never will. My change of heart came about because I wanted to be a better science communicator and a better environmentalist - and you do not achieve that by fighting against scientific facts.

What should developing countries especially sub-Saharan Africa do given that there are so many controversies surrounding GM crops especially those proposing as well as those opposing it?

The controversy is fake. One, one side you have activists peddling lies and misinformation, which they get from the Internet or from their donors in Europe. On the other there are scientists who make very cautious statements because they want to stick to the facts. It is very much like climate change, where one side you have those who deny the science, and on the other people who try to assess the situation rationally.

Based on your research and having involved in GM issues for a longtime, do you think GM crops are the solution to food shortages in sub-Saharan Africa and is it the right time for Africa to resort to GMOs?

That is up to different African countries to decide. But I would suggest that their decisions would be better made on facts rather than on fiction. It would always be too simplistic to say that GM crops are "the solution", but all other things remaining equal, if you are in a drought and you have a drought-tolerant GM maize then you will likely get a better harvest. If you are in an area badly affected by cassava brown streak virus and you want to grow this crop for food security, you will be better off with a GM variety which is resistant to the disease. And so on for banana and the other crops which are being proposed.

The anti-GM activists, including yourself before you changed your mind have argued that GM crops have both health as well as environmental hazards. What is your take on this; what is your evidence to show that foods from GM crops are safe?

It is not 'my' evidence which is the issue - I am not a scientist. I have not personally tested these crops (except to eat GM foods in various countries without fear, of course) so I insist that people who are unsure should get their information from the experts rather than the activists. It is the same as if you maybe have an illness, and all of the doctors say you should have treatment, but a taxi driver says you should forget about it and take the chance. Who would you trust? Those who know what they are talking about because they have sufficient training or the uninformed person? On GM, the experts say it is completely safe: all the major relevant scientific institutions in the world have issued statements to that effect. Even so, you have to look at these things on a case by case basis - different techniques are used in different plants which could have different effects. That is why they are so extensively tested in field trials and so on before being released. But for the last 10 years with billions of people eating GM foods across the whole world, no-one has even had a headache - that is why this is a fake controversy. Food is food.

Could you comment on the issue that growing GM crops will enslave farmers in developing countries as they will be forced to buy seeds every planting season and hence creating markets for the multinational companies such as Monsanto and Syngenta. Is this what is likely to happen if farmers resort to growing GMO's?

This is nonsense. It is another myth which will not die. The cassava which is being developed will be able to be propagated like any other, as will the banana. So once farmers have it, it will remain in their control. All this language about 'farmer enslavement' comes from activists who do not want African farmers to be able to access modern technology and romanticise the 'traditional' agriculture which is currently failing to feed people and leaving millions with malnutrition.

How do you look at the future of GM crops in Africa? Do you think growing GM crops is likely to speed up population growth in developing countries given that there will be enough food and the vicious cycle of food shortage continues?

I find the population growth argument abhorrent and immoral. You should always aim to feed people, having enough food is a human right. You should not keep people in near starvation to try to stop them having more children. Maybe we should just stop vaccination campaigns so that children all die before they can grow up? That would also reduce population growth. It would also be a crime against humanity.

Now that you are a supporter of GM crops, what is your view on those against the GM foods in Uganda and other developing countries?

I am not pro-GM, I am pro-choice. All the farmer leaders I have met in Uganda say they would like the choice to decide for themselves what to grow, and not be dictated to by foreign-sponsored activists. If they want to stay with the traditional seeds, then farmers have that right. No-one is going to come onto their farms and stop them saving their own seed. But the truth is they will then continue to have very low yields and to remain in food insecurity. With improved seeds (I am thinking even of hybrids, not necessarily GMO), yields of things like maize can be four times what you get from the traditional varieties. So farmers who want them also have that right. Africa very quickly adopted mobile phones and the internet, so the idea that places like Uganda are not "ready" for modern technology in agriculture is I think reactionary and patronising.

Who is Mark Lynas?

Mark Lynas is a British author, journalist and environmental activist who focus on climate change and GMOs. Formerly, he was against GM foods before changing to become pro-GM crops.

He is the author of several books on the subjects. In November 2009 Mark was appointed advisor on climate change to the President of the Maldives, Mohammed Nasheed, and was involved in the Maldives' effort to be the first carbon neutral country on Earth by 2020, and its role in the international climate change process, until Nasheed was deposed in a military coup on 7 February 2012.

He is a frequent speaker around the world on climate change, biotechnology and nuclear power. He is a Visiting Research Associate at Oxford University's School of Geography and the Environment, a member of the advisory board of the science advocacy group Sense About Science, and is a member of the World Economic Forum's Global Agenda Council on Emerging Technologies, which produces an annual top 10 list of the technologies with most potential to change the way we all live. Ends

Renowned Former Critic Of GMOs Becomes Their Ardent Supporter By Henry Lutaaya; 3 August 2013



One of the world's leading voices on climate change and biodiversity Mark Lynas has urged Ugandans to embrace the modern science of biotechnology including Genetic Modification, as a tool to ensure food security as well as conserve biodiversity.

Lynas, who last year shocked the global environmental movement when he turned from a sharp critic of GM technology into a supporter, delivered a Keynote address at Makerere University this week in which he said that GM technology offers more benefits to humanity and the environment than dangers.

Speaking at the 1st Bi-annual National Bio-safety Conference at Makerere, Lynas said that Genetically Modification as a field of science offers the best option to combat major challenges facing humanity such as crop diseases, droughts which would in turn help to ensure food security for the world's rapidly growing population.

Lynas noted that besides the potential for increased yield, GM technology that is being tested on a number of Uganda's crops, would help the environment by cutting back on tones of toxic pesticides that are used by farmers around the world in controlling pests.

Lynas, whose book '60 Degrees' has attracted global acclaim and translated in 26 languages, told participants at Makerere that he changed his mind to stop opposing GM when he realised that scientists, upon whom he depended for climate information, were united in supporting GM technology.

He said: "I realised that there was a huge inconsistency in being pro-science on climate change and anti-science on biotechnology. As a journalist, I used would go to the same scientists to get climate facts, but I would reject their information on Genetic Modification, which was wrong because you cannot reject science in the modern world."

Lynas who admitted that it took him a lot of courage to change his position, adds that he has now embarked on a campaign to undo part of the damage he caused the world in trashing evidence-based facts on the potential of GM technology.

"I am partly culpable for the miss-information that has gone around the world about GM. I destroyed GM crops that were being tried in UK for which I have made an apology," said Lynas.

With support from pro-GM groups organisations like the Bill and Melinda Gates Foundation, Lynas has been to Kenya, Tanzania and Uganda advocating for GM crops.

Lynas' lecture came at a time when the Ugandan Parliament is soliciting views about a proposed law to regulate the development, importation of Genetically Modified organises.

Like Lynas of yesteryears, Ugandan farmers mostly in rural areas have been bombarded by misinformation from anti-GM activists that has deliberately and wrongly demonised the technology in order to frustrate its adoption in Uganda.

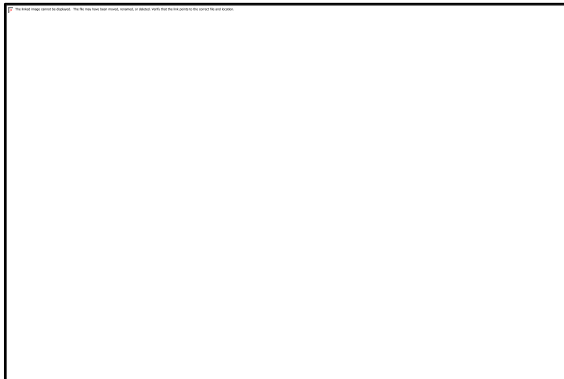
While speaking at the same conference at Makerere, renowned environmentalist and Kitgum Woman MP Beatrice Anywar expressed strong support for the technology as a tool to help vast majority of Uganda rise from poverty.

She however called for punitive measures to be taken against some of Makerere's staff members whom she labelled as spreading lies about GM among peasants in villages.

The Director of the Cassava Programme at the National Crop Resources Research Institute NaCRRI in Namulonge, Dr. Yonna Baguma, told participants that if the Biotechnology and Bio-safety bill is passed, Ugandan scientists are ready to release Uganda's first GM crop as early as 2015.

Baguma, a member of the bio-safety committee under the Uganda National Council for Science and Technology (UNCST) which approves research in GMOs, said that the use of GM technology at confined research sites has been successful in overcoming some of Uganda's most destructive diseases for staple crops like Cassava, Maize, Banana.

Filling the Gap with Genetically Modified Crops: Kenneth Azahan; 5 August 2013



The acceptance of Genetically Modified Crops, GMC, in some parts of Africa signposts situation in which it will exit the continent from the threat of food insecurity.

For countries like Egypt, South Africa and Burkina Faso where GM crops have been adopted, keen observers say the situation appears to be a done deal that will set a precedence for other sister African countries. In the midst of GM crops penetration in Africa, Nigeria and other African countries are still battling with legal constraints of fully adopting GM crops.

In Nigeria, the Bio-Safety Bill is currently before the National Assembly awaiting passage. Judging from the country's undecided stand on GM crops, many are of the view that there is the need for the upper chamber of the legislature to accelerate the passage of the Bill with a view to taking advantage of the benefits inherent in GM crops.

With Africa's population projected to rise by an exponential level (over 1billion) by 2050; the need to adopt a quick fix approach in the continent's food security drive has become imperative. This is where scientists have maintained that GM crops will fast-track the continent's quest to produce enough food for its citizens as well as enable small scale farmers to transit from subsistence to commercial agriculture.

However, those on the other side of the divide believe that scientists promoting GM crops are doing so for their selfish economic gains. The founder of the non-governmental organisation, Health of Mother Earth Foundation, HOMEF, Nnimmo Bassey in a recent interview with Sahara TV, insisted that the rate at which Africa is being put under pressure to open up to genetically modified foods was suspicious. Mr. Bassey accused the organisations which are promoting the widespread use of GMOs in Nigeria and across the whole of Africa of spreading falsehood.

"The assertions propounded by the promoters of GMOs are actually false and this can be deduced from research conducted by reputed international scientists. The argument they give is that genetically engineered crops produce more; they have higher yield than natural crops, and it's been shown that this is not true," he said.

He revealed that several studies had been conducted on the subject, including one in which 400 scientists compared the yield rate of genetically engineered crops in the US with natural crops in Europe and found that the natural crops had a higher yield rate than the GMOs.

Thus, the fable that GMOs are designed to fight hunger in Africa by helping farmers produce more is totally unfounded in his estimation. He also debunked the popular assertion that GMOs utilise fewer chemicals saying that the same companies that produce the GMOs are the same organisations that produce the chemicals and that these chemicals may have been particularly designed to suit the kind of seed they produce. “Genetically engineered crops are not engineered to help anybody,” he opined, “They are engineered to help the industry that produces the crops.”

According to Mr. Bassey, companies like Monsanto, Syngenta, the International Institute for Tropical Agriculture, IITA, the United States Agency for International Development, USAID, the Rockefeller Foundation and The Bill and Melinda Gates Foundations are among the long list of institutions, mostly behind this push to introduce GMOs to Africa.

“The Bill and Melinda Gates Foundation has at this moment announced that they are going to help Nigeria build a bio-technology laboratory, and the whole idea is to prime the country to produce these genetically engineered seeds not just for Nigeria but for the whole of Africa.

He regretted that organisations like the IITA are promoting GMOs even though they have in the past researched and produced hybrid seeds, which seek to do the same things the GMOs claim to do, without the attendant hazards yet are still involved in promoting these GMOs. He also said there is a link with the energy sector as vast parcels of land would be required to grow GMOs, some of which will also be used to produce bio-fuels like ethanol.

For Mr. Bassey, the future of global food security lies in the hands of small-scale farmers and not in large-scale industrial farming. Backing his assertion with the 2008 International Assessment of Agricultural Knowledge, Science and Technology for Development, IAASTD reports, he called for a fundamental right to eat safe food.

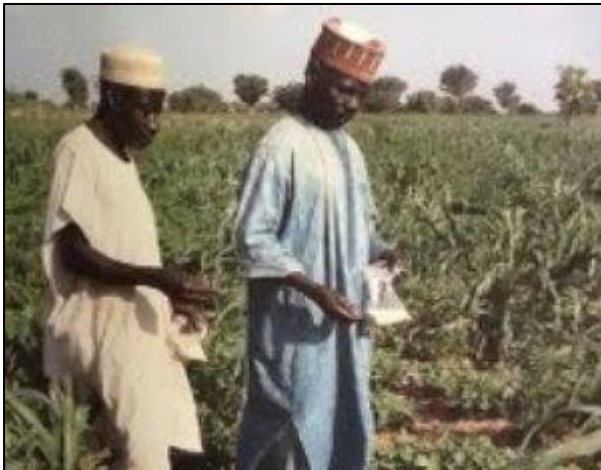
Interestingly, Nigerian scientists have thrown their weight behind GM crops saying it can be applied to ensure food security.

According to a team of scientists from the National Cereal Research Institute, Badeggi, Niger State, led by the Acting Executive Director, Dr. Mark Ukwungwu, Dr. Samuel Agboire, director and Head, Research Support Services Department and Dr. Maji Alhassan Tswako, a plant breeder all highlighted some advantages of GM crops to include, flourishing with less fertiliser, draught and insects resistant amongst others.

The scientists who spoke to journalists recently at the Institute jettisoned the opposition to GM crops and urged the country to embrace GM crops explaining that science was evolving and better discoveries are being made.

Why Government must listen to farmers on agric biotechnology: Abdallah el-Kurebe; 10 August 2013

NEWSDIARY o n l i n e . c o m



In every nation's quest to feed its people and provide food security, many methods aimed at improving agricultural productivity towards availability of food for the people, are put on trial. Nigeria's Operation Feed that Nation, The Green Revolution and the recent Agricultural Transformation Agenda, are few examples.

As the world's population by year 2050 is expected to rise to nine billion, to satisfy the demand of adequate food to meet the ever-growing population, the Food and Agriculture

Organisation of the United Nations (FAO) has predicted that food production will need to increase by 70 percent.

"Meanwhile, land and water resources are increasingly being degraded and depleted, which has serious implications for developing countries, and in particular for the African continent. These are huge challenges, but one possible solution is for farmers to combine their expert local knowledge with recent advances in biosciences."

Expectedly, the world over, agricultural biotechnology is being promoted as the veritable means of beating the 70% target. This is because "biosciences," according to Prof. Walter Alhassan, "represents a powerful tool that augments conventional approaches of food security." For farmers who have suffered over the years to grow crops that are not resistant to weeds, pests, draught, and that could grow without the application of fertilizers, they will readily accept improved variety of crops that doubles yields. An onion farmer, Aliyu Adamu of Duhuwa Gumsa village in Wurno local government area of Sokoto claps his hands to welcome the news that there are crops that have been improved to resist weeds, pests, draught. "Do we really have such crops? What is the government waiting for that it is not helping us with it?

We will surely welcome such crops. We won't have to buy fertilizers, which we now buy at N5,000.00 per bag," Adamu excitedly said. This, for sure will be the position of many, if not all, farmers across the nation. The fact that every Nigerian farmer would like to have crops with high yields, yet resistant to draught, pests, weeds and other crop-growth deterring elements should make government bow to the present need for them. Prof. Calestous Juma observes that "sustaining African economic prosperity will require significant efforts to modernize the continent's economy through the application of science and technology in agriculture."

This is a position that should make Nigeria pave the way for her farmers to fully employ biotechnology for food production. Second world richest Bill Gates posits that “If you care about the poorest, you care about agriculture. Investments in agriculture are the best weapons against hunger and poverty, and they have made life better for billions of people.

The international agriculture community needs to be more innovative, coordinated and focused to help poor farmers grow more. If we can do that, we can dramatically reduce suffering and build self-sufficiency.” Obasanjo’s Operation Feed the Nation and Shagari’s Green revolution employed agricultural mechanization at the time when that was the ultimate method for mass food production. Jonathan’s Agricultural Transformation Agenda (ATA) should not look away from the product of the day, which is Agricultural Biotechnology.

This is because, according to Phil Bloomer of Oxford, “A one percent increase in per capita GDP in agriculture reduces the depth of poverty at least, five times more than a similar increase outside agriculture.” Nigerian government should emphasize research and development in agriculture because current levels of agricultural research and development spending in sub-Saharan Africa are inadequate for agricultural growth and poverty reduction. And, a 2012 report by Africa Human Development observes that “The challenge of food security in sub-Saharan Africa is formidable, the timeframe for action is tight and the investment required is substantial. But the potential gains for human development are immense.”

It will be dangerous for ATA success if biotechnology is not given a chance and most importantly, if the biosafety bill is allowed to lie fallow on Mr. President’s table, unsigned.

Scientists, politicians disagree – farmers in dark: Said Mmanga; 20 August 2013



Machine translation of article by google from original Kiswahili:

12 YEARS expected to be the next world and one billion other people , making the 9.5 billion people by 2050 , which will add various needs including food . Agriculture is the only way to produce food for people, but is facing many challenges as drought , diseases and pests , to mention some. These challenges have resulted in a decrease in the production of various crops including cereals such as maize and rice, leading to food shortages. To cope with these challenges , scientists and agricultural experts in various countries including Tanzania have been struggling day and night to do research that will help making technology that can help increase the productivity and quality of crops.

These technologies have been zikilenga produce seeds that can withstand drought , disease and pests . In addition to conducting research , these experts also have emphasized the use of science and technology in agriculture to increase productivity and enable communities to be food secure .

For example, local agricultural experts , scientists and politicians through the Kilimo Kwanza program , have been encouraging the use of science and technology in agriculture to increase its overall production. Science and technology in agriculture may be , the use of fertilizers, improved seeds in various ways as artificial insemination , genetic engineering , drip irrigation and more. Genetic engineering profession is one of the technology can increase the productivity and quality of agricultural products .

This technology enables the transfer of genes between organisms from one organism to another organism transplant in order to get qualified , it tolerates drought, disease or crop yield . According to Dk.Joseph Ndunguru , professional issues Molecular Plant Virologist and Head of Mikocheni Research Institute (MARI) technology that aims to produce crops with better quality. He said that, being derived from this technology are called for foreign language " genetically Modified Organism (GMO)" or in the interpretation of Swahili informal an organism known as ' kilichoongezwa genes ' and that research using this technology takes place in a special laboratory built in accordance with the principles of safe use of modern biotechnology . That statement is supported by the Research Officer Leader - Agricultural Biotechnology of the National Commission of Science and Technology (COSTECH) , Dk.Nicholas Nyange who said genetic engineering technology in agriculture has started to get great global success in increasing agricultural production . Aliitolea example of Burkina Faso country which started production of cotton derived from genetic engineering (Bt Cotton) in 2008 which increased productivity by 20 percent .

Dk.Nyange noted that crop farmers were also able to reduce the use of pesticide sprays for two instead of six times per season , thus saving labor time and cost of production. Here in engineering technology genes are already in use at the Center for the Study of agriculture, Mikocheni (MARI),

which makes the study of the use of engineering genes to species of cassava with traditional resistance against diseases stripe (cassava mosaic disease) and streaks Brown (cassava brown streak disease) since the year 2010 when this research is in the initial stages of the laboratory (contained research).

According to Dk.Ndunguru , one gains from this technology is producing volatile substances (embryos) from a variety of native cassava and cassava koboresha use it ; kuziwekea three types of cassava genes containing contradictions against disease spots and streaks brown . He added that the technology can be used to improve and solve the challenges of other crops like cotton , banana , and maize with a view to improve them using genetic engineering profession . Despite these successes , genetic engineering technologies which being derived from this technology are called for foreign language " genetically Modified Organism (GMO) has been tinkling the war by politicians and activists in various countries including Tanzania . Here in technology has strongly protested against both the politicians and activists together to provide a variety of factors .

One of the reasons provided by those who oppose the use of technology in agriculture is that it will lead to the extinction of native seeds and that its products are harmful to human health. However, these claims has been provided in the absence of scientific evidence supportive arguments , instead rested in theoretical and abstract perspective . The situation has led scientists especially in developing countries like Tanzania that promote dumping ground blame the technology to be given money by the company higher seed around , which is not true because even here in our colleges such issues are taught .

Technology GMO as appropriate or inappropriate is if the riddle wrong answer here will almai agriculture , politicians , scientists and activists fighting to shove where everyone is attracted to him , and at the same time farmers who many do not understand anything about technology. While these groups are underway tag , the vast majority of farmers do not have the information or knowledge at all about the pros and cons of seeds, plants or goods from a genetic engineering technology conceived either as GMO . Instead, our farmers have continued to witness agricultural production continuing to decline year after year. Statistics show that the contribution of agriculture to GDP has declined from 27.6 percent in 2005 to 25 percent in 2009 , according to the report of the Plan for Growth and Reduction of Poverty (MKUKUTA) second phase .

Many farmers have lost hope and some have ceased operations due to a decline in agricultural productivity because they use expensive while they earn being a bit vintage . Due to this , the use of various technologies in agricultural genetic engineering , including the issue unavoidable if we want to have the most productive farming and commercial agriculture . For instance, some of the citizens of the region of Kagera who is already infected and their banana wilt disease of bananas, of course this technology can give back hope.

Mwanakibibi Forogo (56) of cassava farmer in the village of Kinzae division Bronchitis said Coast now faces a difficult life due to crop production decline. He formerly was able to get so many in a small area cassava unlike now where even plowing a large area is still a little vintage . However Forogo not know anything about the cause of the decline in its yield and does not know the technology of genetic engineering or GMO as conceived as may solve their common illnesses it. But also , do not know if this crop can be attacked by diseases , for other Forogo who represents the majority of the crop farmers , is in the world of ancient agriculture . "Of course I do not know anything about GMO or cassava diseases and even if there is a way to get seeds zinaostahimili

diseases, heats nachojua why are drying up , " he said. For his part Mark Lynas activist who supports the use of crops and products GMO , who 15 years ago led protest movement that technology until he changed the position in January this year , said population growth facing the world and climate change technologies in agriculture as GMO it is necessary to increase production.

Speaking at a debate organized by the Forum for the Development of Agriculture Biotechnology in Africa (OFAB Tanzania) recently said Lynas who oppose the technology concepts that have been placed in bondage itasabisha seed growers and seed can not reproduce . He said more than 600 research conducted on the same technology zimebaini absence of side effects such technologies should be medical or environmental . According to the Lynas for a country like Tanzania the issue is not food produced by adding genes or in the normal way , since many people do not have food for their daily needs . He noted that those who oppose the use of GMO in Africa , including Tanzania, have a hidden agenda and are trying to fight the use of technology in agriculture with non-governmental international and national . "Many people have been telling me that Africa is not ready to use modern technology in agriculture to be suspended so its farmers using GMO technology and others, it is a colonial attitude and behavior , " said Lynas . Referring to the Oshilla technology officer Shingi Auditor of plants produced by technology in Pesticide Research Institute (TPRI) in Arusha said existing GMO is not a solution to the problems facing the agricultural sector in the country although it may help in some areas. " It Supporting tool for other technologies , it has a rapid response imejipangaje as a nation depends on the country for the benefit of our farmers , " said Oshingi . He explained useful or cumbersome for the technology depends on national priorities. "

What do we produce that we devote attention turns GMO technology research can help us , so we must do our research in the area know if there is a profit or a loss , " he added. That statement was backed up by Gloria Wapalila who is also the auditor of the plants produced institute of technology in TPRI who said the same technology as used to be used to produce a problem which farmers have used expensive to produce. However, he clarified that, Tanzania us back in the technology research where there are currently one project to do about GMO cassava run in MARI research center . " It is the only research done in the lab here we compare with Uganda and Kenya that are more than 10 research on GMO issues , " he said.

The Experts of TPRI were advised that , in this period when there has been a recent spat and fight coming between scientists, agricultural experts and activists about the technology of GMO as appropriate or not , it is advisable that we began to organize legal and do enough research to be, some neighboring countries like Mozambique , Kenya and Uganda will soon allow products and technology, so we can not avoid entering the country. However, during the war or the riddle of GMO for activists , politicians and scientists going on , it's time to educate farmers its importance and its impact , if any and applies what , instead of now where most of them do not have any information about the technology .

Searching For a Resistant Cassava Variety: Lominda Afedraru; 21 August 2013



Breeders at the field trial site of GM cassava in Namulonge. PHOTO BY LOMINDA AFEDRARU

IN SUMMARY

Cassava is food for many millions in Africa including Uganda but constantly under attack by viruses. Efforts are being made to combat the menace.

Scientists investigating ways of getting varieties resistant to Cassava Mosaic Virus

(CMV) and Cassava Brown Streak Virus (CBVS) still have a way to go because the team is aiming at eradicating all the four types of viruses at a go.

The National Agricultural Crop Resources Research Institute Namulonge (NaCRRI) is currently conducting research using both the conventional and biotechnology methods on cassava.

Genetic improvement

The research which has been going on since 2005 is an initiative of the US-based Donald Danforth Plant Science Centre in collaboration with US Agency for International Development and Uganda government.

Currently, the varieties which are resistant to Cassava Brown Streak Virus are being tested under a programme known as Virus Resistant Cassava for Africa (VIRCA).

VIRCA is about developing transgenic virus resistant cassava in East Africa and scientists at NaCRRI and Kenya Agricultural Research Institute are working on genetic improvement of the crop for high yields, resistance against pests and diseases as well as having traits preferred by farmers.

The chief investigator, Dr Titus Alicai, says in 2005 the National Biosafety Committee gave his team permission to proceed with the research where they undertook to study the general behaviour of the virus before embarking into real research work.

Earlier, in the 1990s, efforts were undertaken to eradicate CMV, which was a major problem that time. However, in 2000, scientists discovered CBSV, which is a devastating disease resulting into poor yields since it causes rotting of the roots.

Control viruses

The two have since been identified having variants: Cassava Brown Streak Uganda Virus (CBSUV) which was first spotted in Uganda, African Cassava Mosaic Virus (ACMV) and East African Cassava Mosaic Virus (EACMV).

Scientists at NaCRRI have come up with varieties that are tolerant to CMV as well as CBSV. These were bred using conventional means and are already released to farmers. One such variety is Nase14, which is farmer preferred.

However, the VIRCA project is aimed at developing cassava varieties that are resistant to the four viruses. But the scientists can only achieve this by first developing resistance to each virus independently.

Dr Alicai says they are currently breeding varieties which are resistant to CBSUV with plantlets at the field trial site in Namulonge. Once the team generates data from this trial, they will be able to stack resistance for the four viruses in the same plant.

ACMV and EACMS cause very devastating symptoms on the leaves thereby inducing dramatic loss in the yields but CBSV and CBSUV cause extremely damaging symptoms on the tubers rendering them inappropriate for consumption.

“The experiment we are conducting is important because for the first time it will demonstrate that it is possible to control one of the two viruses involved in CBSV and if successful we will generate data to help us know how to control both viruses and thereby control the disease altogether,” he explains. Though the cassava viruses have been spreading rapidly in farmers’ fields, this has been mainly caused by the white flies which feed and suck the sugar in the leaves thereby contracting the virus and transferring it to another plant. At the laboratory, the scientists identify a resistant gene from a cassava variety and transfer it to the preferred variety through gene silencing approach.

“What we do is transfer a piece of genetic information from the virus and copy it to the plant in the laboratory and allow it to grow on a DNA. This process makes the plant to produce molecules that will fight the virus,” Dr Alicai says.

Food for millions

The virus-resistant varieties the team is working on are TME204 and Ebwanatereka varieties, which are farmer preferred. It is estimated that these viruses are causing \$60m (Shs154b) in losses per annum out of the revenue contribution the government is supposed to realise from the production of cassava.

Further estimates show that farmers especially in Mukono and Luweero districts are experiencing 100 per cent loss as a result of cassava brown streak epidemic. Cassava is food for over 600 million people globally, it has been grown by farmers in Uganda for more than 150 years.

Uganda Needs To Adapt GMOs and Biotechnology: Michael J Ssali; 28 August 2013



Developing more nutritious banana varieties at Kawanda. Centre: Multiplication of better quality cassava through tissue culture at Namulonge. PHOTO BY MICHAEL J. SSALI

As legislation on biotechnology and GMOs is before Parliament, opinion is sharply divided--for and against. This is an argument for passing the Bill.

Some groups, including activists, are working hard to ensure that the

Parliament does not permit the use of biotechnology in agriculture or farmers adapting genetically modified (GM) crops. They have come up with many counter arguments like it is wrong to tamper with nature because we will end up with undesirable crop traits that might spread to other plants, and thus destroy the ecosystem beyond redemption.

Keep in mind that for years, we have had the Uganda Biotechnology and Biosafety Consortium comprising of trusted scientists whose mandate is to ensure that new biotechnologies and whatever research work done or its out- come is quite safe. The Bill that these groups are opposing is actually about safe use and regulation of bio- technology in Uganda.

Further development

From time immemorial, mankind has interfered with or manipulated nature to get food. The crops we grow today used to grow in the wild thousands of years ago when man was still a gatherer and a hunter. It took human interference to get the food crops such as tomatoes, maize, bananas and the rest of them out of the wild and to grow them in gardens near people's homes.

Fruits like mangoes and oranges and animals such as goats and cows were part of the wild- life in the woods and grasslands. But man went about interfering with their growth, studying their environment in which they would thrive, and began bringing them closer to him for further development (propagation and breeding).

This was tampering with nature and there were always risks involved. Some of the animals carried diseases that were harmful to humans. For example, there was the risk of catching bird diseases as man struggled to domesticate chickens. A discoverer must sometimes take risks and the domestication of the animals commonly found in our homes involved many risks. Many would fight back and kill their captors.

A cow is a very strong animal but a child of seven years may drive it to wherever he or she wants it to go. But this may not have been the case when it had just come out of the wild. It took some training and observation.

Enormous economic value

Man has continued to make observations on the plants and the animals under his control and to make improvements on them depending on the prevailing challenges and needs. He has carried out such practices as grafting, hybridisation, tissue culture, cloning, gene transfer, DNA tests, and a whole range of others in order to get higher yields or better tasting crops. He constantly carries out seed selection and preservation depending on his desires.

Some crop varieties are more resistant to disease while others may be more tolerant to adverse conditions like drought and a lot of rain. By selecting and propagating desired crop varieties, man has come up with a wide range of plants of enormous economic value from naturally existing species but of different characteristics. For decades, Uganda has been training scientists often using taxpayers' money.

The government has always allocated money to scientific research in institutes such as Kawanda, Namulonge, Kituza, Serere, and the others (never mind that the funding needs to be increased). There is a big reason for having these programmes. Some of them are fighting the "difficult" crop diseases like Banana Bacterial Wilt through genetic engineering. Others are improving the nutritive value of crops such as cassava and bananas. In other words they are using biotechnology to make our crops defend themselves better against disease and pests, to add nutritive value to our food crops, and to make many of our crops better adapted to the environmental stresses brought about by global warming. By not passing the Biotechnology and Biosafety Bill, Parliament will be hindering the progress of scientific agricultural research.

Matter of choice

The passing of the Bill is not to outlaw the conventional methods and practices of farming; rather it sets up alternative methods of increasing agricultural yields in the wake of new production challenges. We want to achieve Vision 2040 and to become a middle-income country by 2020 but we may not if we fear to experiment with our crops.

Plant breeding is about improving the quality, diversity, and performance of agricultural crops to suit our needs.

Plant breeding is one of the major secrets behind the massive crop production and impressive food security in such countries as the US, the UK, and the other industrialised countries in the world. Food production using GMOs is practiced in countries like India, where before everyone worried about survival, given their huge population.

Today, our population is among the fastest growing in the world yet our food production rate is among the slowest given our depleted soils, land fragmentation, crop diseases and hostile climatic conditions. Adaptation to GM crop production for us hardly seems a matter of choice anymore, in my view, it is the only alternative

East African Parliament plans superior regional legislation for GMOs: Charles Kazooba; 8 September 2013



The East African Legislative Assembly (EALA) plans to come up with a superior biotechnology law that will regulate the use of genetically modified organisms (GMOs).

In line with the East African Community Treaty, the law will supersede partner states legislations.

Following a petition to the East African Parliament by the civil society community to look into Uganda's draft biotechnology and biosafety draft law the regional lawmakers promised to first of all harmonize regulation of GMOs in the region and then come up with a superior law.

The feeling is that if efforts at harmonization were not made sooner, additional legislation to bring the adopted national policies into harmony will be required at a later date, increasing associated costs.

Patricia Hajabakiga, a member of EALA and Chair of the Rwanda Chapter, said that there is already a committee at the regional level discussing the both biosafety and biotechnology in order to harmonize ideas.

She said harmonization would be prudent since EAC was transforming into a single customs territory.

The chairperson of the Agriculture, Tourism and Natural Resources committee Ndahayo Isabelle from Burundi said that the EAC must therefore have harmonized policies with regard to food security. She said EALA will develop a law in regard to food security.

The East African Community (EAC) countries, Kenya, Tanzania and Uganda are at different stages of establishing their national biosafety frameworks yet cooperation across the different countries is important noting the porosity of EA country borders.

In other words, a GMO released in one country could easily seep into the neighboring territory through formal or traditional seed exchange systems.

There is general consensus that this is the right time to commence harmonization of regional policies for biotechnology and biosafety to enable development of a coordinated mechanism that exploits synergies amongst and is supported by complementary national frameworks.

The GMOs debate thus invokes mixed feelings from environment, food safety and human health sector policy makers and the general public.

Some activists in East Africa have started lobbying for harsher laws regulating biotechnology in the region but scientists, who are pro-GMOs think otherwise.

For instance, the pro GMO lobby has started campaigning for review of the Tanzanian law which has a provision of strict liability clause to regulate biotech.

They have been pressing for the abandonment of the 'precautionary principle' enshrined in the Rio Declaration on Environment and Development, and the removal of the 'strict liability' clauses that protect citizens and the environment.

Under its commitment to the international agreement, Tanzania developed The Environmental Management (Biosafety) Regulations 2009. This covers the procedures for dealing with applications for the testing, risk assessment, release and commercialization of GMOs, including liability for any damage caused by GMOs.

The Tanzanian Biosafety Regulations apply 'strict liability' meaning that whoever introduces the GMO shall be automatically liable for any damage caused. The pro GMO lobby wants Tanzania to remove this liability and perhaps replace it with 'fault based liability' which would mean that anyone claiming compensation for damage would have to prove that whoever introduced the GMO was somehow at fault.

For example, under the existing strict liability rules, if a farmer's crop was contaminated by GMO seeds then the farmer could expect to get compensation from whoever imported or introduced the GMO.

Under the proposed 'fault based liability' the farmer would have to prove that the person introducing the GMO was somehow at fault, e.g. that they had failed to follow correct safety procedures.

In Uganda, critics contend that the biosafety bill in its current form will make the country's food security subservient to the whims of external market forces.

Ms Barbara Karugonjo, a researcher with Advocates Coalition for Development and Environment argues that the objective section of the Ugandan draft law does not make any reference to precautionary principle as enshrined under international obligations in the Cartagena Protocol.

Therefore, abandoning of the precautionary principle reduces liability of multinational companies who would take advantage of the situation and flood the local market with GMO products at the expense of local farmers.

He says that the mere fact that the Bill does not make mention of the precautionary principle defeats the purpose of the proposed legislation to be cautious of emerging technologies.

The Bill also provides for expedited review of an application for research and general release of a GMO approved in another country with comparable ecosystems.

"The impression created by this provision is that Uganda is clearly in a hurry to introduce GMOs without any safety procedures. It is important to note that no two ecosystems are similar and such provisions undermine the ethos of the Cartagena Protocol and places the farmers in severe jeopardy," he argues.

Third, he adds, the Bill does not provide for compensation to farmers who have been affected by an accidental release of a GMO. The Bill states that a restoration order may be issued where an activity of a person causes damage.

"However, it is silent on who will bear the liability, whether jointly or severally, and does not attach liability to the developer of the GMO," said Karugonjo.

The Kenyan law is yet to be fully tested. Just recently a Minister banned GMOs following a study done by French researchers and published in the Journal of Food and Chemical Toxicology, which indicated that rats fed on GM maize, had developed cancerous tumours.

Bu the ban is being contested by Parliament. Three parliamentary committees on health, agriculture, livestock and fisheries and education science and technology said the ban that was announced by former Public Health minister Beth Mugo in November 2012 was illegal.

The MPs said the ban was simply an executive order that was not enforceable in law because it was not published in the Kenya Gazette to make it legally binding.

Ghana, Uganda research into GM crops: Samuel Boadi; 9 September 2013



Ghana and Uganda are making progress towards the quick adoption of genetically-modified (GM) crops as a means of fighting poverty and ensuring food security among people.

While Uganda is neck-deep into researching on the viability of a good number of crops, Ghana can be said to be making a remarkable headway too.

This can be evidenced by the recent clearance at the ports of the seeds of some three genetically-modified crops – cowpea, rice and cotton – by Ghana's National Bio-safety Committee. And these have been given to some research institutions for field trials. The two countries have not yet passed their Bio-safety Laws.

Banana

Recently, Ghana and the EU signed an agreement that will see the former receive 7.2 million Euros from the European Union to help with the production and export of bananas.

According to Finance Minister Seth Terkper, who signed the financing agreement on behalf of the government, the money will be used for the Banana Accompanying Measures Project (BAM). Research by Ugandan scientists on bananas enriched with vitamin A and iron is beginning to show promising signs.

The ongoing experiment known as bio-fortification at the Kawanda-based National Agricultural Research Laboratories (NARL) is the first of its kind in a developing country.

Dr. Geoffrey Arinaitwe, a member of the research team, explained to some four Ghanaian journalists who were sponsored by Biosciences for Farming in Africa (B4FA) to Kampala recently that the exciting development first appeared in late 2010 when the bananas were planted in a confined field trial at NARL, which is part of the National Agricultural Research Organisation (NARO).

The Vitamin A genes inserted in apple and nakinyika bananas were extracted from maize and asupina – an Asian banana cultivar – while the iron-promoting genes were got from soya beans.

Dr. Andrew Kiggundu, head of the National Agro-Biotechnology Centre (NABC) who took the journalists on a tour of some banana farms under confined trials, said the ongoing biotechnology-based research had prioritized saving staple crops from virulent pests such as weevils, nematodes and diseases like banana bacterial wilt (BBW, and fungal black 'sigatoka', also in bananas, cassava mosaic and cassava brown streak disease (CBSD) in cassava; and the sweet potatoes virus disease.

"In Uganda, for example, 10 million tonnes of bananas are produced each year, but up to 40 per cent rots and goes to waste. It is for this reason that we're determined to provide resistant lines against these serious constraints using biotechnology. But unless the draft bill is passed into law, technology from this useful research cannot get to would-be beneficiaries," Dr Kiggundu noted.

The journalists also toured the NABC laboratory, the Bio-safety Level II greenhouses and the confined field trials (CFT) site for genetically-modified bananas: sukali ndizi (apple banana) which is a dessert and nakyinyika (a cooking banana) – both bearing Vitamin A and Iron micronutrients, which are already expressing signs of integration of the two micronutrients.

Are the bananas edible?

Dr Kiggundu indicated: “We’ve asked government for permission to eat the first GM bananas from here, before anybody else eats them. We want to demonstrate to the world, the high level of confidence we have in the food from crops we have genetically-modified here, that it is as safe as any other banana.”

Ghana’s story

From a paltry 5,000 tonnes in 2005, Ghana now exports 65,000 metric tonnes of banana annually. Ghana exported 62,000 tonnes of bananas to the Eurozone last year.

Ghana’s exotic banana production industry directly employs 2,400 workers and indirectly benefits 40,000 people in the Volta Region alone. Bananas are the most exported fruits in terms of volume and they rank second after citrus fruit in terms of value.

In 2010, Ghana exported 52,000 tonnes of banana to mostly European countries, representing just one percent of the total export from around the world. According to the Food and Agriculture Organization (FAO) statistics, total export of bananas accounted for 15 million tonnes in 2010 valued at over US\$7 billion.

The European banana market is the largest in the world, with about 5.5 million tonnes imported per year.

Since 2006 when the European Union (EU) opened its market, there has been a rise in exports of between 2 and 5 percent annually from Ghana and the Cavendish variety, the most preferred, is cultivated by both small holder farmers and large companies.

Farmers like hybrid seeds but ignorant of GM Tech: Finnigan Wa Simbeye; 21 September 2013

DAILYNEWS

"I LIKE variety 5. The cob has many rows and the grains have filled the cob well. There are also two cobs on the maize stalk," Esther Liberati, 43-yearold farmer from Seloto village in Babati District in Tanzania, explains her number one choice from a set of 10 different types of maize being tested for adaptability to the region.

According to a recent article written by International Institute of Tropical Agriculture (IITA)'s Catherine Njuguna, Ms Liberati was among some 100 farmers or so who took part in a series of field days organised by Africa RISING in her village.

Under a project dubbed Water Efficient Maize for Africa (WEMA) which is a public/ private partnership arrangement that aims to improve food security and rural livelihoods among smallholder farmers and their families, Liberati is excited with the new maize varieties after facing years of uncertainty due to persistent droughts.

Babati District, which is one of Tanzania's arid regions that has suffered regular droughts in recent years the worst of which came in 2011, heavily relies on maize as a staple. Poor rains, diseases and pests have meant that yields are poor and often Babati District of Manyara Region has been a regular recipient of food handouts when droughts strike.

Use of traditional seed varieties and poor weather has impacted heavily on smallholder maize farmers who are the country's economic backbone as they provide both food and foreign currency earnings for the country.

"Farmers in Babati can now plant maize and expect to harvest bumper yields because of the conventional hybrid variety which uses less water and matures early," said Dr Alois Kullaya, Principal Agriculture Research Officer and Mikocheni Agriculture Research Institute (MARI).

Dr Kullaya who is also Coordinator of WEMA project in the country said from harvesting less than half a tonne per hectare to four tonnes thanks to use of conventional hybrid varieties which are a result of years of cross breeding different species of maize.

"We have come up with five varieties which are both drought and disease resistant," said Dr Kullaya who further unveiled that the five hybrid varieties have since been submitted to National Seed Certifying Agency (NASCA) for approval. As the population increases and climate change becomes a greater factor in food security, risk of hunger could increase up to 20 per cent by 2050, scientists warn.

In a bid to find a solution to such challenges, WEMA project was hatched by several international development partners and implemented in Kenya, Mozambique, South Africa and Uganda. Under the African Agricultural Technology Foundation (AATF), the project is funded by the Bill and Melinda

Gates Foundation, the Howard G. Buffett Foundation and the United States Agency for International Development (USAID) with National Agricultural Research Institutes in all the five countries International Maize and Wheat Improvement Centre (CIMMYT) and US based seed biotech company, Monsanto as partners.

But while many smallholder farmers are happy with the conventional hybrid maize variety and totally unaware of presence of much superior seed varieties dubbed genetically modified organisms which some scientists argue provide much better results and provide solution to Africa's food needs.

"With GM seeds, the yields will improve further and resistance to pests and disease will be contained," argued Dr Kullaya who is frustrated by the government's red tape in approving field trials for the crops which are a result of a gene from one species being administered into another seed.

MARI has since 2009 undertaken confined laboratory trials for GM maize in Makutopora village of Dodoma Rural District with promising results but stringent liability regulations are preventing field trials of the same.

According to the country's Biosafety Regulations of 2009, there is strict liability principle which essentially holds anyone associated with importing, transporting, selling or using a GM product liable for any perceived harm associated with it.

Scientists argue that the 'guilty until proven innocent' approach is detrimental to the technology which is already being used by over 17 million farmers globally.

With GM maize, local farmers who harvest between 1.5 and 2 metric tonnes per hectare will quadruple their yields to between 8-10 tonnes.

Dr Kullaya is frustrated that while the government is dilly dallying in approving the modern technology, neighbouring Kenya and Uganda are moving faster towards commercial production endorsement which may also affect Tanzania as seeds will likely cross borders.

Kenyan born Prof Calestous Juma, an advocate of GM technology urged countries such as Tanzania to ignore pressure from European partners opposed to the technology and adopt it for future food security.

Prof Juma who is author of a book titled, 'The New Harvest: Agricultural Innovation in Africa,' argues in it that the biggest challenge facing Africa today is lack of innovation in agriculture production. Juma who is also Professor of the Practice of International Development and Director of the Science, Technology and Globalisation Project said: "When GM crops were first commercially released in 1996, critics argued that they would only benefit industrialised countries.

In 2012 emerging economies overtook industrialised countries as the main adopters of GM crops," Prof Juma argued in a paper titled How Africa can Feed the World published last June. According to the International Service for the Acquisition of Agri-Biotech Applications, from 1996 to 2011 transgenic crops added 98.2 billion US dollars to the value of global agricultural output, over 50 per cent of which accrued to emerging economies, he argued in his paper.

Prof Juma further pointed out that the use of transgenic crops has reduced the use of active pesticide ingredients by nearly 473 million kg, while also reducing carbon dioxide emissions by 23.1 billion kilogrammes or an equivalent of taking 10.2 million cars off the road.

"But not all the regions of the world are reaping the full benefits of agricultural biotechnology. Of the 28 countries growing transgenic crops, only four (South Africa, Burkina Faso, Egypt and Sudan) are in Africa," he lamented while urging governments on the continent to embrace GM technology.

But Juma's critics argue otherwise. "Tanzania's problem is not poor food production but infrastructure to enable commodities move easily from regions with surplus to areas of scarcity," argues Abdallah Mkinde who is Coordinator of Tanzania Alliance for Biodiversity (TAB).

Mr Mkinde also argued that GM technology is not a solution to the country's food security warning that introducing transgenic crops risks surrendering the country's food sovereignty to multinational seed companies which own GM technology. "We don't own GM technology and certainly it doesn't provide a solution to our food needs.

Our best solution would be to improve soil fertility using farm manure, hybrid seeds and rural infrastructure," he argued. Mkinde has a strange bed fellow in Howard Buffet who also opposes US push for the adoption of GM technology by African countries.

"Small farmers in Africa and elsewhere often lack the income and training to buy and use biotech seeds and may become skeptical of technology if new products are used improperly," said Mr Buffet. Buffet who is World Food Programme's Hunger Ambassador argued recently that Africa is not a place for multinational GM technology corporations to make money.

Let's learn from our past mistakes in the 30 years and accept that this American approach of one size fits all is not going to work in Africa," he noted.

Through his Howard G. Buffett Foundation's, the son of American wealth philanthropist, Warren Buffet has years of experience in working with Africa through projects in Ghana, Liberia and South Africa where he assists farmers with modern hybrid seeds, training in good crop husbandry practices and entrepreneurship skills.

"While on my visit to Liberia, I found a woman who had cultivated GMO maize the previous year and kept stock of seeds and replanted the following year but the yield was very poor and I asked her why, she couldn't answer me," Buffett pointed out highlighting the general ignorance which many farmers on the continent have.

GMO seeds should be purchased every season because their productivity drops by up to 40 per cent if replanted which Buffet argued with hiked prices of up to 240 US dollars (approx. 386,032/-) per 50kg bag, it's out of reach by many local farmers.

Government to establish community seed banks: Paschal Bagonza; 26 September 2013



The government will by the end of next year set up community seed banks in the country to enable farmers deposit and also access seeds for whatever they want to use them for. So far, one seed bank has been established and fully managed by the community in Kabwohe, Sheema district, Western Uganda.

Dr Wasswa Mulumba, the head of the Plant Genetic Resources Centre says “these seed banks will be established within communities” to enable them keep the “diversity they have within their community” but can also access it anytime they need it. Dr Mulumba says they plan to start by establishing at least four community seed banks where farmers will be loaned seeds.

Community members, according to Dr Mulumba, will be loaned the seeds “with an understanding that you are going to bring back a certain proportion of that seed so that it continues being available.”

However, seed banks will not be imposed on the community, but will be established where farmers have been working with the national gene bank and also appreciate the diversity.

He underscores the significance of community seed banks in helping the country to monitor what is happening to different varieties of seeds.

He adds that the community seed banks also help “enhance the health of the farming system as far as pests and diseases are concerned.”

Such banks also contribute to increasing productivity because farmers are getting more aware of pests and diseases, which they try to keep away from their crops, according to Dr Mulumba.

In addition to the only seed bank in Kabwohe, Sheema district, there are also community seed stores that have been found in communities doing quite a similar thing in Kabale, but need strengthening.

Dr Mulumba says they are helping these community seed stores to become “well organised seed banks.” The new community seed banks will be established in Kabale, Mityana and Nakaseke.

Currently, there are about 4,000 accessions or different samples of seeds especially rice, maize, sorghum, millet, soy beans and beans among others at the National Gene Bank, Entebbe.

The bank also collects “relatives” of such crops because “they might have some genes that are important to be incorporated into the crops so that we can have better varieties which are resistant to drought, pest and may have better taste”, according to Dr Mulumba.

The bank collects mainly local varieties.

The Entebbe-based national gene bank began in 2004.

Tension over GM Crops Grows In Tanzania: Finnigan Wa Simbeye; 15 October 2013

The Des Moines Register



Tension over rice prices in Tanzania: Failing rice harvests on Zanzibar islands have prompted tension between the government and farmers, especially women farmers. Tanzanian journalist Josephat Mwanzi uncovered a side of Zanzibar that rarely is seen by tourists on the popular resort isla.

Scientists say they can help, but regulations set strict liability on use

DAR ES SALAAM, TANZANIA — A typical Tanzanian family will not pass a day without eating ugali — a stiff porridge made from ground corn, somewhat like Italian polenta.

Would Tanzanians eat ugali if the flour came from genetically modified corn?

Tension over that question is tearing at the country, with scientists insisting the answer should be “yes,” while GM foes say, “No way!”

Most of Tanzania’s corn is grown by smallholder farmers who typically plant seeds from traditional varieties and rely on natural rains. But the rains have failed them. The country’s 44 million people suffered severe droughts in 2003, 2005 and 2011. Millions needed food handouts to survive.

Beyond drought, local scientists say this basic crop also is threatened by climate change, disease and pests.

Genetic modification could help overcome those problems, scientists say. The technology has been adopted by more than 17 million farmers in other countries.

Under current government regulations, though, Tanzanian scientists cannot conduct field trials with GM plants. And farmers cannot cultivate any crop developed with the new biotechnology.

Alois Kullaya is one of several local scientists who are urging the government to relax the regulations. He is principal agricultural research officer at Mikocheni Agricultural Research Institute and also Tanzanian coordinator of a research consortium called Water Efficient Maize for Africa.

“We have finished confined laboratory trials from genetically modified seeds in 2009, but until now we can’t conduct field trials because of restrictive liability regulations, which means that all this research goes to waste,” Kullaya said.

Drought, disease drive need for modified crops

He said there is no question the technology is needed. Tanzania faces a future where farmers will have more mouths to feed under ever more difficult conditions — due to the double whammy of population growth and climate change.

Another threat comes from plant diseases. Several regions have been hit by viruses that cause maize lethal necrosis disease. Infected plants wither and wilt, with leaves turning from green to yellow. They often die before flowering. The disease can destroy an entire crop.

GM technology offers an eventual solution to that problem too, scientists say.

Under Tanzania’s biosafety regulations, though, developers of GM crops could be held liable for negative effects claimed in connection with them. The regulations, adopted in 2009, set out a “strict liability” principle. Essentially, it holds that anyone associated with importing, transporting, selling or using a GM product faces liability for any perceived harm.

Critics say this is a “guilty until proven innocent” approach.

Tanzanian President Jakaya Kikwete, whose government has adopted an agricultural development blueprint dubbed Kilimo Kwanza, has said the regulations will be eased, but he has not given a specific time frame for doing so.

Tanzania’s East African neighbors take a different, fault-based, regulatory approach with higher standards for proving harm and negligence. So researchers developing GM crops have shied away from Tanzania and worked instead in Uganda and Kenya.

While Uganda and Kenya have not given final approval for commercial sales of GM crops, farmers in those countries have been able to see field trials demonstrating their effectiveness. In Uganda, for example, scientists are making headway in trials of GM bananas that resist a destructive wilt disease. Tanzanian farmers have lost thousands of acres of the crops to the same disease.

Anti-GMO activists defending regulations

Opponents of genetically modified organisms are urging Kikwete’s government to hold the existing regulations in place. To allow GM crops would be to risk injury to health and the environment, they argue.

“Whoever introduces GM crops should be responsible for whatever happens on the ground,” said Abdallah Mkindi, Coordinator of Tanzania Alliance for Biodiversity, a 19-member organization of environmental and organic farming groups.

He alleges that local scientists are a front for multinational seed companies. Those companies eventually will control Tanzania’s farmers if they are allowed to sell GM products, Mkindi and his allies maintain. Rather than improve food security, that prospect threatens food for the future, they say.

“GMO is not a solution to famine,” Mkindi said.

Farmers want options, technology that works

Cassava is another crop that scientists have targeted for genetic modification, inserting genes intended to help the widely consumed tuber resist diseases and pests.

Cassava farmers at Mapinga village near Dar es Salaam said yields have been poor in recent years because of cassava mosaic disease. Mwajuma Mpanju said her crop was wiped out by the disease three years ago.

Farmers are interested in any technology that works, she said. All tools should be available so that farmers themselves can choose what is best to meet their needs.

What farmers want, she said, is choice — a variety of seeds and tubers on the market.

Indeed, scientists warn that Tanzanian farmers may take to the GM crops on their own if they see remarkable success in Uganda and Kenya.

After Burkina Faso adopted BT cotton, which contains a defense against destructive insects, farmers in neighboring West African countries reportedly obtained the seeds even though they were illegal in those countries.

“In Uganda, BT banana is doing very well,” Kullaya said. “If we don’t allow GMO field trials ... farmers in (Tanzania) will likely adopt the variety.”

Low yields could force region to adopt GM crops: Isaac Khisa; 16 October 2013

The EastAfrican

www.theeastafrican.co.ke

In spite of ongoing campaigns against growing genetically modified crops in East Africa, the effects of climate change, pests and diseases as well as rapid population growth could see farmers in the region embrace GM crops as soon as biotechnology laws are passed.

Scientists who gathered in Kampala on September 27 to mark 10 years of the existence of the African Agricultural Technology Foundation (AATF) said farmers in Uganda, Kenya, Tanzania, Rwanda and Burundi must grow GM crops alongside their conventional crops if the region is to achieve food security.

AATF is a not-for-profit organisation that promotes public-private partnerships for access to and delivery of appropriate agricultural technologies for sustainable use by smallholder farmers in sub-Saharan Africa.

Yonah Baguma, a principal research officer at the National Agricultural Research Organisation in Uganda said conventional crop breeding has proven unsuccessful in making crops to diseases and pests.

“We as scientists embarked on using biotechnology in developing resistant planting materials because conventional methods proved futile,” said Dr Baguma.

READ: [East African scientists defend work on GMOs](#)

Sterile crops

Dr Baguma added that some crops such as cassava and bananas are difficult to breed for resistance using conventional methods as they are sterile, and thus do not produce fruits.

So far, Uganda has approved and carried out field trials on banana to test black *sigatoka* disease resistance (2007-2009); two trials to evaluate Bacterium *throngsis* and roundup ready cotton (2009-2010); a trial to test cassava mosaic virus resistance (2009-2010); and two ongoing trials to test banana bio-fortified with vitamin A and iron, to test resistance to banana bacterial wilt.

READ: [Ugandan scientists to start trials on GM potato for resistance against blight](#)

The scientists are also carrying out confined field trials on GM maize to test their resistance to stem borer and drought as well as Irish potato to test resistance to *Phytophthora infestans*, the fungus that causes potato blight.

This puts Uganda at the helm of carrying out confined field trials on GM crops in different parts of the country.

Kenya is carrying out confined field trials on cassava to test for resistance against cassava mosaic virus, cotton for insect resistance and maize to test drought and insect resistance. The country's scientists are also carrying out research on sweet potato for disease resistance as well as bio-fortified sorghum enhanced with vitamin A, zinc and iron.

Commercialisation

Kenya is working towards commercialising GM cotton by next year after successful field trials showed the crop's ability to cushion farmers against high production costs. Uganda projects to commercialise the crop in 2017. Tanzania, Burundi and Rwanda are yet to start trials on GM crops.

The GM cotton variety is resistant to pests and diseases, which have contributed to low yields.

In Africa, only South Africa, Egypt, Burkina Faso and Sudan have commercialised GM crops, according to the Global Status of Commercialised Biotech/GM Crops: 2012 report released by the International Service for the Acquisition of Agri-Biotech Applications.

Until 2008, South Africa was the only country in Africa that allowed the commercial cultivation of GM crops, such as maize, cotton and soybeans.

In the same year, Egypt started growing small quantities of GM maize, followed by Burkina Faso, which allowed GM cotton. Last year, Sudan allowed growing of GM cotton.

South Africa accounts for nearly all of the three million hectares of GM crop plantings in Africa, dwarfing the 129,000 hectares in a largely GM-free Europe but still a tiny fraction of the 170 million hectares of global GM crops.

Globally, more land in developing countries is under GM crops compared with industrialised countries, for the first time since the introduction of the technology two decades ago, the report said.

"Out of the 28 countries that planted GM crops in 2012, 20 were developing and eight were industrial countries, compared with 19 developing and 10 industrial countries in 2011," said the report, signifying a major shift by farmers to growing GM crops.

Many African countries are currently at different stages of enacting biosafety legislation, ranging from functional, interim and "work-in-progress" national biosafety frameworks.

Nigeria will not be laggard in agricultural biotechnology: Akinwunmi Kole-Dawodu; 18 October 2013



NAN-F-27

Biotechnology

Iowa (U.S.), Oct. 18, 2013 (NAN) Dr Akinwumi Adesina, Minister of Agriculture and Rural Development has said that Nigeria was ready to embrace agricultural biotechnology.

He stated this on Friday, in Iowa at a World News Conference organised by the World Food Prize Foundation (WFPF).

He advocated for an accelerated pace for the use of biotechnology while calling for appropriate bio-safety regulations.

“Life is all about balancing the risk and we should not be afraid of science. The issue of food insecurity we are grappling with today in Africa can be overcome by science.”

The minister said that through biotechnology; bio-fortified crops such as orange flesh sweet potatoes, Pro-Vitamin A cassava and drought tolerant maize now hold great promise for feeding Africa.

He explained that the U.S. transformed its agriculture by linking research and development, private sector and farmers thereby turning the nation into the largest producer and exporter of agricultural commodities.

He argued that Africa could also achieve this adding that 60 per cent of all the available uncultivated arable land in the world is in the continent.

Adesina stressed that there was a new energy and dynamism across the continent that could be seen in an emerging middle class, improved governance and a heightened interest by foreign investors.

He however said that the continent was still grappling with food insecurity and malnutrition.

"For decades, Africa has looked at agriculture through the wrong lenses, seeing agriculture as a development program, run by governments.

"We see challenges, we see poverty and we devise solutions for managing poverty. Poverty can not be the comparative advantage of Africa," He said.

He observed that biotechnology could create accelerated opportunities for millions of farmers to connect to markets, private agribusinesses as well as propel them out of poverty into wealth.

The News Agency of Nigeria (NAN) reports that the minister also had a breakfast keynote address delivered to the Global Youth Institute, a youth programme of the WFPF. (NAN)

Pioneers of GMO Revolution Receive Agriculture's Highest Honour: Henry Lutaaya; 25 October 2013



L-R: Robert Freley of USA, Montague of Belgium and Mary-Dell Chilton of USA won the World Food Prize last week in Iowa, USA

Three scientists who discovered and developed the technique of using specific genes to control the

behaviour of plants have been recognised for their contributions which are acknowledged as a powerful tool towards ending hunger and poverty in the world.

The three scientists Dr. Van Marc Montegue from Belgium and two American researchers Dr. Mary Dell Chilton and Robert Freley received the World Food Prize at a sparkling awards ceremony held at the seat of the capital of the US State of Iowa in Des Moines last Thursday.

The World Food Prize, started by Nobel Peace Laureate the late Dr. Norman Borlague in 1987, is considered by many as world's highest honour in the field of Agriculture and is awarded every year to individuals with outstanding contributions towards ending hunger in different parts of the world.

The President of the World Food Prize Foundation Ambassador Dr. Kenneth Quinn hailed the three scientists for their pioneering efforts that have led to the development of a number of genetically enhanced crops that are now grown on 170 million hectares by over 17 million farmers worldwide.

The award winners received glowing tributes for their work which many say has helped to reduce hunger in many parts of the world. Because of its ability to enhance crop yields as well as resistance to pests and climate stresses, GMO crops have been cited as one of the best tools to end hunger and poverty in the world, especially Africa where the challenge of poor yields, climate stress and crop pests and diseases pose the greatest challenges.

In response, the laureates, while acknowledging the opposition towards their efforts, noted that the technology offers immense potential in the fight against hunger and poverty.

Mary Dell Chilton, one of the founders of the global multi-national Syngenta, said:

"My hope is this will put to rest the misguided opposition" to the crops. Chilton referred to genetically modified organisms as a "wonderful tool" in the fight against hunger.

The awards were part of a week-long series of events that included the Norman Borlague, also held in Des Moines, to discuss the relevance of biotechnology in an increasingly changing climate to ensure food security and environmental sustainability.

The events were however not without the cloud of controversy that has surrounded the GMO technology for several years now.

Several groups such as the Union of Concerned Scientists staged protests around the awards venue blaming Fraley's Monsanto as having failed to improve agriculture.

The groups which included Centre for Food Safety, Iowa Citizens for Community Improvement and other Action Aid, said they delivered a petition to the World Food Prize signed by more than 345,000 people opposed to GMOs.

Uganda's parliament is yet to debate a controversial bill whose aim is to regulate the introduction and development of crop traits that result into higher yields or better resistance to pests and diseases.

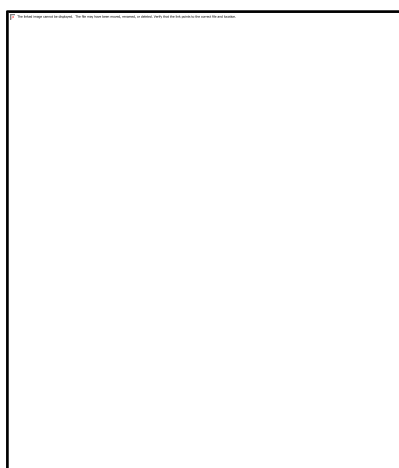
Endorsing GM Crops: Kenneth Azahan; 29 October 2013



News Introduction:

Continued endorsement of genetically modified, GM crops within the scientific community to many is cheering news. - By Kenneth Azahan

The United States of America, Academy of Science, recently found that “No adverse health effects attributed to genetic engineering have been documented in human population.” In similar allaying of fears, the European Commission in a report stated that the World Health Organisation, WHO has concluded, the GM foods “Are not likely, nor have been shown, to present risk for human health.”



Besides, an overview of safety studies carried last month in the publication, Nature Biotechnology, highlighted that critics have failed to produce that GM foods are have negative health effect. Interestingly, Nigeria’s Minister of Agriculture and rural development Dr Akinwumi Adesina, at a world news conference organised by the World Food Prize Foundation, WFPF, in Iowa, United States of America, expressed the country’s readiness as well as advocated for rapid use of biotechnology. Adesina, who called for appropriate bio-safety regulations, noted that “Life is all about balancing the risk and we should not be afraid of science. The issue of food insecurity that we are grappling with today in Africa can be overcome by science.”

According to reports the minister also said that the US transformed its agriculture by linking research and development, private sector and farmers thereby turning the nation into the largest producer and exporter of agricultural commodities.

It would be recalled that Nigeria’s scientists had earlier highlighted the benefits inherent in the use of Genetically Modified, GM, crops saying it can be applied to ensure food security.

A team of Engineers lead by the Acting Executive Director, National Cereal Research Institute, Badagi, Niger State, Dr. Mark Ukwungwu who spoke recently when Bioscience For Farming in Africa, B4FA led journalists to the institute, besides ensuring food security, GM foods can be leveraged on to improve farmers economic wellbeing, in the sense that GM crops requires less inputs to achieve higher yield.

Giving credence to calls that Nigeria should embrace GM crops, the scientists explained that science was evolving and better discoveries are being made stressing that with Uganda and Ghana experimenting with the crops, many more countries will follow suit soon.

Lack of fertiliser, improved seedlings amongst other factors has been militating against the ability of farmers to practice commercial agriculture in Nigeria and other African countries.

The research institution according to Engineers at the institution which is about the oldest research centre in the country, has developed 62 varieties of rice, 8 varieties of soya beans and sugar cane but noted that there was need to improve the infrastructure in the sector adding that no country that has attained rice sufficiency grows it with rain fall.

The scientist averred that the Agricultural Transformation of the present administration has done a lot in terms of provision of inputs but more still needs to be done to improve the infrastructure. Meanwhile, Countries that have already keyed into scientific inventions to improve agricultural yields through the use of genetic modified crops have leveraged on it to broaden their food sufficiency approaches as well as opened viable economic windows for farmers and their citizens to explore.

Sadly, the positive impact of science on agriculture has not been felt in some parts of the world – Africa and some South-East countries of Asia. While science has made it possible to have various kinds of seedlings that encourage all year planting, Africa is yet to feel the benefits of this scientific feat as most farmers in the continent still rely on their traditional seedlings that often time does not give good commercial yield as well as withstand diseases.

This is largely due to neglect of the sector by various governments in Africa and ignorance or lack of zeal for some farmers to transit from their traditional to modern or mechanised agriculture and the end effect has been low productivity and crop harvest could not stand competition in the international market. Therefore, farmers in Africa largely do not make much profit as those in the developed world.

Poor utilisation of science in agricultural practices in the underdeveloped world has resulted in low productivity that does not only make poor countries unable to ensure food security but also, make the sector unattractive for many thereby, limiting the chances of building a successor generation of farmers. As a result, of this, agricultural activities are more often than not left in the hands of old and conservative farmers who largely do not embrace the application of science in agriculture. Despite the potentials of GM crops there are countries in Africa and South-East Asia that are said to be still cultivating non hybrid species of crops; and the result is low yields. It is said that, some 40 per cent of the world's corn farmers still use nonhybrid, open-pollinated varieties that agricultural advanced nations such as the United States abandoned decades ago, and their yields are far, lower than what could be achieved with modern seed varieties.

Kawanda Develops Wilt Resistant Banana Varieties: Francis Kagolo; 30 October 2013



Researchers at Kawanda national agricultural research laboratory have developed new varieties of bananas resistant to the devastating banana bacterial wilt disease, nematodes and weevils.

The bacterial wilt disease has ravaged banana crops across the country for over a decade with a capacity to cause 100% loss on a plantation.

Leaves of an affected plant turn yellow and droop while the fruit gets discoloured and destroyed. The disease can spread quickly through a plantation and from farm to farm.

Following its outbreak in 2001, farmers in parts of central and western Uganda have been cutting down their plantations to contain the disease, hence losing their source of income and food.

But Dr. Andrew Kiggundu, head of the biotechnology centre at Kawanda, said the future is bright.

The new varieties developed in collaboration with the Queensland University of Technology, Australia, are still being monitored in confined field trial gardens at the research institute.

According to Dr. Kiggundu, the varieties are a result of genetic engineering, a third generation form of biotechnology which allows the transfer of genes between species that would not naturally interbreed.

Banana genes were mixed with genes from sweet pepper to get the variety that is resistant to bacterial wilt.

"We first planted these bananas last year and we got 100% resistance against the bacterial wilt. If they show resistance for the second time, we will be able to plant them in various places around the country for final confirmation," Kiggundu said.

He was addressing journalists including those visiting from Tanzania under the Biotechnology for Africa (B4FA) media fellowship.

Nematode and weevil resistant varieties

Besides bacterial wilt, the experts are also testing another variety of bananas that is resistant to both nematodes and weevil borers (Kayovu). The two pests attack the comb of the plant and weaken its roots, retarding its growth before it eventually falls when the wind comes.

They account for between 30% and 40% of losses in banana plantations, although the damage can be heavier in poorly managed plantations, according to Dr. David Talengera, a research officer at the biotechnology centre. He said the nematode and weevil resistant genes were got from pawpaw and rice plants.

Vitamin fortification

To reduce micronutrient deficiency and anaemia among Ugandans, the researchers have also fortified yellow bananas (Ndiizi), mostly eaten as fruits, with Vitamin A, Zinc and Iron.

The three nutrients, essential for proper growth in children, intellectual development and supply of blood in the body, were got from genes of maize and a special type of foreign bananas called Aspina.

"Banana is a staple food. Some people can eat bananas daily but still lack these nutrients. A number of children are stunted while many expectant mothers die due to lack of enough blood. This is what the new varieties are to address," said Kiggundu.

He asked Parliament to expedite passing of the Biotechnology and Biosafety Bill, 2012, to allow distribution of the new varieties to farmers, slated for 2015.

Tabled in Parliament in February, the Bill provides for development and general release of Genetically Modified Organisms (GMOs), and a regulatory framework to facilitate safe development and application of biotechnology.

"We develop technologies which we feel should reach farmers to boost food and income security. If we don't pass that law for regulation of GMOs, we will be opening Uganda to danger," said Kiggundu.

Kiggundu allayed fears of the products having ill-health consequences.

'For the first time in our civilisation, plant varieties will go through a rigorous approval process for safety. If the law is passed, crops will first be tested against toxicity and allergy issues. This has never been done before in our society," he stated.

"If any GMO crop can pass these tests then be sure that it is safe. It is better to trust food that goes through strict testing regulations than one that is not tested."

Asked about allegations that GMO seeds are expensive, Talengera said unlike US where seeds are developed by business companies whose seeds are patented, Kawanda is a government institution.

"These (varieties) are public goods. We are government employees. The moment a farmer gets a banana variety and it works, they will be free to share the suckers."

He cited Kenya, South Africa, Burkina Faso and Egypt as other African countries that have embraced GMOs.

NARO IITA Develop First-ever Hybrid Banana Variety: Akinwunmi Kole-Dawodu; 30 October 2013



Expertise from the National Agricultural Research Organisation (NARO) and the International Institute of Tropical Agriculture (IITA) have succeeded in developing the first-ever hybrid cooking banana varieties developed for high-yields and disease-resistance.

The banana varieties, 26 in number named NARITAs, were as a result of over two decades of joint breeding efforts by the two bodies. Production of East Africa Highland Banana, matoke, has been identified to witness increase in productivity traceable to the distribution of the high-yielding disease-resistant hybrid 'matoke' banana.

The development is part of the IITA banana and plantain program which was started in 1979 with the aim of addressing challenges facing plantain in the region, especially low yield and Black Sigatoka disease attack.

According to IITA, the hybrid bananas were tested in all banana growing areas of East Africa, in collaboration with respective national programmes. The new hybrids record almost 60 per cent higher yield than the local "matoke." The hybrids also proved to be resistant to black Sigatoka, a fungal disease of banana globally which leads to loss of over 30 to 80 per cent of banana.

East Africa was the choice of the hybrids' testing on the notion that the region is home to highland banana as well as the highest consumer of the variety worldwide.

Commenting on the development, the IITA Banana Breeder, Rony Swennen affirmed that the hybrids banana denote good news for millions of smallholder farmers growing banana in the region as they pose a great potential to boosting the region's food security while also eradicating poverty, and that the previous cooking bananas, grown before in the region, are old varieties with low yielding and prone to diseases.

How science is vital for future farmers: Michael J Ssali; 6 November 2013



When teaching of sciences emphasised in schools, most people think about the need to reduce the shortage of health workers, engineers, other science-oriented professionals. But few realise the ordinary farmer will need to be grounded in science to keep pace with the emerging food production challenges.

The future farmer will, for example, need to understand how methane gas is produced as a by product of agricultural activities and its contribution to climate change. He or she will need a clear understanding of the advantages of biotechnology applications such as tissue culture, which generates disease free and clean planting material.

It is one thing for a smallholder farmer to plant hybrid seed because he or she has been told to do so and quite another when he or she chooses hybrid seed because he or she fully understands its advantages and the process of its breeding.

Dr Margaret Karembu, director of the Nairobi based International Service for the Acquisition of Agri-biotech Applications, has written that Africa's agriculture remains backward due to limited application of modern science and technology.

So, producing enough food for the growing population will require technologies that demand the least amount of land with the least aggregate of external inputs in extremely harsh conditions such as drought and flooding. For these are some of the future challenges that climate change portends.

Future agricultural production therefore has a relationship with how well equipped and prepared the school teaches science.

Our best science students need not be oriented only towards conventional 'good' professions but also towards farming which, if scientifically practiced, can be productive and well paying.

The youth can turn their large numbers into the big labour force needed to revolutionise agriculture if only they can change their attitude of regarding farming as the occupation of the uneducated and 'unemployed'.

Ministry of Education is expected to play a leading role in this effort by making sure that every school has a school garden, where the youths get introduced to climate-smart farming technologies.

A school garden at every school makes sense since farming and agriculture-related industries are the country's biggest employers.

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Fund agricultural research, plant breeding, develop hybrid seeds for farmers: Mohammed Kandi; 15 November 2013



Mr Daniel Otunge, is of the African Agricultural Technology Foundation (AATF) and Coordinator of the Open Forum for Agricultural Biotechnology (OFAB) in Africa. In this interview with our Agriculture Editor, **Mohammed Kandi**, Mr Otunge believes Nigeria in particular and, Africa at large, are lagging behind in adopting best technologies that would transform the agricultural sector. He also expressed concern on the high rate counterfeit seeds that are gradually taking over the African markets. Excerpts:

We have heard much about Biotechnology-driven agriculture around the world these days, what is the significance of developing seeds into hybrid and why should the farmer accept this system rather than his own “traditional” method?

I think it's important to produce hybrid seeds and market them to farmers because we have realized that that the Open Pollinated Variety (OPV), have a lot of challenges in terms of the diseases that attack them and the pest that attack them that they are susceptible to and therefore, you find that the yields are very low, that is why the breeders are saying let's come up with a hybrid seeds which have better yielding technology and if farmers can adopt these in large numbers then they will be able to harvest more from their farms than they are currently doing, depending on their open pollinated variety or farmer saved grain, because this grains as you keep growing them, their potency goes down and the more you grow them and save and plant and save, they will keep on reducing in terms of their vigour that enable them to yield more. Therefore, hybrid seeds are better because they are better developed technology that can ensure that when you plant it, you get better yields; you get maximum yields especially, when you actually combine that with proper agronomy in terms of fertilizers, if there is good rain, if you weed in time and all that, and then you will get the best.

Considering the appreciable growth in the global agriculture in developed societies world over, what would you say are challenges facing the agricultural sectors in Nigeria and in Africa?

The agriculture sector in Nigeria in particular and Africa in general is faced by many challenges. One of them is low production, the breeding of what is called the breeders seed, the fast seed that comes from the breeder or the institution that breeds them, we get very few of them and secondly, there is very limited funding to breeders to be able to produce more seeds, and then thirdly, we have very few companies in Nigeria, local companies that are able to multiply the breeder or the foundation seed into Certified Quality Seed and market them to farmers.

The other thing is that there is very limited investment in the seedling sectors by the government and that means many farmers are not aware of this high quality seed that are there. The other thing is that most of the seeds that are being planted by farmers are actually farmer-saved seed and not

the hybrid seed and that distorts the market and therefore, most seed companies are unwilling to invest in the Nigerian market.

Another thing that you may have is that the poly seeds that are available in Nigeria and the implementation of those poly seeds are questionable. You need the government to be more serious in terms of the implementation of the poly seeds and also the protection of the breeder's right so that you encourage more scientists to be able to breed better seeds for our farmers.

Do you think there are counterfeit seeds in circulation in Nigeria and Africa and how does the farmer identify one?

Actually, that's what I wanted to come up with. One of the major challenges is the importation of low quality or bad seed into Nigerian market because regulation is weak and may be, they are also not following the national standards and principles that are there and therefore you find a lot of faking of seeds because farmers are looking for quality seeds and therefore, scrupulous people are taking advantage and going to take grains and then they colour them, package and then sell them to farmers as seeds and yet they are not and when farmers plant that, it turns out they are not producing anything.

The only way farmers can know whether these seeds are good seeds or not is if the seed companies themselves are strong enough to come up with good and well protected packaging that are given by the government and of course the international standard that are put on the labels, that are difficult to copy, that's when the farmers can be able to determine.

Apart from that, there needs to be in place serious policy by the regulatory authorities, government authorities so that they can create the market once while we check which seeds are not of good quality and remove them out of the market and prosecute the people who stock them- both the seeds and its suppliers that will be able to determine.

Who should be held responsible should counterfeit seeds flood the market?

The Government Regulatory Agency in charge of Seed certification should be the one at the feet of sanitary measure, they are the ones supposed to be responsible for seed if it is being marketed. And then the other thing is that, the seed company itself, if their labels, for example, Premium Seed, if their label is being used in the market to sell fake seeds. They should be able to detect this and then remove it from the market or appeal to the authorities to remove it by doing their own survey, that is what other countries are doing and in a country like Malawi for example, the seed company will be held responsible if its packages are constantly the ones that are being faked. They should make sure they are the ones that monitor the market, and if they see that their labels are being faked, and then they see what to do and by working with the authorities to make sure that the people that are doing this are identified because it's a really bad thing.

Do you think there should be proper regulation for African breeders and what is the implication of not having any in place?

Regulations are needed especially in intellectual property; it is needed to protect the rights of breeders so that you can have more people entitled to breed. Then you can also have encouraged

investment in the seed business in the country because if the seed companies realize that their intellectual property they invest in are not protected, then it means they would not be able to control the market because anybody else can get in the market, reproduce their seed and sell it.

Do you think that biotechnology can enhance the development hybrid seed especially in cutting down the longevity of the period of development?

Yes, it can be done. Biotechnology, especially the GM technology, is genetically modified engineering that can actually reduce the number of year seed gets to develop because it is a shortcut whereby you pick on a particular gene you want, you specifically pick on it and insert it into the crop you want to enhance its productivity or protect against insect. As opposed to the method of convention where you just do the crossbreeding and do what is called backcrossing, until you get whatever you want and all the genes in it, that backcrossing takes a very long time and you are not even sure whether you are going to get the exactly the trait that you need.

Biotechnology has been able to shut them down and you now protect the crop from the insect, from pests and many others. What we really need to discuss asides Africa, even as Nigeria, the length of time it takes to access the potential risks involved in biotech crops, it's what is making the technology take a long time but it can be reduced because some of these have been done in other countries, for example, Burkina-Faso. If Nigeria wanted to research on BT (Biotechnology) cotton, they do not have to repeat the whole thing yet Burkina Faso which is next door has done it. Ghana is just going to do exactly what I'm saying, instead of going to test the BT cotton in the land, they are going directly to what is called multi-location testing in farmers seed, which will take them two years instead of five years that Burkina took to do the testing of the technology and more so it would take them a year or two and maybe by 2014 or 2015, the farmers in Ghana will be growing breeding cotton.

What strategies should stakeholders adopt to ensure availability of quality seeds to the farmers?

The strategies, first and foremost, I think are to make available seed the companies as they want. The seed companies are developed in capacity so that they can take out the breeders and scan them into foundations and multiply them and have them certified and market them to farmers and you can use various marketing strategies. One of them is to organise which is what is done in many countries, organize farmers in farming schools so that these farmers can be trained and awareness is created among them of the existence of our availability or better yielding seed facilities that they can adopt.

The other thing is that government can also put in subsidies and create facilities that farmers can access and be able to buy the seeds and plant them and another thing that can be done is to put more money into agricultural research so that breeders have money to do research to develop better hybrid seed for farmers.

From all that you have seen would you say that Nigerian biotechnology and research organizations match international standards?

I think I was not really very impressed because when we visited the two institutions, most of them did not have electricity and workers at one of the organisations are also on strike and that means

there are certain issues that need to be addressed in terms of the labour issues but when it comes to the issue of electricity, it is really unfortunate that you can visit a high-hand lab like in NABDA for example, and find out that there is no electricity and therefore the research that was going on is somehow suspended unless there is another place where they do this because what I know is that electricity should be supplied permanently for some of these seeds that are at development stage to grow optimally and protect them from many other things.

Secondly, that means they need to be more investments in these areas because even the labs that we visited, some of them are still remittant actually, then maybe ten, twenty years behind because there are new technologies that breeders use currently in both the agriculture lab and the bio scientist lab that Nigeria needs to invest in and maybe put in a place like NAFDAC, advanced technology lab. That means also more training in terms of human resources, more buildings of infrastructure in terms of equipping the labs and having the high-hand technologies that are needed to do this kind of research but I know NAFDAC and the others on a positive note, they work with a number of other institutions like universities in Nigeria and also co-societies and others and maybe those institutions have better technologies which can be used to develop some of these crops like cowpea. I know cowpeas are being done at Zaria, I'm sure they have the facilities to be able to do this and therefore that partnership is needed but another thing Nigeria needs to do is to consolidate, stop having so many institutions doing the same thing and therefore, the little money that we have is spread through unnecessary things and at the end of it all, it will not have impact.

What do you think is the essence of bringing together journalists and scientists to brainstorm on biotechnology, GM promotion?

I am personally a journalist by trade and I know the power that we have, the power of the pen, the power of the camera that we have and then the power of the media outlets like the newspapers, the radio, the television and even the internet that we use to project information. I would encourage fellow journalists that please use your power to explain to the people about the technology, understand it yourself as a journalist by reading deeply into the issues.

Understanding what the gene is, you have learnt a lot, you have been trained to be able now to write more effectively and pass on correct information that is science-based, to the population so that they can understand these technologies and you will be able to explore the needs and the concerns that surround these technologies and staple its development in Africa, because the rest of the world is moving forward, they are moving forward with these technologies and they are benefitting hugely.

India, Pakistan and China are now becoming the largest cotton producers because they are simply adopting the biotech cotton and we can do it. We have 60% of arable land in Africa, what we need to do is to come up with the best and good technology and also have good policies and regulations to be able to use this land to feed ourselves and feed the world.

Apprehension over GM crops misleading, say African scientists: Kenneth Azahan; 19 November 2013



African scientists under the aegis of African Science Academies, ASA, has described as misleading certain claims that Genetically Modified crops were harmful to human and animal health.

The scientists in different presentations at the ongoing conference in Addis Ababa, Ethiopia, on the theme, 'The Role of Biotechnology for Africa's Development' hosted by the Ethiopian Academy of Sciences as part of the ninth annual meeting of the African Science Academies, AMASA-9, were unanimous that GM crops are not only safe for consumption but also environmentally friendly.

For Prof. Jennifer Ann Thomson of the Department of Molecular and Cell Biology, University of Cape Town, South Africa, in a presentation tagged 'Is Africa Going to Miss the Train?' said 50-70 percent of Africa's labour force is in agriculture, hence the need for the continent to play key role in trends in the sector.

"Infected crops have potential of causing diseases if consumed and the hybrid and GM crops are resistant to infections thereby making them safer for consumption than non disease resistant crops", Thompson said. She stressed that even though transgenic crops have been opposed by skeptics, it holds the key to withstand pests and diseases.

"The difference between classical breeding and GM is time and if farmers have accepted hybrid crops and bought the seed, they will also buy GM seeds. "Claims that if you consume GM foods you will not be able to have children ... are totally baseless," emphasising the need for the public to be availed with the right information.

She expressed optimism that with the assent to GM field trials ongoing in some African countries such as Nigeria, Uganda, Ghana, Kenya amongst others, the continent stands to benefit from the technology.

For his part, Dr. Melaku Gedil of the International Institute of Tropical Agriculture, IITA, Ibadan, emphasised that biotechnology application in Africa is critical to reducing the time frame associated with developing new varieties using conventional breeding methods. He also stressed the need for Africa to develop manpower that would drive the technology that has potentials of making her a food secured continent and opening up her economy.

In a remark, president, Nigeria Academy of Science, Prof. Oyewale Tomori noted that time had come for scientists to get involved in ensuring that research is giving its place rather than leaving it all to politicians to decide the fate of science.

Prof Tomori regretted that it was institutions in the west that were encouraging research on the continent and urged African governments to support research for her growth.

The conference which is being attended by scientists from and beyond the region is expected to come out with Africa's stand on biotechnology vis-à-vis bio-safety.

Former anti GM advocate apologises for misleading farmers: Alex Abutu; 25 November 2013



Mark Lynas, a visiting professor at Oxford University and former lead campaigner against the deployment of genetically modified organisms has apologised to farmers across the globe for misleading them during his role as an anti-GM activist.

“I personally share some of the blame myself, for the years I spent as an anti-GMO activist. During this time, I personally destroyed GMO crops in the field with activist groups. I co-organised the first-ever occupation of Monsanto Headquarters in the UK. Every time I hear another myth about GMOs causing cancer or taking genes from fish and putting them into tomatoes or making seeds sterile or whatever it is, I feel partly responsible for this,” Lynas said.

“In my view, the controversy over GMOs represents one of the greatest science communications failures of the past half century. Millions of people have come to believe a story about GMOs, which is not just wrong in parts but across the board is the precise opposite of the scientific truths,” Lynas said at the launch of AfricaSTI magazine in Abuja, Nigeria.

He said that scientists were to blame for failing to inform society of the real benefits of their work, even when the scale of the challenge became clear. Lynas noted that biotechnology was not a silver bullet but that it can help address the colliding imperatives of population growth, ecological damages and climate change.

According to the repentant GMO advocate, if activists succeeded in getting governments to ban GMO crops worldwide, then they will have denied our scientists a vital tool for promoting food security and sustainability in an era of accelerating ecological crisis.

Ghana Takes Measures to Revamp Cotton Industry: Audrey Dekalu; 29 November 2013



Tamale, Nov. 28, GNA - Among considerations to revamp Ghana's cotton industry is the introduction of *Bacillus Thuringiensis* (BT) cotton, also known as genetically modified cotton.

Mr Bede Zeideng, Northern Regional Minister, said new cotton varieties genetically engineered with BT gene had been introduced globally to contain the boll worm pest that affected cotton.

Mr Zeideng said this in a speech read for him at the Biotechnology and Biosafety Sensitization workshop in Tamale.

The three-day workshop is to build confidence of partnership in safety and benefit of biotech crop and also identify from each target group who can advocate for biotech crops.

Topics to be treated include Principles of Biotechnology, Status of Biotech Research in Ghana, Global Status of Commercialized Biotech Crops and Possible Areas of Collaboration between Farmers and the Media on Agric-Biotech Communication.

Burkina Faso, one of the largest cotton producers in Africa, introduced the technology since 2008 with a recorded yield increase of 12.5 in their cotton output and a 66 percent reduction in pesticide use.

Mr Zeideng said in partnership with the private sector, the Savannah Agriculture Research Institute (SARI) of the Council for Scientific and Industrial Research (CSIR) had undertaken six field trials in cotton growing zones of the country to confirm the efficacy of the technology under Ghana's farming conditions.

Also on trial at SARI is the BT cow pea to control the devastating pod borer pest as well as BT rice trials in the Ashanti Region.

'A proper understanding of this new technology by our farmers is needed to ensure that they are not only properly managed but also sustainable,' he said.

Dr Abdulai Baba Salifu, Director General of CSIR, said biotech in agriculture would ensure access to appropriate improved crop varieties in production to achieve food security.

'I prefer to eat a product that is going to kill me in 30 years time, and I'm not even sure it will kill me, than to stay hungry and die today,' he said adding that it was better than starvation faced by populations in Africa.

Biotechnology in agriculture involves the use of scientific methods to produce genetically modified food crops that are more pest, disease and drought resistant and with short maturity periods.

The Biosafety Law in Ghana was passed in 2011, to allow the application of biotechnology in food crop production involving genetically modified organisms (GMOs) to enter food production.

The law also ensures an adequate level of production in the field for safe development, transfer, handling and use of GMOs.

However, scepticism is still rife in the adoption of GMOs in Ghana, but Margaret Karembu , Director, International Service for the Acquisition of Agri-biotech Applications (ISAAA), said Africa needed to take advantage of the technology in order not to be left behind.

For that reason ISAAA was sharing information in a timely manner in simpler versions for better understanding to enable farmers and policy makers to engage.

She said the technology had attracted a lot of debate of fear and outright rejection and that the workshop would take the opportunity to correct the misconception and commended Ghana for conducting field trials in that direction.

Professor Eric Quaye, Chairman, National Biosafety Committee (NBC), said the NBC would be vigorous in following protocol and would also ensure that the right procedures were adhered to.

The NBC, he said, had the power to terminate field trials that did not conform to regulations governing it and that it was not the aim of the NBC to threaten investigations into the technology but to ensure that that right things were done.

GNA

By Yakoba Chiwambo

Asked as to why most African Governments do not use a Low inflation rate, the answer was with the case When Computers came, many said it was going to cause job losses and it was a

WMO headquarters and the WHO Regional Office for Europe.

technology is one technology where African scientists have the chance and capacity to do it themselves, and yet now see their own food being produced by others." —A. D. Research Fellow who is also a scientist at National Cotton Research Institute, Malawi

Regarding the possibility of causing death or retained labelled.

are colonial plan I would say by most European countries to stop the growth of these crops. Much as it may make a lot of sense to them, since they don't have any problem with food security and would have to make for

For his part, Research Assistant at National Research Organisation (NARO), Desipie Jola, concerned with his fellow scientist's young GMO technology is safe.

"Let people make us, we have researched enough on

The society might be at crossroads especially due to the division among the scientist around the world on the technologies which is said to be

According to Tobi, GMOs are so important especially to the world's poor because of the earth's food shortage facing many African countries.

For instance, statistics have it that diseases account for almost 70 percent of crop losses in east Africa. Other

Farmers Yearn For Biotech: Samuel Boadi; 13 December 2013



John Dziwornu addressing the conference while other GNAFF executive members listen

Members of the Ghana National Association of Farmers and Fishermen (GNAFF) have declared their commitment to the promotion of technologies that would benefit smallholder farmers and fishers in the country.

At a press conference held yesterday in Accra, members of the association could not fathom why some organizations had taken a position to prevent the passing of the Bio-safety Act 831 of 2011 and the Breeder's Bill.

According to John Dziwornu, General Secretary of GNAFF, who officially addressed the media, "Indeed, should this bill not be passed, it would pose more of a danger to the country. This is because there would be no set protocols to regulate the introduction and use of biotechnology in Ghana. This would be akin to not having a pesticides law.

He stated that such legislation, amongst others, are to regulate the introduction and use of biotechnology in the agricultural sector.

He however gave assurance that GNAFF would ensure that the processes to adopt such technologies were safe and sustainable for the country.

Ghana signed onto the Comprehensive African Agricultural Development Programme (CAADP), an initiative of the African Union/NEPAD, and committed herself to contributing 10 percent of GDP to the agricultural sector in order to achieve an annual growth of 6 percent.

"CAADP requires African farmers, especially smallholder farmers to buy into the process. This is through their representative signing to a compact for farmer-based organizations," Dziwornu stated.

Charles K. Annan, a consultant and member of GNAFF, in a remark, noted that Ghana's markets are already flooded with agricultural products from other countries, especially North and South America to the disadvantage of local farmers.

Most of these countries, he mentioned, have adopted biotechnology and succeeded in exporting Bt foods to Ghana.

“Already, GNAFF is grappling with how to mitigate the impact of high cost of agricultural inputs including seeds and fertilizers, which are imported and this does not provide stable price and budgeting for smallholder farmers.

“Within the ECOWAS region, we have free movement of goods and people. Burkina Faso and Nigeria have made progress with transgenic cowpea trials. Burkina Faso is also producing Bt-cotton and improving incomes of smallholder farmers while in Ghana, our cotton farmers are struggling to make a living.”

Dr Margaret Ottah-Atikpoe, Head of Microbiology Division of the Council for Scientific and Industrial Research (CSIR), emphasized that “if Ghana should delay with the process, we may be overwhelmed with cowpea from Burkina Faso and Nigeria after completion of their confined field trials and onward commercial releases.

“The assertion that biotechnology and genetically-modified organisms are cancer-causing agents is not true. This assertion is largely based on information gleaned from the internet. It is neither logical, evidence-based nor has any merit.”

GMOs: new ideas will always face opposition: Christopher Bendana; 14 December 2013



Parliament has sent members to consult their constituents about the recent National Biotechnology and Biosafety Bill 2012 (NB&BB). People now must be informed in order to help their MPs contribute positively to the bill. Supporters of the Bill are usually scientists especially at government research stations across the country who see their research rot in the laboratories because it can't be released to the farmers. On the other hand, those who are against the Bill are mainly the urban elite working for NGOs and others who do not know the advantages therein. The GMO, also referred to as GE technology, is like other Western technology: air travel, internet, telephone, human parts transplants, etc which surprised many. There is always the fear of the unknown. The transfer of genes not only between species but also from different species is something many consider fantasy.

Traditionalists, in particular, considered it playing God In his recent article "Issues to address before GMO bill is considered" in Saturday Vision on November 23, Giregon Olupot, a Makerere lecturer, raised pertinent issues like safety. First of all, the NB&BB 2012 is an obligation Uganda has to fulfill having ratified the Cartagena Protocol on Biosafety. Olupot says Cartagena calls for some benchmarks which he lists: National Policy on Biosafety, Regulatory Regime, Risk assessment, Personnel & Capacity and Systems for public Awareness & Participation.

These issues are handled in the Bill. Clause 6 talks about the Uganda National Council for Science and Technology as the regulator (Competent Authority). This hosts the best Ugandan scientists. Another, Clause 9, talks about the establishment of the National Biosafety Committee (NBC). NBC will be responsible for reviewing and making recommendations on applications received by the Competent Authority.

NBC will be constituted by scientists from different organisations including farmers, the private sector, Uganda National Bureau of Standards, the Ministry of Health and that of Environment. And, it is hoped, the team will have the expertise and integrity. Clause 29 talks about Risk and Safety. Olupot must know that Ugandan scientists are highly regarded globally, in biotechnology safety. For example, recently, Getachew Belay, a senior biotechnology policy advisor at the Alliance for Commodity Trade in Eastern and Southern Africa (ACTESA), said they would prefer Ugandan scientists for risk assessment in the COMESA region. ACTESA is a specialised agency of the COMESA. Getachew was addressing a delegation of legislators, farmers and policy makers from East and Southern Africa in Burkina Faso during a study tour on bt cotton, a cotton variety bred using genetic engineering. "We want to use Ugandan scientists for regional-level risk assessments once the COMESA regional policy on biotechnology and biosafety is out," he said. "Uganda has produced a good number of technical experts." Still on capacity, according to the Uganda Biotechnology & Biosafety Consortium, Uganda has 24 PhD, 50MSc level scientists and over 70 Bachelor level scientists who are specialists in major crops grown across the region which include maize and cotton

If Olupot wishes to see how risk assessment is handled in Uganda, he can visit any research institute across the country. At the National Crops Resources Research institute, Namulonge, NaCRRI varieties of the same species like cassava are separated by, say, other gardens of maize to help stop mixing.

The final release of a variety like a hybrid follows a rigorous process on stations evaluations, on model farms evaluation and then a committee in the Ministry of Agriculture, Animal Industry & Fisheries (MAAIF) has to be satisfied, before the final release. On who should import, export, research or release GMOs does not matter, as long they have approval from the competent authority, which Clause 18 handles. Olupot also wants laws governing patents, protection of indigenous plants and microorganisms.

That is fine because the Plant Variety Protection Bill, is in the pipeline. And Parliament can work on other Bills. He was also not happy about the silence on GM medicine and animal feeds. But the Bill addresses the general safe development and application of modern biotechnology where medicine and animal feeds are included, as well as tissue culture.

Further, the Bill provides for regulation of research, development and general release of genetically modified organisms and for related matters. But Olupot has a point on labelling. How do you distinguish, for instance, hybrid from GM maize? We need labelling so that those with the GM fear do not use GM products. On Confidential Business Information, I believe it will be done just like in other sectors like mining or telecommunications, so as not to give a competitor undue access to useful information. So let us have a law, as Patrick Okori, the principal scientist at the Crops Resources Institute for Semi-Arid Tropics in Malawi says. "Let's have a law. There is no perfect law in the law. There is always room for amendment."

Olupot's input as a soil scientist is welcomed by fellow scientists. They are specialists in their fields. Just as you are doing something for Uganda, so are they. Believe them, advise them.

Look at a country like Burkina Faso, one of the four countries growing GMO bt cotton on the continent. During my recent visit there, Hema Omer, an official at Burkina Agricultural Research and Environment Institute INERA, said 50% of their edible oil was now from bt cotton.

Omer said there was no reported health effect from people who had taken oil from bt cotton. The World Health Organisation has not reported any side effects by people growing or eating products product using GE.

GM, like other technologies, is a continuous process; just like treating a disease like malaria, where a line of treatment can be effective for some time and then it faces resistance, so the pharmacies have to look for a new line.

Biotechnologists do not call GMO the magic bullet that will end human hunger. It is a tool to complement where other tools have failed. In the case of Uganda, scientists say, they can only fight the Banana Bacteria Wilt and Cassava Brown Streak Disease using this technology.

Agriculture state minister Prof. Zerubabeeri Nyirahas asked the opponents of the technology to offer alternative solutions to these diseases. The farmers are already using biotechnology technologies like tissue culture.

The Banyankole have a saying, “If you reject the gains on a cobweb that a rat has been nibbling on and eat the untouched part, you may end up regurgitating those grains where the rat rested its anus”.

If we fear how GM crops are bred, do we know how soda is manufactured? We just trust the scientist wherever they are.

Quoting a strict law from Tanzania is not very important. Countries have different interests. If Uganda’s interest now is food security, Tanzania’s might be issues of political federation.

We pursue our interest. GM crops acreage has been rising. According to Clive James, Chair at International Service for Acquisition of Agri-biotech Applications, global commercialized Biotech/GM crops moved from 0 in 1996 to 100 hectares in 2006 and about 180 hectares in 2012. The main crops are cotton, maize, soybean, canola, sugar beet and papaya.

The writer is a journalist who has visited agricultural research stations across the country and interviewed several researchers, including plant breeders, geneticists and virologists

Why the push for biotech should be fair: Lominda Afedraru; 18 December 2013



Genetically modified banana in a green house at Kawanda research station. While the use of biotechnology in agriculture has benefits, it is also a contentious issue world over, including Uganda.

Ensuring food security is a global agenda hence the need to devise means to produce enough food to feed a growing population amid various challenges and constraints. So, biotechnology in agriculture is being used to develop plant and animal varieties resistant or tolerant to pests and diseases, can adapt to climate change while maintaining or boosting food nutrient. In Uganda, scientists are researching a number of crops using biotechnology. These include cassava varieties resistant to Cassava Mosaic and Cassava Brown Streak Viruses, banana varieties resistant to black sigatoka, nematodes, bacterial wilt and also rich in vitamin and iron, improved sweet potato varieties, drought-tolerant maize, and rice that grow in soils with fewer nutrients.

Achievements Much as biotechnology is contentious and has met resistance in different parts of the world, including Uganda, every year the World Food Prize is awarded to recognise achievements in agriculture and issues related to food policy. The event is held in memory of the founder, Norman Borlaug, who won the 1970 Nobel Peace Prize for developing wheat strains that kicked off the Green Revolution in Asia. At an award ceremony held in Iowa, US, three scientists Marc Van Montagu of Belgium, and Mary-Dell Chilton and Robert T. Fraley of US received the 2013 World Food Prize for their individual breakthrough achievements in founding, developing, and applying modern agricultural biotechnology. “The pioneering work of the three scientists contributed to the emergence of a new term, ‘agricultural biotechnology’, and set the stage for engineering crops with novel traits that improved yields and conferred

resistance to insects and disease, as well as tolerance to adverse environmental conditions. Their work has made it possible for farmers in a number of countries to improve the yields of their crops thereby increasing incomes, and feed a growing global population,” read part of the message from the conference organisers.

Open to dialogue While addressing the meeting, president of Pontifical Council for Justice and Peace, Cardinal Peter Turkson, remarked that scientists using biotechnology has no problem so long as they are using the gift of nature in hope of solving difficulties faced by humans in terms of hunger and must be subjected to moral respect for a common good.

“Dr Borlaug had manure on his boots because he did not only confine his research in the research station but extended it to the fields. Times have changed and recognising science on account of domain means the fruit of research should be opened to dialogue,” he said. Therefore, scientists must be in position to carry out research while observing justice and fairness. Cardinal Turkson cautioned them to apply precaution to avoid damage to human health. “Rules of labelling can be

observed to make true choice, patents and property rights are also legitimate but must be focused towards feeding the poor and the responsibility of this application lies in the hands of farmers, seed users, sellers and consumers,” he added. Prof Wilberforce Tushemereirwe, director, National Agricultural Research Laboratories Kawanda, attended the conference and was of the view that recognition is good because agricultural scientists develop products to provide food, improve incomes and better livelihoods.

Ensure safety “Technology, whether conventional or biotechnology, is all aimed at improving varieties that resist pests and diseases as well as adding nutrients to food for human health,” he said adding that modern biotechnology should not be perceived negatively. This is because scientists use caution by following scientific guidelines where issues of safety are considered. The research going on in Uganda using biotechnology is aimed at contributing to food security although the products are not yet with the farmers. He believes Uganda started late with biotechnology, besides, there are groups opposing it especially the law formulated to regulate the products and ensure safety. Citing the drought-tolerant maize on trial in Kasese, Prof Tushemereirwe said farmers will be able to growing the crop even during dry spells and this helps to avert hunger.

Figures on Biotech

The 2012 statistical data by International Service for the Acquisition of Agri-Biotech Applications (ISAAA) indicates that since the first cultivation of staple transgenic crops in 1996 until the present, biotech crops have contributed to food security by increasing crop production valued at US \$98.2 billion and providing a better environment by reducing the application of significant amounts of pesticides worldwide.

Today, approximately 12 per cent of the world’s arable land is planted with biotech crops. There have been dramatic increases in the total acreage planted. Corn, soybeans, canola, and cotton are the major biotech crops grown commercially on a large scale and have become an integral part of international agricultural production and trade.

The report states that 2012 marked the first year since the introduction of biotech crops that developing countries grew more biotech crops than industrial countries . It states: “In the period, 1996 to 2012, millions of farmers in 30 countries planted an accumulated 1.5 billion hectares. A record 17.3 million farmers grew biotech crops worldwide in 2012, with over 90 per cent of them small resourcepoor farmers in developing countries

GMO technology in agriculture: learn from Uganda: Leon Bahati; 19 December 2013



Machine translated from the Kiswahili

This measure is derived from the same technology that the opposition to what is being described to be used can cause health and environmental effects

Scientists different in the East African region have been studies on the feasibility of using Genetic Engineering technology (GMO) in agriculture.

This action arises from the same technology that the opposition to what is being described to be used can cause health and environmental effects .

However, researchers around the world have been defending the same technology that is safe and already some countries such as the USA , India and China have started to use the same technology in agriculture.

The beauty of GMO

The beauty of technology is that it can help the GMO farmer harvesting several crops in a small area, misuse or use little pesticides and crops germinate well in areas with little rainfall .

Different countries have zikitamani see its citizens produce enough food and probably have a surplus for sale, but have been afraid to pursue head to head to be the new technology .

A good example is President Jakaya Kikwete visited the Agricultural Research Institute of Mikocheni (MARI), in March this year and encourage scientists to accelerate research of GMO technology , to Tanzanians to start kuifaidi .

He insisted , saying: " You have reached the time for Tanzanians to change negative thoughts about the technology, because studies around the world show is safe, especially given that until now there is no scientific proof that shows that GMO has implications for human health. "

Basically , President Kikwete said the government is prepared to set policies that use new technology

to many countries in the world , but will do so after its researchers provide a full report on the technology and advise based on their observations .

Studies on GMO Tanzania

What they scientists through genetic engineering technology is the use of biological laboratory techniques , to reduce or increase the character or the benefits of plant or animal products . These adjustments depend on the needs targeted by the researcher .

Among the changes that the researcher is able to implement them through GMO technology is to make products that better nutrition , the ability of the plant to respond to diseases , pests and plant to grow in an environment of little rain .

Chief Researcher of the Centre for Research and Control of Tropical Plant Diseases (TPRI) , Dr Roshan Abdallah says Tanzania began using GMO do not allow products produced with the same technology into the country.

In order to satisfy themselves about the pros and cons of the technology, says the Government to use the center, makes observations about the safety of Tanzanians if GMO utilized. At present inquiry lies at the level of the laboratory .

Such a move he says will be followed by a pilot plant produced by GMO and grown on specialized farms with controls at various locations in the country.

However, he said all countries bordering Tanzania are further ahead in GMO research and zikaidhinisha may be used , Tanzania will give a tough time in controlling such crops farmed or used in the country.

Studies on GMO Uganda

While Tanzania if in this initial stage , neighboring Uganda has already begun to experiment in different areas. Among these crops are cassava , cotton and bananas.

Head of the Center for Agricultural Biotechnology existing factory on the outskirts of Kampala , Dr Andrew Kiggundu , says they have begun a pilot study of GMO farms since 2010 and expect to complete the study in 2020 .

"We expect by 2020 , we will have a positive response , probably allowed farmers to start using it to increase production, " he explained.

For now he says they are trying to detect trends as well as to ensure high growth potential of these products to deal with plant diseases and insect pests and diseases.

After that point, he said, will be experimenting these crops through mice and examining their health practices . They will use mice because their system of practical science is like a human , for any side effects that can happen to these animals also can find a man.

Dr. Kiggundu says they convincingly that these products do not harm the mice , their research will have to answer that is safe for the health of Ugandans .

Referring to the technology through a field of banana grown with GMO , Chief Researcher of the center, Dr. David Talengera , says they use the same technology in the form of bananas popular with many people, to produce products that will be of more benefit to Ugandans .

Dr. Talengera is sena overall research project is progressing well and are confident they will reach the stage of experimental animals recent months.

However, he said for now all the products are produced from the same field in order yakiteketezwa been appointed who ensure not considered edible by humans , animals and insects.

To prevent birds or bees take anything for food or make honey , says they have been covered by a bunch of bags.

Chemist in the Research Laboratory of the National Agriculture In Uganda , Ephraim Nuwamanya says East African scientists are usually the exchange of experience , so he believes will kayobaini through these studies is beneficial to the whole of East Africa.

In African countries already have allowed GMO technology should be used in agriculture , South Africa, Burkina Faso, Egypt and Sudan.

Out of Africa countries using the technology include the U.S. , Argentina, Brazil, Canada, China, Paraguay, India, China , Mexico, Romania , Germany and Portugal .

Ending African hunger: some lessons for African leaders: Abdallah el-Kurebe; 24 December 2013



"Based on World Food Prize 2013 Proceedings"

The greatest challenge in human history is before us. It is the challenge of feeding a world population that would be upped from seven to nine billion people by the year 2050. It is one of the reasons that the Borlaug Dialogue, an annual series, was organised by the World Food Foundation to discuss the way forward.

Facts

- By 2050 the world population is expected to reach 9 billion people. Most interestingly, the major part of the population growth will occur in developing countries. East and South East Asia's population will rise by 228 million people (up by 11 percent) to 2.3 billion while Sub-Saharan Africa's population is expected to grow faster by 910 million people (up by 108 percent) to 1.7 billion by 2050. Source: The Food and Agriculture Organisation of the United Nations (FAO).
- FAO forecasts that food production will have to increase by 70 percent until 2050. This means that due to the increasing consumption of food per capita as well as changes in diets, the projected nine billion people could consume the amount of food required for an astounding 13 billion people.
- There are 525 million farms worldwide. Eighty-seven percent are found in Asia. There, the average area cultivated by a farmer is 1.6 hectares. In comparison, the average crop-land in Europe is 27 hectares, in North America it is as big as 121 hectares, according to IAASTD.

The 2013 Iowa Hunger Summit held in October to commemorate with the UN World Food Day, has come and gone leaving food for thoughts for actionable leaders across the globe. This is most especially the African leaders in which continent hunger has stroke harder. Or so it seems. With its theme tagged, Biotechnology, sustainability and climate volatility, the Dialogue recognised Marc Van Montagu from Belgium; Mary-Dell Chilton and Robert T. Fraley from the United States for founding, developing and applying modern agricultural biotechnology towards ensuring adequate food and nutrition for the world populace.

Their researches have made it possible for farmers to grow crops with improved yields, resistance to insects and disease, and the ability to tolerate extreme variations in climate such as excessive heat and drought. The award was not only inspiring for African Scientists but also a lesson for African governments.

The Dialogue further aimed at improving food security, enhancing agriculture and nutrition, and reducing hunger and poverty globally. And the mantra of the event, which were in the form of speeches, panels and press conferences, was the ability of biotechnology to "feed the 9 billion

people expected to populate the world by 2050," particularly in underdeveloped regions of China, India and Africa.

World leaders like former Prime Minister of Great Britain, Tony Blair; current President of Iceland, Olafur Ragnar Grimsson and President of the Pontifical Council for Justice and Peace, Cardinal Peter K. A. Turkson, attended and delivered inspiring speeches.

Sandwiched between proponents and opponents of biotechnology at the Summit, Turkson urged both sides of the issue of whether to use biotechnology to solve the world's hunger crisis or sit down and try to find a solution that works for all. "It is not [farmers] who are missing the point. Whoever refuses to look at the whole food insecurity picture - people and their dignity and their lives as well as food production and distribution - will miss the point."

He brought up the debate between the two sides biotechnology crowd saying, "When you juxtapose the World Food Prize and the Occupy World Food Prize, at first glance the divergence can appear and sound like polar opposition. The urgency of world hunger and food insecurity certainly cries out for 'rightful betterment,' and therefore calls for dialogue. For the dialogue to progress in good faith, all the stakeholders must genuinely be represented and meaningfully take part.

But he went on to ask, "Why then is there so much displeasure and distrust today, so much scepticism and strong opposition [to GMOs]? Never before, having accepted an invitation, have I received so much mail, some of it urging me to withdraw - much of it recounting destruction and suffering in relationship with globalized industrial agriculture promoting GMO crops."

Former British Prime Minister Tony Blair, who is the founder of Africa Governance Initiative (AGI), said: "I believe that Africa can be, for the first half of this century, what Asia was for the second half of the last. That is the goal but it will only become a reality if African leaders are able to drive the reforms their countries need, and African governments are equipped to deliver them."

In Africa, AGI is currently working with seven different governments, including Sierra Leone, Rwanda, and Liberia, and in each case ending hunger and implementing agricultural reforms to improve food security is a priority. True to it, in redefining the fight against hunger, poverty and suffering, Africa needs better governance based on prioritisation, planning and performance management.

Akinwumi Adesina, Nigeria's Minister of Agriculture and Rural Development, in his Keynote Address at the World Food Prize said: "I know the road map toward that vision for Africa is challenging. It is for Nigeria as well. But as Africa's most populous country, and soon to be its largest economy, we are using the power of agriculture to create jobs, increase wealth, and promote private enterprise to ensure that growth is sustainable.

To unlock the combined potential of some of the fundamentals needed in the major transformation of Nigeria's agriculture sector, the change has to be across the entire value chain – from field to mill to table," he said.

The minister assured that "our focus would be on creating eco-systems in which small, medium and large-scale farmers would not only co-exist, but also flourish together. We would do more than plant new fields. We would also create value-added foodstuffs from our staple crops through an aggressive import-substitution programme and policies that would encourage new investment in food production and promote agriculture sustainability and resilience." Project Leader of

Biosciences for Farming in Africa, Sir Brian Heap; Greg Jaffe, Mark Lynas, Anne Glover and Gilbert Bor spoke on “Straight Talk on GMOs: Facts, Fiction and Food Security.” Heap has been engaged in public issues of biotechnology, population growth, sustainability and science policy with the World Health Organisation, the UK-China Forum and European Commission.

Discussions have held and lessons were learnt at the Hunger Summit on how to grow more food for the ever-growing population. These lessons should not be archived or domiciled on shelves. Practical steps should be taken by African leaders to ensure mass food production for the people of the continent. Action must be taken to see that the case of an African farmer being the hungriest, is averted. Individual and collective commitments must be seen to fruition, especially where the lives of African citizens are involved.

The African Union (AU) summit, which held in Maputo, Mozambique in July 2003, saw African leaders making commitments to reverse the under-investment, which had held the agricultural sector back.

They promised to allocate at least 10 percent of national budgets to agriculture and as well, achieve six percent annual agricultural growth. But a decade after, only about 20 percent of the countries have fulfilled either of their Maputo Commitments (10% of budget to agriculture or 6% growth).

But according to ReSAKSS, based on other national sources, the percentage of the public agriculture spending in the 2010 national budgets, only seven countries including Zambia, Burundi, Burkina Faso, Mali, Niger, Republic of Congo, Senegal, Ethiopia and Malawi spent above 10%.

In the same vein, spendings on research and development (ReSAKSS still affirms based on World Bank report of 2012) has been the same. Only Botswana, Mauritius, Namibia, South Africa, Burundi, Kenya, Uganda and Mauritania spent above 1%.

Latest figures from the AU and ReSAKSS indicate that only 10 countries including Angola, Eritrea, Ethiopia, Burkina Faso, Republic of Congo, Gambia, Guinea Bissau, Nigeria, Senegal and Tanzania, have met the six percent agriculture growth target.

The African leaders in 2012 declared 2014 as the AU's Year of Agriculture. “This represents a once-in-a-decade opportunity for a review and renewal of African leadership and commitment to an African-led decade for Agriculture, learning from the successes and shortcomings of the previous decade to accelerate the pace of progress,” said Forty Chances.

But in spite of the declaration, in Nigeria's 2014 budget, which stands at N4.91 trillion, the country allocated only N31.4 billion to agriculture. This is less than the promised 10 percent (least) of the national budget that is tagged: “Budget for Jobs and Inclusive Growth.”

“A one percent increase in per capita GDP in agriculture reduces the depth of poverty at least five times more than a similar increase outside agriculture,” Phil Bloomer observes. Therefore, African leaders should affirm the Maputo Declaration by ensuring that 10% of their annual budgets are allocated to the sector. They should also stand up and borrow leafs from agriculturally-developed nations as well as go into partnerships with corporate organisations that are readily there to support the continent in agriculture.

As a Union, Africa should collectively consider the application of agricultural biotechnology because, according to Prof. Walter Alhassan, “Biotechnology represents a powerful tool that augments conventional approaches to tackling the future challenge of food security.”

In deed for Africa, this should be the last hunger season.

Abdallah el-Kurebe is Media Fellow of Biosciences for Farming in Africa and can be reached @ www.elkurebe@gmail.com

Farmers Lose Maize to New Disease: James Odong; 31 December 2013



Maize farmers in Ngenge and Kiriki sub counties in Kween District in Eastern Uganda are counting huge losses after a serious attack by suspected maize lethal Necrosis (MLND) on their maize fields.

The Chief Administrative Officer Kween District, Mr Nandala Michael Leonard has told The New Vision that the attack is on the second season crop of maize.

"Farmers have reported the attack on Longe 5 and 10 Ugandan maize varieties and the Kenyan maize varieties, we are still compiling the list of affected farmers and gardens to forward to the Ministry of Agriculture", he said.

Christopher Chemayek, the LC1 chairman of Sikwo village in Kapkwot Parish in Ngenge Sub County said he has lost 4 acres of maize.



"I started seeing my maize leaves drying up and did not mind much; little did I know that it was a disease. I had expected to harvest 15 bags per acre and was expecting 60 bags all together in my four acres but now I have got only two bags from the entire garden", Chemayek told The New vision at his home in Sikwo village.



Another farmer, Rukia Yapmusobo, 42 said she planted two acres of maize expecting to harvest 30 bags as usual but she was shocked when she harvested only ten bags.

"Am now faced with food shortage because I normally keep twenty bags for food and sell ten to get money for buying soap, sugar and other requirements", Yapmusobo told The Newvision.

The Head of Cereals Programme at the National Agricultural Organization (NARO) Dr Godfrey Asea said the new disease is caused by a combination of two viruses.

"The prevalent virus known as the sugarcane mosaic virus combines with another virus Maize dwarf mosaic virus; it causes the maize lethal virus. The sugarcane mosaic virus has been prevalent in different parts of Africa, but does not cause any problem," Dr Asea said.

The disease was first identified in Kenya, but it has spread along the border affecting the districts of Tororo and Kapchorwa in eastern Uganda.

The disease causes stunting in maize, premature drying affects seed production and becomes short, according to the scientist.

“In extreme cases it can kill the whole plant. The whole plant dies before it is mature. So the farmer loses 100% in that case,” Dr Asea observes.

Since the disease is new, Dr Asea says, a lot is being done to identify resistant or tolerant varieties, so as to curb the problem.

This new disease has potential to affect the maize industry in Uganda and reduce production thereby dealing a big blow to institutions like schools and prison.

“So we are moving first with stakeholders and collaborators. I think there is hope. We are starting to identify newer varieties which are resistant or tolerant to the disease,” he adds.

Genesis of disease

According to Dr Asea, the disease was first reported in Longisa Division of Bomet District and Naivasha and later reported in South Rift valley, including Sotik, Chepalungu, Borabu, Narok South, and Narok North.

“National survey conducted reported early July, 2012 ,Moderate disease incidence observed in Embu, Meru and Trans Nzoia, Embu North, Upper Meru central, Igembe and South and High disease incidences observed in Naivasha, Bomet, Chepalungu, Sotik and Borabu Districts and yield losses estimated to be over 90%”, Dr Asea explained.

The scientists are also developing new hybrids they think will be tolerant.

Maize is a major staple food for a large proportion of the population in the region of East Africa, in addition to being an important animal feed.

Estimates indicate that in Uganda, an average of 1.5 tonnes of maize per hectare is produced. Ends.

Farmers should not be given free seeds and planting material: Michael Ssali; 1 January 2014



Sometime last year, Uganda Coffee Development Authority (UCDA) made patrols in Masaka region to warn farmers against drying coffee on the bare ground.

Some farmers interpreted the measure as harassment by the government and some of them were heard suggesting that UCDA should donate to them tarpaulins on which they would dry coffee. The suggestion puzzled me until I remembered that for several years, our politicians have now been donating coffee seedlings to the farmers, especially around election time.

Tarpaulins cost between Shs30,000 and Shs50,000 each and can be used for coffee drying for a minimum of three years. One 70kg bag of Robusta kiboko coffee last year sold at Shs180,000. The average farmer harvests about five bags. However, some farmers still think it the responsibility of UCDA or the government to donate tarpaulins on which to dry the coffee. The struggle to reduce poverty should not be confused with politics.

Some of the politicians have never really experienced poverty, they do not even want it to go away, and they are apparently using it for their personal aggrandisement. Often they donate seed to peasants just to propagate their popularity without caring much about what takes place later. They will even distribute planting material when the rainy season is about to end, fully knowing that irrigation is far beyond the means of the recipient communities.

Priorities

Poor people should not be given things free but rather helped to appreciate the benefit of hard work. If we want them to take farming as a business then why are the politicians so quick to give them free things? Which similar support is given to shop keepers, mechanics, tailors, carpenters or builders? In my view, if people are to be introduced to growing a crop, they should undergo some form of training in ground preparation, the crop's husbandry practices, post-harvest handling, and marketing before they get the seed to plant.

They also should be interested in growing the crop and be prepared to work. Some of the people we want to produce particular crops could have totally different priorities, if they had the chance to choose. Finally, the planting material they get should be of the recommended quality--high yielding and disease free.

Boosting Maize Production Via Drought-Tolerant Seedlings: Ifeanyi Charles Nwoko; 12 January 2014



As a result of unpredictable weather conditions, experts always underscore the need for farmers to plant crops that could adapt to varying weather conditions.

They also advocate the adoption of genetically modified crops that are resistant to drought, flood and pest.

The adoption of genetically modified crops may not, however, be feasible now, as President Goodluck Jonathan has yet to sign the Biosafety Bill into law.

Nevertheless, there is some cheering news for maize farmers, as the International Institute for Tropical Agriculture (IITA), Ibadan, has developed some drought-tolerant maize varieties that are capable of maturing early.

Released in August 2013, the maize varieties are tolerant to Striga, a parasitic weed that constrains the productivity of staple crops such as maize, sorghum, millet and upland rice in sub-Saharan Africa. The development of the new varieties is a great relief to farmers, as IITA records indicate that Striga infests about 40 million hectares of smallholder farms in the country, causing yield loss of between 20 per cent and 80 per cent.

"These varieties are hybrid varieties that can grow across environments ravaged by drought, striga and low soil-nitrogen in the country," Dr Sylvestro Meseka, a plant breeder with the IITA, said. He said that the varieties had been tested in Nigeria in partnership with five research agencies. The agencies are Institute of Agricultural Research and Training; Institute of Agricultural Research, University of Ilorin; University of Maiduguri, and National Centre for Genetic Resources and Biotechnology.

"Ife Maizehyb-5 and Ife Maizehyb-6 have the potential yield of 6 tonnes and 5.5 tonnes per hectare respectively, compared with local varieties that yield about 1.5 tonnes per hectare," Meseka said. Dr Baffour Badu-Apraku, a member of the team that developed the varieties, said that the hybrid varieties were developed to meet the needs of seeds companies and farmers in West and Central Africa.

He said that seeds companies and farmers in those regions had been asking for stress-tolerant, extra-early maturing hybrids that would reduce the instability of maize yield, especially in the savanna.

"The hybrids would contribute to a significant reduction in the instability of maize yields in Nigeria as well as in other countries of West and Central Africa, including Ghana, Mali, and Benin," Badu-Apraku said.

With the ability to thrive under conditions engendered by adequate rainfall, drought, Striga or witchweed, these maize varieties hold the key to bountiful harvest by maize farmers.

Alhaji Ibrahim Abdulahi, a Sokoto-based farmer, who is one of the beneficiaries of the new IITA maize varieties, attested to increased yields of the maize species.

He said that although the year had been a good one in terms of harvest; the harvest from his maize farm was the most bountiful.

“I am happy that whereas I harvested 70 bags of maize in 2012; in 2013, I am expecting to harvest about 100 bags,” Abdullahi said in November 2013.

“The maize plants, right from germination to full maturity, were green and very healthy; I did not bother myself about rain or witchweed.

“Now, that I am ready for harvest and I am sure that I would get more yield this year than that of last year; when you look at the farm, you will see it; it is quite obvious.

“We are happy that the harvest this year will be better than that of last year and we thank God for it,” Abdulahi then said.

The IITA is also carrying out research on maize seedlings that would be suitable for flood-prone areas and areas which could be affected by unpredicted flood.

Meseka gave an assurance that the varieties would be developed and released very soon. He said that in 2013, the IITA released 370 varieties of maize seeds to farmers, adding that the seeds were released, in collaboration with local and international partners.

Some of the new varieties are Hybrid and Open-pollinated varieties, Pro-Vitamin A variety, which nourishes the human body, among others.

“So many varieties have been identified, screened and released.

“Among the varieties released in 2013 is the Pro-Vitamin A variety, which if eaten, would increase the level of Vitamin A in the human body.

“This is because we found out from our survey that there is a glaring deficiency of these micro-nutrients in so many areas, and it is a consequence of poverty,” Meseka added.

Agriculturists commend the IITA for the drought-tolerant and pest-resistant maize varieties it has released.

They note that the institute is, indeed, living up to the people’s expectations as one of Africa’s leading research institutes set up to find solutions to the problems of hunger, malnutrition and poverty plaguing Africa via increased food production.

The experts insist that the new varieties would boost maize production in Nigeria and other African countries facing poor maize harvests as a result of drought.

They, nonetheless, urge the IITA to make pragmatic efforts to make the new maize varieties available to all maize farmers, particularly those in remote rural communities.

(NANFeatures)

Passage of Plant Breeders Bill Generates Disagreement: Audrey Dekalu; 16 January 2014



Accra, Jan. 16, GNA - The Plant Breeders Bill before Parliament, on Thursday generated disagreement with proponents insisting it is the way Ghana should go while opponents maintain it would be disastrous for the country.

At media sensitisation workshop on Genetically Modified Organisms (GMO), proponents and opponents took turns to brief journalists on why GMOs should be embraced or why Ghana should tread cautiously.

The day's event is a partnership between the Graphic Communications Group Limited and the Centre for Indigenous Knowledge and Organisational Development to equip journalists with the requisite knowledge on GMOs.

Professor Walter Alhassan, Scientist and a proponent said GM is a subset of biotechnology and noted that the technology seeks to increase yield, improve protection from insects and disease, increase crops' tolerance to heat, drought, and other environmental stress.

According to him the Crops Research Institute of the Council for Scientific and Industrial Research (CSIR) is presently conducting confined field trials on BT cowpea and BT cotton in the Northern Region.

Prof Alhassan said biotech in agriculture would ensure access to appropriate improved crop varieties in production to achieve food security.

He explained that a GM seed for agricultural production is a choice farmers would have to make when Ghana goes commercial in production, whilst Ghanaian consumers also make similar choice to purchase and consume GM foods.

Biotechnology in agriculture involves the use of scientific methods to produce genetically modified food crops that are more pest, disease and drought resistant and with short maturity periods.

The Biosafety Law in Ghana was passed in 2011, to allow the application of biotechnology in food crop production involving GM Organisms to enter food production.

The law also ensures an adequate level of production in the field for safe development, transfer, handling and use of GMOs.

Opponents are of the view that GMOs are organisms which genetic material have been altered using genetic engineering techniques and come about as a result of laboratory process that fuses genes from one species with another in an attempt to obtain a desired trait or characteristic.

In most cases, they are used to produce genetically modified foods for the western countries and can be produced on a large scale within a short time and therefore serve as a good relief to countries battling food insufficiency.

Its introduction into the country they say would come at a cost, especially given that they will compete with naturally produced crops for patronage and consumption.

Mr Yaw Opoku a member of Food Sovereignty Ghana (FSG), an advocacy movement, has called on parliament to delay the passage for a thorough debate on GM foods, saying selling your food sovereignty is worse than slavery “and that is exactly what the bill sought to do”.

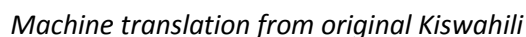
However Prof Alhassan said there are adequate and thorough safety measures in the country to manage environmental and health risks associated with biotechnology.

Mr Opoku on the other hand debunked the assertion saying there are a lot of regulatory bodies in the countries that are not living up to expectation.

Mr Ken Ashibgey, Managing Director of the Daily Graphic said the debate on the GMOs is taking many twists with civil society groups emerging to support or oppose it.

He said there is the need for journalists to be informed to lead the debate on the subject.

CHANGAMOTO
Panapofuka Moshi Pana Moto



The researchers have used laboratory all kinds around the world , come and seed bearing or simple technology to increase the quality of agricultural products in order to cope with the increasing number of people.

All this is not only specific focus on the growing number of people , but also a reflection on the use of a small area of farming for higher yield thereby avoiding large continuous land for agricultural use.

In an effort to secure the best seed , the researchers have been hurt to get their heads drought resistant seeds to withstand diseases

The researchers here in Tanzania and in Uganda , have used much of their time to come up with at least a seed that can increase productivity for the farmer, so he should be able to benefit from his power he entered the field.

In this study they have been highlights various products including , cashew nuts , groundnuts , cassava , sweet potatoes , corn and even bananas to mention a few products.

Researchers have used laboratories inside and outside their country to come up with varieties that they think will grow in many parts of the country depending on the weather, but also manages to give the expected yield for the maximum.

Despite these efforts , yet the process of crop research in Africa seem Lack of support for a large percentage and farmers.

Lack of support there and farmers, kunajionyesha open when you visit the various centers of research and realized that there is no great enthusiasm in using the most modern seed growers to continue the seed they used to do.

Clear evidence you created in the garden of the Uganda Farmers Cooperative (NFF), where the congregation Coordinator Kawempe Arthur explains how farmers have little awareness in the acquisition of modern banana seeds produced by their center.

He says basically the production of modern banana seedlings in the lab takes six months and in the nursery takes two months before being sold to farmers.

He says that the production of banana plants you can be beneficial to producers and buyers , farmers must import the number of seedlings before they need to be generated , but have not been doing so.

Kawempe says many farmers have to buy seedlings already existing import substitution , so the facility sometimes find themselves producing many seedlings than you need or a few seedlings than you need.

He says his station is capable of producing many seedlings meet the needs of farmers, but fail to do so because the farmers have limited calling.

Kawempe says many farmers in Uganda are still the original banana faith that make it difficult to accept the change and use modern banana.

He says in producing and promoting contemporary bananas have been considered factors including the nutrients it needs to be present at Bananas, disease and drought tolerance in order to combat a variety of weather conditions.

According to one of the banana plant Kawempe better sold for 2,000 Uganda shillings which was considered to be significant for many small farmers who are their customers.

Such price of Shs 2,000 to 2,500 for the banana plant has been fetching good for banana producers seedlings available in Arusha.

Best banana producers are in Arusha in Arusha and Arumeru district where most have been sold to small farmers in the northern zone.

Despite the region have many banana farmers , still not many who alerted using banana seedlings.

According to Kawempe many small farmers in Uganda are unable to afford more than 2,000 banana plants due to poor living conditions facing them.

He says due to the quality of the bananas it , there is a need for African governments to support the efforts made by small producers of banana seedlings.

Kawempe says to do so will enable increased production of bananas better in many areas of Africa and increase the production of bananas.

On the other hand he says business is done mainly banana seedlings during the rainy season , and that between April and September there is no business at all.

"We are trading of seedlings in the rainy season , but between April and September, we string a plant here , " says Kawempe.

On the other hand Kawempe has advised farmers in rural areas be encouraged to establish their own nurseries and seedlings of bananas, if governments are strongly committed to spreading the seedlings to more farmers.

By doing so , Kawempe says banana seedlings will be produced and spread throughout much of the country.

At some point , Kawempe says a great solution in the production of bananas anywhere, is to encourage a few large scale farmers.

" We need a few farmers , but large landowners to exist and the largest producer of bananas, " says Kawempe.

This statement of Kawempe presents challenges not to Ugandan banana farmers only , but also of Tanzania and other places occurring rezoning.

Even the government of Tanzania is required to view to see the importance of a few farmers with large farms not only bananas , but other crops.

By doing so , programs like the Agriculture First , its effectiveness can be measured more easily than it is today , where its measurement is done with more difficulty.

It is the same procedure , the use of the best technology in agriculture can succeed in Tanzania , Uganda and other parts of Africa.

Despite sluggish in the use of technology for farmers, researchers still do not have a broken heart. They should treat the situation as an opportunity to study, so you can be a great benefit to farmers.

African Orphan Crops Consortium To Sequence 100 Crops: Charles Benoni Okine; 28 January 2014

Graphic Business
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SPECIAL SUPPLEMENT ON **AGRIC**

African Orphan Crops Consortium to sequence 100 crops

THE African Orphan Crops Consortium, which includes the University of California, Davis, Mars Inc and other global partners, has released the names of the 100 African crop species which genomes it plans to sequence, assemble and annotate to improve the nutrition of African farm families, especially their children.

The list of the 100 species, developed by African scientists and their colleagues elsewhere, is being released so that researchers around the world can contact the consortium with suggestions for research needs regarding the selected species.

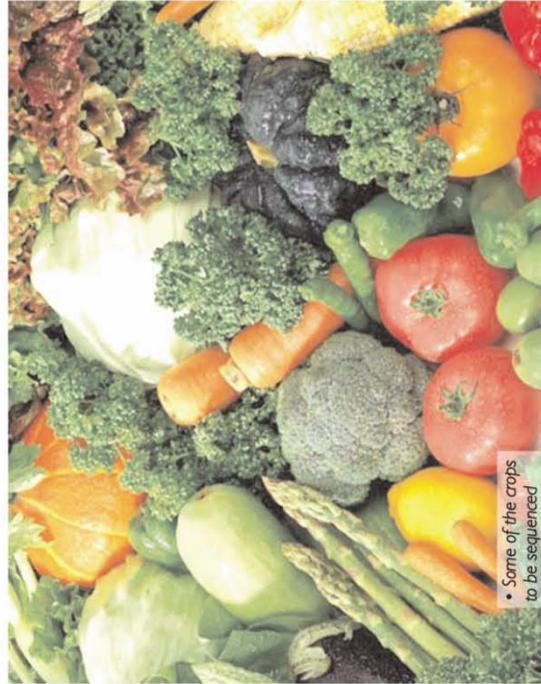
The crop list includes African eggplant (garden egg), amaranth, spider plant, onion, okro, papaya, star apple, yams, cape tomatato, lentils, sweet potato leaves, mango and bananas.

Others include avocado, guava, mango, plantains, pumpkin, bittergourd and the African orange.

With generous in-kind contributions by its partners, the consortium will sequence a reference genome and 100 lines for each of the crops listed.

The first orphan crop to be studied will be baobab, which can be used as a dried fruit powder for consumer products.

Baobab is called "the wonder tree" in



Some of the crops to be sequenced

Africa because its fruit has antiviral properties and other health benefits, 10 times the antioxidant level of oranges, twice the amount of calcium as spinach, three times the vitamin C of oranges and four times more potassium than bananas.

The consortium's goal is to use the latest scientific equipment and techniques to guide the development of more robust produce with higher nutritional content.

"Orphan crops" are African food

crops and tree species that have been neglected by researchers and industry because they are not economically important on the global market.

Mars Inc. previously led a similar collaboration that sequenced, assembled and annotated the cacao (cocoa) genome and made these data publicly available on the Internet to all researchers in 2010.

In December 2013, the consortium opened the African Plant Breeding Academy in Nairobi, Kenya, to help

reduce hunger and malnutrition among the 600 million Africans who live in rural areas, and to boost Africa's food supply.

The academy will train 250 plant breeders and technicians in genomics and marker-assisted selection for crop improvement over a five-year period.

The resulting improved planting materials will then be offered to smallholder farmers throughout Africa.

Background

The academy provides scientists and technicians with a dedicated place to sequence, assemble and annotate the genomes to help develop food crops with higher nutritional value and which can better withstand climate change, pests and disease.

The data derived would be made publicly available with the endorsement of the African Union through a process managed by the Public Intellectual Property Resource for Agriculture.

The African Orphan Crops

Consortium includes the African Union

- New Partnership for Africa's

Development (co-chair); Mars,

Incorporated (co-chair); World

Agroforestry Centre (host of the

Academy); BGI (doing the initial

sequencing); Life Technologies

Corporation (donor of sequencing

equipment); World Wildlife Fund (co-

chair); University of California, Davis

(developed the Academy); IPlant

Collaborative (managing the data

produced) and Biosciences eastern and

central Africa - International Livestock

Research Institute (which works closely

with the World Agroforestry Centre).

The consortium invites communities

focusing on the development of orphan

crops to collaborate with the

consortium on improving the

productivity and nutrition of these

crops. **GB**

AGRICULTURE/Technology

Scientists: No biotechnology, no forging ahead

By Daniel Semberya

THE last century, conventional breeding produced a vast number of varieties and hybrids that have contributed to higher grain yield, stability of harvests and farm income in developing countries. The national framework for modified organisms (GMOs) are becoming part of an increasing number of products, including food and food additives, beverages, drugs, adhesives and fuels. Agricultural and pharmaceutical GMOs have rapidly become a multi-billion dollar global industry.

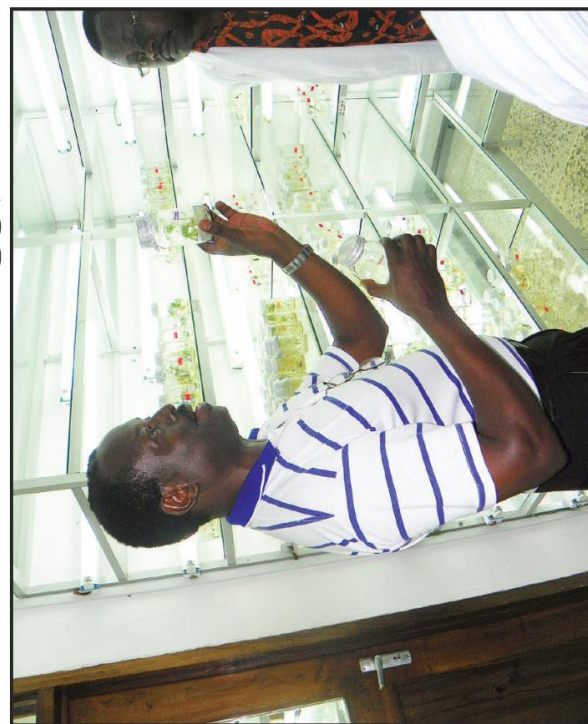
According to Mneney farmers planting GMO have benefited a lot economically. He said in order for the Tanzanian farmers to benefit immensely it is for the Government to take immediate needed measures that could ensure Tanzania as a country does not lag behind in as far as science, technology and innovation are concerned.

Mneney said biotechnology is not a new phenomenon, but started time in memorial when man started the selection of plants.

He said the first stage started about 6000 years ago when the use of micro-organisms in things like bread, wine and beer, among others. The second stage started in the beginning of the twentieth century, this is when the production of plants through tissue culture process started.

And eventually is the third stage seen in the beginning of 1970s, the development of genetic engineering. It was during this period when the use of molecular biology and GMO came into effect.

He said Tanzania has the National Biotechnology Policy of 2010 whose main



Principal Research Officer and Head of Cashew Biotechnology Unit (CBU) at Mikocheni Agricultural Research Institute (MARI), Dr Emmanuel Mneney stresses a point when he was briefing journalists on the importance of biotechnology after attending a half-day session at the institute's biotech-laboratory. (Photo: Daniel Semberya)

objective is to ensure Tanzania benefits from the use of biotechnology for the development and social prosperity.

Why biotechnology is very vital for Tanzania? Mneney says this is the right technology of which products to fund all biotechnology programmes; to put in place copyright system; to put a sustainable system of research, storage, economic and environmental

CMD alone accounted for an estimated 47 per cent of East and Central Africa's cassava production losses during a serious outbreak of the early 1990s and 2006. Poor cultivation practices combined can cause yield losses as high as 50 per cent in all of Africa.

Another one is the Cassava brown streak disease (CBSD), which can cause up to 100 per cent yield loss. It further causes a loss of US dollars 45 million per year. CMD and CBSD disease were first detected by the British in 1894; and the there have been various researches carried out and the diseases still exist. "We need to incorporate the genetic engineering technology as a strategy to eliminate the disease."

"If it has worked in other countries, why not Tanzania, we also have more challenges in maize, cassava and sweet potatoes, why can't we use this technology."

In Tanzania cassava is mainly grown almost in all regions along the coast of the Indian Ocean, namely Dar es Salaam, Tanga, Coast, Lindi, Mtwara and Pemba, respectively.

Cassava is also being cultivated in the Lake zone area, mainly in Mara, Mwanza, Shinyanga and Kagera regions.

Challenges to its adoption include: perceptions and attitudes access to and use of proprietary technology; biotechnology policy; the scarcity of biotechnology research will be an avoidable.

However, according to potential that biotechnology offers to agricultural productivity and food these advances, biotechnology has raised

concerns about potential side effects to human and animal health and the environment, including risks to biological diversity and socio-economic and cultural values. The concept of GMO to biological diversity and human and animal health are now widely acknowledged.

These concerns and opportunities surrounding modern biotechnology dictate the need to develop policy and legal interventions to guide the safe use of biotechnology to prevent or effectively reduce its risks to human and the animal health and the environment to acceptable levels.

However, a decade after GM crops were introduced into the world, their production has grown to about 12.5 million ha globally. Biotechnology is now being introduced into Africa through Bt maize, which was introduced into South Africa in 2003.

Since its introduction, the technology has been found to reduce losses of maize incurred through damage by stem borers. However, there is still a large untapped potential in biotechnology that can be embraced to address Africa's challenges.

Although biotechnology is gradually being embraced across the globe, it nonetheless faces much opposition.

Challenges to its adoption include: perceptions and attitudes access to and use of proprietary technology; biotechnology policy; the scarcity of biotechnology research will be an avoidable.

However, according to potential that biotechnology offers to agricultural productivity and food these advances, biotechnology has raised

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security, there is a need for greater dedication by Tanzania and other African governments towards biotechnology development.

This can be done by developing their capacity to negotiate access to intellectual property (IP) rights, and to enact and operationalise IP rights and biosafety policies and guidelines that foster technological innovations, delivery and trade.

When Tanzania is dilly dallying at allowing the cultivation and growing of biotechnology crops other countries are benefitting from the technology. Until 2012, there were around ten countries using modern biotechnology to produce crops globally and these include: The United States of America, Brazil, Argentina, India, Canada, China, Paraguay, Pakistan, South Kusini and Uruguay.

And the European countries include: Spain, Portugal, Czech Rep., Poland, Slovakia, Romania, Sweden and Germany.

African countries that also do not like to be left behind that have already brought the modern biotechnology on board include: South Africa, Burkinafaso, Egypt and Sudan.

Crops mainly produced in these countries include: Maize, soy bean, cotton, canola, sugar beet, alfalfa, pawpaw, poplar, tomatoes.

Some of the economic beneficial these countries have achieved are enormous. For example China after introducing Bt cotton in their country, the production shot up from 5 to 10 per cent from 0.5 hectare and the income also shot up from US Dollars 360-550 per hectare.

India's cotton production also rose to 40 per cent from 2 hectares, managed to minimize the usage of fertilizers and insecticides by 50 per cent; likewise, its income shot up from US Dollars 75-200/ha. With the introduction of Bt cotton, farmers have managed to raise their income and saved their time as well.

When Tanzania is still doing GMO laboratory trials at MARI-Dar es Salaam and Makutupora in Dodoma, their neighbouring countries; Kenya and Uganda are at an advanced stage at implementing their field trials.

Researchers from these two countries because of their fault based liability regulation, have managed to attract researchers from developed countries

where the technology is at advanced stage and they are collaboratively working together to produce improved seeds, clean, AND improved plant materials for cassava, bananas so as to mitigate CMD, CBSD, and maize Lethal Necrosis (MLND) and banana wilt diseases which have become a threat to cassava, banana and maize crops across East African countries.

Researchers from developed countries are said to be reluctant to collaborate with the Tanzanian researchers because of the strict liability, of which officials at the Vice President's Office depart of environment told this paper that discussions were underway with different stakeholders to see the possibility of dropping the strict liability regulation to fault based liability regulation.

The Officer Incharge of the Mikocheni Agricultural Research Institute (MARI) Dr Joseph Ndunguru was once quoted by this paper saying that there are various research documents across the global on GMO, but none of them has proved negative impacts either Bt cotton or Bt maize to human beings or animals.

"That is why we insist this technology is a good thing to use. Countries in the neighbourhood like Burkinafaso, South Africa, Sudan and Egypt are using, but nobody from these countries has been affected," he noted.

Chief Research Officer, COSTECH, Dr Nicholous Nyange speaking on behalf of the Costech's Director General urged the invited editors and senior journalists to play their role by delivering the right information to policy makers and the general public to enable them understand and eventually make informed decisions.

He cautioned people without scientific background who make sweeping statements against biotechnology without scientific evidence or proof saying if this situation is left unchecked could hold back good benefits gained from the new and modern technology.

The Editors and senior reporters' interactive visit to MARI was organized and coordinated by both the Tanzania commission for science and Technology (COSTECH) in collaboration with the Open Forum on Agricultural Biotechnology in Africa (OFAB), Tanzania chapter and brought together Editors and senior journalists from different media houses.

Liability clause hurts Tanzania farming research: Leonard Magomba; 16 February 2014



DAR ES SALAAM, Tanzania - The delay to remove a clause on strict liability for agricultural technology has been blamed by scientists for driving away donors, who are ready to fund research projects.

Scientists say the clause may also negatively impact President Jakaya Kikwete's call, for scientists to conduct research on genetically modified organisms (GMOs) so as to establish the practicality of the technology in the country.

Basically the clause means that if anything goes wrong, the researchers are liable.

A Member of the National Biosafety Advisory Committee, Dr Roshan Abdallah said amending the 2004 NEM Act would help scientists get approval for research into the safety of biotechnology.

The scientists were speaking during a visit by journalists at the Mikocheni Agricultural Research Institute (MARI) last week. It was organized by the Open Forum on Agricultural Biotechnology (OFAB), Tanzania Chapter.

The scientists said donors have been running away from sponsoring agricultural research specifically on GMOs due to strict liability clause in the 2004 NEM Act.

The ongoing hurdles among scientists around the country over the delay to review and repeal of a clause that holds any liable to punitive sanction should anything go wrong in development of agricultural technology, the scientists said. The National Coordinator of Open Forum on Agricultural Biotechnology (OFAB), Tanzania Chapter, Philbert Nyinondi said the strict liability is the legal responsibility for damages, or injury, even if the person found strictly liable was not at fault or negligent.

It has been applied to certain activities in tort, such as holding an employer absolutely liable for the torts of her employees, but today it is most commonly associated with defectively manufactured products.

However, Tanzanian scientists are optimistic that the government's vow to fund tissue culture technology in the 2014/2015 national budget would assist farmers to battle vulnerabilities of their traditional crops.

A Senior Researcher of the Tanzania Commission for Science and Technology (COSTECH), Dr Nicholas Nyange said if the application of the biotechnology would delay due to this clause, there is no need to worry because the government is willing to fund tissue culture.

"As long as the government is able to fund tissue culture, this could also be used as a way of helping farmers to fight against diseases," Dr Nyange told East African Business Week last week. MARI's Head

of Cashew Biotechnology, Dr Emmarold Mneney asked the government to transfer banana tissue culture to small-scale farmers so as to defeat challenges that contributes to the declines of the agriculture sector. "If the government wants to overcome the challenges that deteriorated the agriculture sector as well as boosting productivity and production, they have to transfer knowledge to smallholder farmers, who are many," he said. Dr Mneney said tissue culture technology is the best option for them.

He insisted, if exploited efficiently in the agricultural sector, the technology could save commercial farming and hence boost the nation's forex earnings.

Biotech is Inevitable In Tanzania Agriculture: Said Mmanga; 18 February 2014



(On the importance of biotechnology to Tanzanian Agriculture)

AGRICULTURE reference that is the backbone of the nation for that will be expected by the majority of Tanzanians are an estimated 45 million. However the industry faces challenges that are in one way or another have contributed to making it fail to grow or be productive according to their importance. Some of these problems are caused drought and climate change , so rain , lack of uncertainty, an increasing number of people that not match the production of food crops and diseases of various crops.

For example , notice the state of the economy in 2012 and Plan National Development in 2013/14 tabled in June last year shows that agriculture is not among the economic sectors and social growing much faster (around seven percent to 22).

According to the report, the industry is growing at the same rate mining, trade and tourism , communications and financial services that can not afford to hire the majority of Tanzanians like agriculture. But also , these sectors do not provide sufficient market for the products or goods produced by the agricultural sector which is the pillar of the national economy iliyoajiri 75 percent of Tanzanians about 45 million , according to the Census of Population and Housing in 2012. According to the information of the state of the economy in 2012 and the National Development Plan of 2013 /14, the agricultural sector has grown by an average of 3.6 percent per year during the past 10 years.

While agriculture growing at the same rate, the population has grown steadily from 35 million who were present in 2002 to nearly 45 million, according to the Report of the Census of Population and Housing in 2012. It is clear that an increasing number of people in the 2.84 percent per year, not match the realities of food production, which is definitely the use of technology especially biotechnology in agriculture is an inescapable issue.

The use of biotechnology can not be avoided by that time the population increases also land and water for agriculture is decreasing. According to Dk.Emmarold Mneney, researcher at the Centre Mikocheni Agricultural Research (MARI), Dar es Salaam, biotechnology is a profession of using biological processes in living organisms to refresh and services for the development and quality of human life. He notes that there are three classes of biotechnology which is the first bridge that existed 6,000 years ago, which involves the use of micro - organisms in the product km bread , beer , wine , cheese. Class II, started in the beginning of the 19th century which involves the production of seedlings using tissue (tissue culture) and biotechnology grade three , started in the 1970s , which involves the use of the use of biological molecules (molecular biology) and genetic engineering technology which is the context of this article.

Dr. Mneney clarifies that the profession of engineering genes enables the transfer of genes from an organism one and insert in living creature else to get the qualifications required to be resistance to disease, drought or giving high yields and creature has been done with genetic change in a foreign language is called 'genetically modified organism' (GMO) or genetically kilichoongezwa Swahili for easy creation, although not an official translation.

He says that this technology is used in research to find improved seeds containing offer high yields, disease resistance and insect pests such as corn and cotton, nutritional supplements for bulk rice, cassava and millet with vitamin A, but high technology has the capability to produce seed ability to adapt to climate change as tolerate drought, acidic and salty conditions. "This technology has high efficiency and speed boosts to gain favorable outcomes, it also reduces the use of chemicals like pesticides and insecticides and disease thereby helping to preserve the environment," he said.

For his part Dk.Roshan Abdallah, Program Coordinator Safe Use of Biotechnology (CBS) He mentioned other benefits of genetic engineering technology is to increase food production, reduce operating costs and not damage the environment.

He says in this period when the nation is facing a climate change genetic engineering technology is an important tool in the production of drought resistant seeds with disease. Explaining the other benefits of the technology Dk.Mneney says, "It can generate maize with contradictions against the bore of maize (Bt - maize) and cotton producing an antagonism against the teaching of the buds." He adds "enables the cultivation of cotton operated in regions of Africa where crop farming is now banned because of red worms".

Despite the benefits of genetic engineering technology in the country but has been faced with numerous challenges, including knowledge and understanding of the researchers, leaders, politicians and the general public about the issues of this profession is still limited. Dr. Emmarold Mneney the research center MARI says that there is a difference of understanding between users biotechnology and law enforcers which cause confusion for communities with stringent Code of managing Biotechnology Engineering Genes particular order of consequence to pay compensation of Strict liability for each subject from a favor to the researcher.

"The study of genetic engineering in agriculture is stuck in because donors are reluctant to invest / collaborate with researchers, and our researchers are doing studies of genetic engineering are forced to neighboring countries," said Dr Mneney. The researcher adds that, "without doing research in the country, we can make decisions sensitive research findings (Evidence-based Decision making)" Nicholas Nyange Coordinator of the Forum for the Development of Agricultural Biotechnology (OFAB) Tanzania is noted that the issue of Safety Liability for now lies at the level of the Ministry is being work to find solutions. Despite these challenges Tanzania has already begun to do research using genetic engineering technology to find contradictions seed diseases brown spots and streaks for cassava.

Dupont scientists make breakthrough in crop biofortification: Abdallah el-Kurebe; 21 February, 2014

GONGNEWS.NET



Paul E. Schickler, Dupont President has announced that scientists at Dupont Pioneer have made research breakthrough in crop biofortification that would deliver micronutrient enriched sorghum, which will contribute to food and nutrition security.

As well, the efforts he said, is to improve nutrition for the nearly 300 million people in Africa who depend on sorghum as a staple crop, but who do not have access to another staple that provides the essential nutrients that sorghum lacks.

“The African Biofortified Sorghum (ABS) initiative’s achievement of enhancing pro-vitamin A stability in sorghum marks a critical advancement in our ability to meet the food and nutrition needs of a rapidly growing global population,” said Schickler.

He added that DuPont Pioneer scientists were working with other researchers in the U.S. and Africa “to enhance sorghum with pro-vitamin A and eventually iron and zinc through biofortification,” which is the process of improving the nutritional value of crops through plant breeding or through biotechnology methods.

The ABS initiative, the report says, is expected to benefit millions of Africans that rely on sorghum, which is deficient in key nutrients. Vitamin A Deficiency (VAD), in particular, is the leading cause of preventable blindness in children and increases the risk of disease and death from severe infections.

Up to half a million children in Africa become blind from VAD and nearly 600,000 women die from childbirth-related causes, many from complications that could be reduced through better provision of vitamin A.

Schickler observes that there is need for collaboration to improve the food and agriculture value chain in Africa. “Beyond increasing nutrition of a staple crop for millions, the ABS initiative aims to improve agricultural seed systems to deliver seed to farmers and promote productivity.”

He disclosed that Pioneer has worked closely with Africa Harvest, a Kenya-based non-profit organization that promotes the use of advanced science and technology products to improve sustainable agricultural development in Africa.

Florence Wambugu, Africa Harvest's Chief Executive Officer said: "The success of the ABS Initiative underlines the need for broad-based partnerships to address food and nutrition security and agricultural systems in Africa and around the world. Apart from Pioneer's technology donation and expertise, the private sector's discipline of turning science into beneficial products has been a critical ingredient of success with ABS Initiative."

DuPont has received a 'Patents for Humanity' Award from the United States Patent and Trademark Office for its willingness to share its intellectual property that has resulted in groundbreaking research to strengthen the nutritional profile of sorghum and help improve public health in target African countries.

"Though the ABS Initiative is focused on Africa, this Initiative serves as a scalable model for using advanced research and science to promote sustainable food and nutrition security and seed delivery infrastructure," said Schickler.

Campaign against genetically modified foods misinformed: Kenneth Azahan; 10 March 2014



A geneticist/plant breeder, Institute for Agricultural Research, IAR, Ahmadu Bello University, Zaria, Prof. Mohammed Faguji, Ishiyaku has declared that countries and organisations leading the campaign against Genetically Modified, GM, foods had ulterior motives, as people consuming the products worldwide were neither less nor more human.

He said that age-long consumption GM foods in America and other parts of the world without any side effects was a enough evidence that their safety was not contestable. Ishiyaku made the submission during a chat with journalists sponsored by the Bioscience for Farming in Africa, B4FA, to the institute on a study tour. He expressed optimism that following the success achieved during the GM cowpea trial, Nigerian farmers would within three years be presented with the GM variety if the Bio-safety Bill is passed by the National Assembly.

According to him, food and field-testing carried out on GM foods showed that they were safe for human consumption, adding that the technology was developed from scientific procedures. Any opposition to them, he said, should follow similar procedures rather than trying to mystify the benefits they hold for food security and poverty eradication.

He said the inability of those opposing the GM technology to come up with scientific evidence that it is harmful to human beings and the environment makes it clear that they are acting scripts of chemicals producers and other interests.

‘The campaign against GM is coming from producers of chemicals who are apprehensive that its acceptance will affect the fortunes of their businesses. Also, the rivalry between America and Europe is responsible for the anti-GM campaigns...’.

The Geneticist further noted that there was yet another group who try to link religion with science claiming that modifying genes was tantamount to playing God and wondered whether such persons have bothered to inquire if permission was sought from God before developing other varieties through scientific means. He warned that Nigeria and Africa must not toll the part of Europe stressing that it does not have the level of hunger found in Africa so can afford to play politics with the issue.

Africa's concern is influenced by Europe's position on GMOs: Abdallah el-Kurebe; 21 March 2014

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Diran Makinde is of the New Partnership for Africa's Development (NEPAD) Agency African Biosafety Network of Expertise, Ouagadougou, Burkina Faso. He spoke with Abdallah el-Kurebe on Crop Biotechnology and Its Regulation in Africa during the annual meeting of the American Association for the Advancement of Science (AAAS) in Chicago. Excerpts:

At this time when world population growth is threatening food security and countries are adopting biotechnology to boost food production, many countries in Africa are still

adamant, especially on biosafety frameworks. What is NEPAD doing to help African countries to develop systems?

The quest for effective mechanisms to regulate modern biotechnology has elicited policy responses at various levels the world over, with the main multilateral framework being the Cartagena Protocol on Biosafety. African countries are at various stages towards developing and implementing domestic frameworks that comply with this Protocol. In addition, several efforts have been made towards regional cooperation in biosafety. NEPAD Agency's African Network of Biosafety Expertise (ABNE) has in the last few years been at the forefront of efforts to help African countries develop and implement biosafety systems that will ensure that the technology plays a key role in multi-faceted efforts towards the continent's socio-economic self-sufficiency. Like elsewhere in the world, African countries have engaged in the debate on the pros and cons of modern biotechnologies and products thereof for a greater part of the last two decades. Efforts to develop and implement regulatory systems have also been on-going across the continent for the same length of time, with varying levels of success across countries and regions for the desired policy change. The debate and policy trajectories have incessantly been altered both in content and nature by a number of internal and external factors, not least the developments unravelled by conclusion and implementation of the provisions the Cartagena Protocol on Biosafety. Africa's geographical and socio-economic peculiarities also shape the content and nature of the debates, and their outcomes. Key among these peculiarities are: the economic and social importance of agriculture in Africa; the degree of food insecurity and poverty on the continent; the pressures exerted on natural resources by the continent's population as they endeavour to satisfy food and nutritional needs; the vulnerable nature of Africa's agriculture due to climate change, diseases and predators; the need to explore new ways of developing agriculture to overcome food insecurity and alleviate poverty; and all this while needing to protect biodiversity, the environment and human and animal health. This raises both the importance of biotechnology in the development of Africa's agriculture economic development, as well as the need for effective regulatory mechanisms to ensure maximisation of benefits and minimisation of risks.

You have been working with African governments, especially on development. What in your view is the attitude of African leaders with regard to absolute commitment to fight food insecurity?

Well you see, in a quest to reduce hunger, food insecurity and poverty through agriculture, African governments agreed to increase public investment in agriculture by committing a minimum of 10 per cent of their national budgets to agriculture with the aim of raising agricultural productivity by at least 6 per cent by 2015. , a mixture of both conventional and biotechnological approaches . Unfortunately, the adoption of agricultural biotechnology in Africa has been slow due to lack of adequate capacity, political support and/or political will, access to proprietary technologies, scientific uncertainties, resources and activism. Despite all these, African countries are making steady progress towards developing and implementing domestic frameworks that comply with the main multilateral framework, the Cartagena Protocol on Biosafety (CPB) (Secretariat of the Convention on Biological Diversity, 2000). This notwithstanding, there are still some inherent weaknesses in these domestic frameworks even for the countries that have had these regulations in the very earlier stages like Burkina Faso, Egypt, Kenya, Malawi, Mauritius, South Africa, Zambia and Zimbabwe, etc., which makes it difficult to enforce. Sometimes, this is aggravated by the lack of sufficient coordination between implementing institutions. Much of the early push for the development of biosafety regulations in Africa came through the UNEP-GEF project amid concerns that developing countries would become testing grounds for novel and potentially risky substances that they had neither the capacity nor the regulatory frameworks to handle. Although African policy makers expressed these concerns over GMOs, it wasn't until the Southern Africa countries faced food aid crisis in 2002 that these concerns metamorphosed into a public phobia for GMOs in Africa. These concerns by African policy makers were partially influenced by Europe's position on GMOs, as well as a mistrust of the motives of multinational seed companies. Eventually, the ensuing biosafety frameworks and legislations reflected these sentiments and were overtly restrictive, for example, the Biosafety Act of Zambia (Government of Zambia, 2007) and the Biosafety Proclamation of Ethiopia (Government of Ethiopia, 2009). There were however, other factors at play in some other African countries. For instance, Burkina Faso wanted to facilitate the local introduction of GM cotton to revive its flagging economy, which was a main driver for their biosafety legislation.

African countries to develop biosafety frameworks?

Funding has been made available for capacity-building from the Global Environment Facility (GEF) for developing countries to draft National Biosafety Framework (NBF) documents after the CPB entered into force in 2003. This was an important driver of the process in Africa even though a number of these countries at that time had little knowledge of, or interest in, biotechnology or biosafety. As discussed in the GEF evaluation report (GEF, 2006), the CPB does not prescribe the immediate need for comprehensive legislation. The availability of these frameworks or legislations did not however necessarily translate into functionality. For countries in Africa to have a functional biosafety regulatory system, the passing of a Biosafety Bill or the modification of existing legislation to comply with international provisions is just the beginning of a long process. It requires capacity building at many levels. This is necessary to build on the progress made by many countries and to ensure a full implementation of the NBFs developed under the UNEP-GEF program.

What is the specific role of the ABNE in the context of biosafety regulations?

The ABNE was conceived under the auspices of the NEPAD Agency by African leaders to build the capacity of African regulators to ensure functional biosafety systems within the member states of the African Union. It is in existence to facilitate development of synergies between national, regional & international biosafety actors operating on the African continent and the wider socio-economic development targets and aspirations of countries. This should see biosafety frameworks and the technology taking their proper place as key components of national systems of innovation and key tools, not adversaries, in national development agendas. Now, more countries have developed their guidelines and biosafety laws either for commercialization or conducting confined field trials for some indigenous African commodities. Some of the components of a functional biosafety regulatory system include: (a) National Policy, which is required to frame a country's unified approach to biotechnology and biosafety. However, there are some conflicting positions taken by different

government ministries leading to regulatory decision making delays and or poor decision making. (b) Legislation: According to Global Environmental Facility, 2006 “Inexpertly drafted legislation that ...creates insufficient or legally uncertain permits and processes, for example – may deter external investors and importers from future attempts to act within the country.” (c) Administrative arrangements for which there is a need for a central point where reports are received and evaluated, and where monitoring processes are undertaken to ensure adherence to permit requirements. Competent administrative bodies with adequate funding for processing applications and clear mandates are needed. Others include, Scientific Risk Assessment where independent scientific experts knowledgeable in risk assessment that will serve in an advisory capacity and not involved in decision-making are needed. There is a poor critical mass for this in most of the AU member states. (e) Extension services: In many developing countries the extension system is unfortunately weak or non-existing and for a new technology they need to be trained in all aspects of the application of GE technology in order to ensure that farmers apply it to best effect. (f) Inspectors: These government employees play a vital role in monitoring, inspection and compliance and need to be appropriately trained to know what to look for; and (g) Trained farmers: because farmers are to gain maximum benefit from GM seeds, they must also implement good farming practices. Farmers need to understand the reasoning behind non-use of saved seeds, the biosafety requirements such as the need to plant non-transgenic ‘refugia’ around pesticide-resistant crops to prevent the emergence of pesticide- resistant insects, etc.

How then could the regulatory systems be enhanced in Africa?

To enhance the regulatory systems in Africa the following have been suggested: availability and sustainability of financial resources to the regulatory systems; the need for integration of multiple actors with multiple agendas; access to credit by farmers to buy GE seed; Control of informal seed trade and possible breach of intellectual property rights; capacity to enforce regulations; capacity for inspection and monitoring; increase public awareness; access to accurate information on biotech/biosafety; adequate infrastructure; timely and adequate seed supply; nascent public-private sector partnerships and improved linkages in public-private partnerships.

What effect has politics to the issue of GMOs, especially in Africa?

The political dimension of GMOs was and still is the outstanding problem on GE regulation worldwide. In Africa, the lack of political will for GE technology widely observed in most countries is mainly attributed to Africa’s policy-making elites who prefer the European-style regulations for GE crops. The early adopter countries warmed up to GE technology and later there were elements of ‘backsliding’ due to the mis- information and the pressure exerted by activists; such as the recent Kenya government decisions on GE import ban and the labelling regulations. We have also found that elections can be a challenge and an opportunity.

Achieving Food, Nutrition Security: Samuel Hinnah; 22 March 2014



The promotion of the production and consumption of orange-fleshed sweet potato (OFSP) in Ghana is regarded as one of the key strategies to reduce vitamin A deficiency in children and achieve food security. The current efforts by both government and Non-Governmental Organisations (NGOs) to spearhead this initiative are encouraging, however, there is more grounds to cover.

The technical backstopping that NGOs may need from government extension services may be difficult to access in the current resource constrained operating environment. As a result, NGOs who want to invest in OFSP will need to

initially invest in some in-house technical capacity to augment government efforts.

They also need to share resources and experience from the field to ensure that there is healthy collaboration among them. The evidence gathered from the experiences of NGOs in this area should facilitate advocacy activities towards more investment into OFSP, by providing information and evidence on best practices to relevant national authorities and other development partners.

Food availability

Sweet potato provides higher yields per given area in a shorter time compared to maize and cassava. The crop can be produced on marginal soils and easily integrated into many cropping systems. Again, improved, early maturing sweet potato varieties are ready for harvest in three to months.

Lydia Sasu, the executive director of the Development Action Association (DAA) says given the right investment in sweet potato production and consumption, Ghana can become food secured as well as improving on the livelihoods of farmers.

As a country, there is the need to ensure that farmers have access to the sweet potato vines in large quantities so that the famers can multiply the vines to produce more of the crop, she said.

Sasu noted that the government in partnership with the private sector and NGOs need to put in place policies and programmes that would attract the youth to venture into producing sweet potato.

Food access

Sweet potato can easily be integrated into many cropping systems and its relatively low labour requirements compared to other crops, and ability to be stored in the ground for some time, enhances access for producing households. There is huge potential to use sweet potato in agro-processing, for example, for partial wheat flour substitution as confectionary and snack food.

According to Francis Kweku Amagloh from the University for Development Studies, orange fleshed sweet potato is not readily available on the market currently, however, there is the need to introduce the crop to farmers and eventually become available on the market.

In Ghana, women of childbearing age (15 to 49 years) afflicted with night blindness are about 1.5 times higher compared to the maximum cut-off of 5% for classification a of deficiency with public health significance, he said.

Recent research has focused on testing two approaches to improving sweet potato vines, investing in trained community based vine multipliers who maintain quality planting material to serve the surrounding villages and the Triple S approach, a system designed for households in drought prone areas to store small, healthy roots in sand during the dry season and re-sprout them six to eight weeks prior to the inset if the rains.

GMOs identified as the future for agric: Charles Benoni Okine; 1 April 2014



The GMO debate rages on, and in this report, Charles Benoni Okine and Jessica Acheampong report about the position of Israel's Agric Minister

GENETICALLY modified organisms (GMOs) have been described as the future for the production of food to meet the demands of the bloating global population. "Look, the future is in GMO," Mr Yair Shamir, the Minister of Agriculture of Israel, told the GRAPHIC BUSINESS in an exclusive interview during his visit to Ghana a couple of weeks ago". His endorsement of the highly controversial topic comes at a time when the debate on the use of GMOs is raging, with those opposed to the new method of agriculture production slightly having an edge over the proponents of the idea because of their loud voice across the world.

In Ghana, for instance, many civil society groups have emerged specifically to prevent the government from succumbing to the idea of passing any laws that would make the use of GMOs in crop and animal production possible. Similar pressures are also mounting in many parts of the world, forcing governments to gauge their commentary on the matter, although they are optimistic about the potential of GMOs to transform the agriculture in the world. He admitted that some groups among the general public are against GMOs in food production, saying that "these days; the general public's opinion is against it; the Europeans are not accepting it, whether legally or otherwise." But Mr Shamir was quick to add that for "everything that we are doing in Israel for export and import, we do not do anything that has to do with GMO".

He noted that "we are doing something in the laboratories, in order to prepare ourselves for the future, we examine the possibility of what can be done because when the time comes and people decide that it is time to go for the new way of doing things, we will have been ready for it." He held the believe that the necessity for more food to meet the growing demand would create the appetite for GM foods. "There are other countries like the United States of America (USA) and others elsewhere doing GMOs but we (Israel) are not," he reiterated; adding that "we are just doing it for research purposes and its only restricted to the labs and it is very confidential". Describing what GMOs would do for foods, he said "The GMO will rather accelerate the process because instead of taking a long time to get a variety, you can do it in just a step". "It is for a certain period of time, since a virus could affect the organism and the fertiliser would not work and you might need to support production for the next year, and you will later realize that only GMO will give you the antidote," he added.

Plant evolution According to Scitable, a collaborative learning space for science has been altering the genomes of plants and animals for many years through traditional breeding techniques. Artificial selection for specific desired traits has resulted in a variety of different organisms, ranging from sweet corn to hairless cats. But this artificial selection in which organisms that exhibit specific traits are chosen to breed subsequent generations has been limited to naturally occurring variations. In

recent decades, however, advances in the field of genetic engineering have allowed for precise control over the genetic changes introduced into an organism. Today, it is possible to incorporate new genes from one species into a completely unrelated species through genetic engineering, optimising agricultural performance or facilitating the production of valuable pharmaceutical substances. Crop plants, farm animals and soil bacteria are some of the more prominent examples of organisms that have been subject to genetic engineering.

Way forward Some scientists are also of the view that in order to end the long debate, there is the need to combine the conventional ways of producing food with the non-conventional means to ensure that the world does not lack because of a raging argument about whether GMOs are to be accepted or not. The debate is necessary to bring out the best for the world because the population is bloating out of proportion and food production must match the growing demand. The assertion by the Israeli minister that although Israel is not commercially cultivating GM foods, neither are they importing, is necessary to prepare the grounds for any eventuality, and Israel is highly on its guard to ensure that it is not overtaken by events when the time comes for GM foods to be officially commercialised. Biology Fortified is also of the view that “Scientific arguments are not settled by counting the number of people supporting an opinion. They start with a careful search for scientifically valid evidence and they carry this forward with open-mindedness and careful logical reasoning and they eliminate false conclusions from the discussion. Good scientific reasoning also takes notice of the whole body of evidence on a topic and updates the verdict as new evidence becomes available.

The Biotech Debate And Our Challenges: Michael Ssali; 2 April 2013



You could have read Nassib Mugwanya's article, Are GMOs really the threat?, in Seeds of Gold last week. Since Uganda is debating the law on biotechnology and bio-safety, GMOs (genetically modified organisms) and food production is topical especially in agricultural circles.

The debate may not attract as much public attention as the Marriage and Divorce Bill but it has a bearing on food security for our growing population and our future. It also has a bearing on our household incomes as a farming country.

I liked Mugwanya's observation that millions will be harmed by not having enough food because of poor legislation on biotechnology and bio-safety. It is only a matter of weeks since Farmers Diary devoted space to this debate and it keeps surfacing in the media with some opposing and others supporting the adoption of biotechnology in Uganda.

Tackle issues

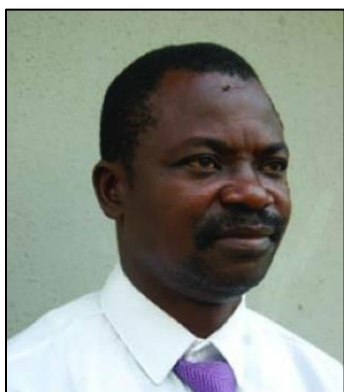
The legalisation of biotechnology is not to outlaw organic farming, which is to sustain soil fertility and produce food in its natural form. The issue is that we are faced with new crop diseases, harsh climate, malnutrition, and a fast growing population—challenges that we cannot overcome effectively without resorting to biotechnology. Our scientists must come up with the appropriate crop varieties.

Some nutrients have to be genetically introduced into traditional food crops that people find more affordable and eat in great amounts such as cassava and bananas to counter malnutrition. We must also speed up food production to feed a bigger population.

During a recent Unesco conference in Nigeria, Prof Maciej Nalecz, Director of Basic Sciences, International Centre for Biotechnology (ICB) said: "Advocacy for and popularisation of biotechnology is needed in Africa in order to tackle agricultural-related issues such as food and nutrition safety, drought-resistant plant and tissue culture and many others." The conference marked the official commissioning of ICB at the University of Nigeria, Nsukka, as a Unesco Centre.

The good news is that our parliamentarians will spend the time discussing how biotechnology is to be regulated and safely used, which is no cause for anxiety.

Nigeria scandalously quiet on GM: Onche Odeh; 4 April 2014



Prof Dele Fapohunda, a Biotechnologist, Founder and President, Safe Food and Feed Foundation, is an ardent advocate of safe foods. In this interview with ONCHE ODEH, he decries the quietness of Nigerian government and experts over issues of Genetic Modification (GM) of foods, despite evidences that they are flooding the country, among other issues on the global GM controversies.

Excerpts.

What do you make of the controversies surrounding Genetically Modified (GM) Foods?

First, let us start with the genesis of all this. The project started in the 1960s when attention of the financiers was focused on the hungry millions of people in India, Mexico, the Philippines and Africa. High yielding varieties of rice and wheat were to be developed with genetic modification, and heavy input of fertilisers, herbicides and pesticides. This is why the International Rice Research Institute (IRRI) was formed in the Philippines. It was alleged that widespread corruption and insecurity were twin factors that did not allow the experiment to succeed in Africa. The Consultative Group on International Agriculture (CGIAR), a research and aid organisation, has been very active and visible in the initiative that concentrated on producing high yielding varieties. This commendable initiative of reducing starvation among the world's poor then by experts was led by Norman Borlaug, now called the father of Green Revolution. As we speak, some countries are large producers and major world exporters of the monocultures and many ready-to-eat foods, which are now GM.

Why is the project being opposed now?

Opponents insist that the foods are unnatural and unacceptable because they meddle with the natural biological processes. They therefore continued to create a 'fear effect' in the mind of consumers. Many citizen groups are daily calling for Genetic Engineering (GE)- free zones around the world and vote instead for conventional organic agriculture. Health and environmental concerns have heightened of recent, with Rights groups taking many governments to court. This has happened in USA and in the Philippines. Although they noted that increased food production meant people no longer die of hunger, they, however, are dying of malnutrition as some of the new improved varieties lack essential nutrients like iron and vitamin A resulting in food and nutrition related morbidities. Since this form of agriculture also depends on huge doses of pesticides and fertilisers, death of fish, as well as health impacts to human consumers through allergies and cancers are equal sources of concern. Pesticide residues are regularly monitored by the WHO and FAO because built-in pesticides cannot be removed from agric produce. Also this large input of petrochemicals and emergence of secondary pests, which ultimately shoot up production costs has widened the gap between the rich and poor. The emerging economic challenge has led to the migration of small holder farmers and landless farm workers to urban settlements.

Is it true GM foods are being rejected?

That's very correct, and there are practical cases of rejection of GM corn from one country by another. Hormone – fattened cattle are also being rejected in Europe. This year, the government of Hungary destroyed thousands of GM corn fields and gone proceeded to tighten control as dairy cow feeds. Sometimes the protests have gone violent, for example, a wheat farm was destroyed by protesters in Australia in 2011. Vandalism against the experimental stations was also reported in the Philippines in 2013. Such violent act on laboratories, and field experimental stations had also happened in the USA and Europe. There are many non-violent groups like Friends of the Earth, Union of Concerned Scientists, Food and Waterwatch, Institute of Responsible Technology, Organic Consumers Association.

But supporters have continued to allay fears?

Yes, supporters have accused opponents of relying on results of unverified junk research. There are recent researches on animal field trials citing many feeding studies conducted by public research laboratories which concluded that there are no safety problems linked to long-term consumption of genetically modified food. The anti GM activists had advised that GM food should be banned, or accordingly labelled to afford consumers the opportunity to make choices. In what speaks of the contrary, a report quoted, Hamburg, a very senior official of the FDA in March as saying that the FDA hasn't changed its position on GMOs, despite two decades' worth of studies linking GMOs, and the pesticides and herbicides required to grow them, to everything from allergies to cancer, Hamburg said the FDA has "not found evidence of safety risks" associated with GMOs. Therefore there is no need to specially label GM food as so.

Sincerely, what do you think is the future of GM?

That is a difficult question for me because a highly probing review of the Green Revolution package has revealed a tough divergence of opinions, each equally seemingly convincing. Intricacies and complexities involved in assessment of food security have thrown up bitter divergence in the role of a critical aspect of Green Revolution. The vehement and frontally tendentious divide is capable of threatening the financial base of some international companies and capable of rocking the political stability of the world if not well managed. Remember that big names and corporate bodies are involved. Money and politics are twin characters on the table that serve as platform of presentation that paraded the potential of blinding and neutralising each side of the argument. Huge financial commitment has been made over the years and such investment cannot just be overlooked by any latter-day criticism. But the question remains: Can we say the conception and execution of the project is sincere, ab initio? Sometimes the claims and counter claims can be alarming with profound implications for example the opponents insisted that contrary to claims, it is indeed scientifically proven that the dangers and long term health implications far outweigh so called benefits.

But Norman Bourlaug, the brilliant man at the centre dismissed negative claims as ranting of the uninformed, describing the critics as armchair opponents who never witnessed nor experience penury and hunger. He believed that if they lived just one month amid the misery of the developing world, as he did for fifty years, they'd be crying out for tractors and fertiliser and irrigation canals and be outraged that fashionable elitists back home were trying to deny them these things. He admitted the project has not turned the world into a Utopia, but equally insisting that it was a step in the right direction.

What is the position of Nigeria on this?

Many countries are involved in the two sides. These include France, Finland, India, Switzerland, Peru, Italy, Greece, Spain, Austria, Russia, Australia, Hungary and South Africa. I am not sure of the stand of Nigerian government, scientists and the business group on this. And this loud silence to me is scandalous, when one considers the rate at which many GM foods flood Nigeria. Meanwhile, this scientific and economic battle rage in other parts of the world, and Nigeria still continues to battle with issues of corruption and insecurity, unfortunately the twin factors that enhance national retrogression I just got a report now that the next phase of the Green Revolution is targeting Africa, through a grain research centre in Mexico, and that could be sooner than expected. Are we ready to accept or criticise, based on verifiable facts? Food safety activists like ours will do their best to sensitise Nigerians and we are open to collaboration with similar minds in this crusade

Uganda adopts nutrient-rich crops but with challenges: William B Odinga; 9 April 2014



IN SUMMARY

Many African countries are adopting crops, which are bred with higher amounts of nutrients to boost nutrition of their populations. There have been varying degrees of success owing to a number of factors.

Nutritious crop varieties developed in Uganda, Rwanda and other African countries are ready for multiplication for distribution to farmers, an international conference has heard.

But Uganda's agriculture ministers expressed fears that Ugandan farmers may take long to benefit from these crops because of a number of technical-related issues .

Speaking at the sidelines of the Second Global Conference on Biofortification, which was held from March 31 to April 2 in Kigali, Rwanda, Dr Zurubabel Nyiira, the State Minister for Agriculture said: "Uganda has the framework to scale up production of biofortified crops. The problem with Uganda is especially in the public service. Our technical people don't seem to have the will to support the transformation of the smallholder farmer."

Increase value

The three-day conference, convened by HarvestPlus and Rwanda, under the theme, Getting nutritious foods to people, deliberated how to get iron-, zinc- and Vitamin A-rich crops to more people. Some parts of Uganda have already adopted Vitamin A-rich orange fleshed sweet potatoes.

Vitamin A- and mineral-rich crops, developed through a process known as biofortification, which means breeding crops to increase their nutritional value, are intended to improve nutrition and hence public health.

They are being produced to reduce anaemia, cognitive impairment, visual impairment and other malnutrition-related health problems, according to a statement from HarvestPlus.

"Nutrient-rich crops are most beneficial to groups that are that are vulnerable to deficiencies in micro-nutrients, such as vitamin A, iron or zinc, including children and pregnant and breastfeeding women, and those whose diets are limited by low income or lack of access to diverse, healthy foods," the statement adds.

Widely as possible

Dr Howarth Bouis, director, HarvestPlus, said the Rwanda conference was intended to discuss ways of delivering the biofortified crops as widely as possible.

"Biofortified nutrition-rich staple food crops are already available for scaling up. We eat to avoid hunger but fundamentally we need to be healthy," he told the conference, which attracted more than 350 participants from around the world.

Rwanda was chosen to host the conference for its success in growing iron-rich beans.

“These beans are high yielding, disease resistant and provide up to 45 per cent of daily iron needs, which is 14 per cent more than the traditional varieties. Over 700,000 families are growing the beans,” said Rwanda’s Prime Minister, Pierre Habumuremyi, during the conference.

Make Agric Game Changer of Africa – Paul Boateng: Charles Okine; 11 April 2014



A Member of the British Upper Chamber of Parliament, the House of Lords, Lord Dr Paul Boateng, has urged African governments to devote a chunk of their budgets to the development of the agriculture sector to make it “the game changer for their economies.”

He said the funds should be channeled into the research and development of new methods of farming to enable Africa to produce not only to feed itself but become a net exporter of food to the rest of the world.

Dr Boateng made the call in an exclusive interview with some selected African journalists who are Fellows of Biosciences for Farming in Africa (B4FA) shortly after

addressing a special luncheon at the House of Lords on Wednesday.

The programme was specially organised by B4FA to offer opportunity to the fellows to interact with doctoral students of Cambridge University, Members of the House of Lords and professors in science.

Dr Boateng said bioscience application in agriculture was the way to go, and urged Africans not to turn their backs to the new technology in farming but embrace it in a manner that would help them transform the agricultural sector.

"Why should Africa be spending billions of foreign currencies to import food to feed its people when it could easily become the net exporter of food?" he quizzed.

According to him, the agricultural potential of the continent is enormous and can easily be a game changer for the various economies if the right investments are made into the sector.

"The youth do not have jobs and the agriculture sector can help create job opportunities for them in a manner that will not make them feel belittled but very well placed and empowered in society," Dr Boateng added.

Statistics

Crop losses due to pests and diseases are estimated at 35 per cent, while 80 per cent of African rice farms traditionally depend on rainfall.

Africa's population now stands at 1.1 billion and it is expected to reach 2.4 billion by 2050, yet up to 25 per cent fall in agricultural yields is estimated due to climate change by the same year.

In spite of this potential, the average grain yield, for instance, in Africa is 2.2 tonnes per hectare, below the world average of 3.4 tonnes per hectare.

Way forward

Against this background, Dr Boateng suggested that unless Africa embraced new technologies and biosciences into its agricultural sector early enough, it would lag behind.

Dr Boateng waded into the genetically modified foods debate and indicated that they were new technologies that could be adopted to help change the face of farming on the continent of Africa and in the world.

To him, Africa has no reason to wait to be hit by massive food shortages before taking action on what can rather make the continent rich and bring back smiles on the faces of small to medium-scale farmers, for instance.

GM cowpea nears commercialisation in West Africa: Alex Abutu; 12 April 2014



All is set for the African Agricultural Technology Foundation (AATF) facilitated Pod Borer Resistant Cowpea project review meeting expected to lay the ground rules for the commercialisation of Genetically Modified Cowpea in the West African Sub-region.

The meeting with the theme: Towards commercialization of PBR cowpea is expected among other things to review project activities in 2013, look at requirements for regulatory approvals for PBR cowpea and evolve strategy for product deployment in target countries.

Dr Denis Kyetere, AATF Executive Director, said at the communication strategy review and update workshop in Accra, Ghana, a prelude to the main meeting, that the GM technology would assist the sub-region and Africa at large overcome the threat of pest infestation as well as enable the continent attain self sufficiency in Cowpea production.

Kyetere noted that the project had reached an advanced stage and that the product is expected to be commercialized in 2017 and as such, “it is very important to be strategic in our communication. It is also critical for us to be proactive in our approach at engaging stakeholders with the right message.”

Also speaking, Dr Prince Addae, the AATF PBR Cowpea project manager said that Pod Borer posed a serious threat to the production of cowpea in the sub-region as farmers experienced over 80 per cent reduction in yield due to Maruca.

“Farmers will witness an increase in yield and also reduce the number of spraying they usually carry out on their farms as the cowpea variety will be able to protect itself against threat from insects and pest,” he added.

The Nigeria component of the project conducted at the Institute of Agricultural Research, Ahmadu Bello University, Zaria is ahead of Ghana and Burkina Faso as it had already carried out the first phase of mutli-locational trials in three locations of Kano, Zamfara and Kaduna states.

“Results from the trials are wonderful and we have gone ahead to incorporate the GM gene into cowpea varieties preferred by farmers in Nigeria,” Addae said.

Cowpea is planted on 12.5 million hectares of land and consumed by over 200 million people in Africa.

Food Security: Ghanaian Minister urges Africa to embrace biotechnology: Magdalene Offong Ukuedojor; 14 April 2014



The Ghanaian Ministry for Food and Agriculture on Monday urged all African countries to embrace biotechnology in view of the looming food insecurity in Africa caused by climate change.

The Deputy Minister, Food and Agriculture, Dr Alhasan Yakubu, made the call in Accra, at a Stakeholders' Review Meeting on Maruca Resistant Cowpea (beans)

"Food security in Africa is as important as it has always been in all our activities.

"It has often been said that Africa is endowed with natural resources; currently, exploiting our natural resources is no more that sustainable

"It is important that we look at alternative ways of managing the already vast ecology and secure ourselves nutritionally and pass on well tested infrastructure, technology, marketing to the next generation.

"The three things Africa agriculture needs are: investment, market and technology

The deputy minister said African legislators need to work on their bio-safety regulations and laws to ensure the passage of country-based bills which would guarantee improved technology for food crops.

"What the state institutions can do is to provide the appropriate legislation to help in this direction. One will be to help indigenise global treaties and conventions as in the case of biotechnology and natural resource management.

"Or to have laws that take on board our cultural foundations as a people in Africa, so that in the long run we do not have laws managing resources that are not compatible

"People must be engaged to understand that the issue of getting African agriculture to pick up will be to put African agriculture at the heart of global business.

`And the only way to do so is to make people feel safe with their investments.

"To do this is to call for more legislation and not less; legislation protects the investor and the consumer and government is in

Yakubu also reiterated the need for trust and confidence on African scientists in their researches and discoveries.

"African scientist must become the ferry house for bringing global technology to ensure that we achieve these three objectives – food security, industry and employment.

“The African scientist has a huge responsibility so that technologies that are globally available can also be brought home to the African farmer.

“The Africa’s policy makers and managers must also begin to trust the African scientists and work closely with African scientists so that we can share in this globally available public good.

“Our scientists should work very closely with policy implementors to realise food security in Africa.

“Cooperation between us will not give room for uninformed and wrong information that can filter to the population and not make it difficult for the technology that we are evolving to get to the farmer.”

Biotechnology is a technology that harnesses cellular and biomolecular processes to develop and improve on the quality of crops and animals to ensure food security.

These technologies, which also include genetic engineering, help to combat debilitating and rare diseases, and also reduce effects of environmental hazards such as floods, drought and desertification on crops. (NAN)

Fears As New Maize Disease Breaks Out In Mukono: Henry Lutaaya; 18 April 2014



Maize farmers in Mukono district are deeply concerned about the outbreak of a rapidly spreading and devastating new disease that attacks the crop causing nearly 100 percent loss in yield.

The disease is characterised with rotting of the tassel or the male part, stunting the crop, and in extreme cases, gradual drying of leaves and the entire plant; More worrying perhaps is that these characteristics are similar to those of the Maize Lethal Narcosis, a devastating new disease that has ravaged maize crops in Eastern districts of Sironko, Bulambuli over the past few months.

Dr. Godfrey Asea, a Maize breeder at the National Crop Resources Institute at Namulonge, says the Maize Lethal Narcosis disease had not been confirmed yet in Central Uganda, but added that they will investigate the cases in Mukono.

Godfrey Musoke, a farmer in Mukono says the disease started with the July crop of last year but mostly affected the off-season farmers like him who target buyers of fresh cobs for roasting.

Musoke says: "This disease started around July of last year 2013. We started seeing leaves dry. Almost the entire field was affected by the disease.

"At first we thought the problem was due to herbicides. Soon after, we learnt that several farmers were experiencing similar problems. We then thought that may be it is the seeds. But we realised that farmers who had bought from different companies such as Naseco, Fika and victoria seeds were all facing the same problem. That is when we noticed that it was a disease."

"Musoke explains that the disease affects the tassel and prevents the plant from developing grain."

The disease has hit Musoke financially already, as he explains. "I planted seven acres here last season but I am likely to lose everything. It's a major loss because I used about Ushs 1.5 million.

I realised however that the disease mostly affects the off-season crop. So this time, I've decided not to plant out of season,"If the disease continues at the current speed, Musoke says he will abandon the crop altogether.

Dr. Asea said they are working on having a tolerant variety. The time it takes for them is of essence, because the disease threatens to wipe out maize growing in the country, if no urgent solution is sought.

Maize is a major food security crop but also helps millions of households to get income by selling excess produce, while others depend on it as a trade commodity, or as an input in the animal and poultry feeds industry.

Opponents of genetically modified organisms close ranks with promoters: Kenneth Azahan; 4 May 2014



Opponents of Genetically Modified Organisms, GMOs, are in new gear as they begin closing ranks with promoters of GMOs. - By Kenneth Azahan

Since the debate on appropriateness of Genetically Modified Organisms, GMOs began, leading opponents of the technology have been from Europe. Individuals and organisations kicked against the technology, which began in America claiming that it was harmful to health and the environment.

Notable non-governmental organisations such as Green Peace, Alliance for Natural Health, Organic Consumers Association and Friends of the Earth to Africa, India and the rest of Asia who championed the anti-GM campaign, claimed that mixing genes between species seem unnatural and something was bound to go horribly wrong.

Fears over the technology spread like wide fire, and within few years, GM was essentially banned in Europe. In spite of the opposition from NGOs Environmentalists and the likes, there are scientists within Europe and across the globe who have constantly held that GMOs were as safe as non GMOs. However, individuals and stakeholders in Europe have found love with GMOs. A leading supporter of the technology is Secretary of State for Environment, Food and Rural Affairs in England, Rt Honourable Owen Paterson MP who is one of such stakeholders who views GM as having potentials in tackling the global challenges of food security, climate change, hunger alleviation and sustainable intensification of agriculture.

According Hon. Owen, GM technology could be likened to Norman Borlaug's initiative that saw to series of technological advances that transformed crop production in developing countries back in 1940 against the backdrop of war, famine and political instability. "It is no exaggeration that Borlaug is referred to as the man who save billion lives", adding that his example demonstrates what mankind can achieve through the application of science.

He stressed that 70 years on from that pioneering work, the challenges facing the world are not less daunting with the world's population expected to grow from 7 billion to 9 billion by 2050. "I believe that it is time to start a more informed discussion about the potential of genetically modified crops: A discussion that enables GM to be considered in its proper over all contexts with a balanced understanding of the risks and benefits.

"While I believe that there are significant economic, environmental and international development benefits to GM, I am conscious of the views of those who have concerns and who need reassurance on this matter. I recognise that we, government, industry, the scientific community and others- owe a duty to the British public to reassure them that GM is a safe, proven and beneficial innovation. We

must lead this discussion, explaining to the public not only what GM technology is but also how it can help”, Owen stated while having audience with African journalists in London.

Explaining why he was passionate about GM and yet it is banned in Europe, Owen disclosed that Britain was bound to obey the dictates of European Union being a member. He however, stressed that arrangements were ongoing in the EU to allow individual countries in Europe that are convinced about GM safety to grow and consume it.

The Secretary of State for Environment, Food and Rural Affairs in England is not the only stakeholder who is passionate about embracing GMOs. Lord Ewen Cameron and, Lord Paul Boateng who hosted African Journalists to a launch at the House of Lords in London were unanimous that GMOs would play a vital role in providing food for the increasing world population.

Lords Cameron and Boateng who spoke separately maintained that since 1996 there has been a 100-fold increase in the global use of GM adding that farmers would not grow GM crops if they were not benefiting from doing so.

The views expressed by stakeholders in Europe on GMOs suggest that the continent has tacitly reneged on its initial stand. For instance, Honourable Owen Paterson has repeatedly stated that “Europe benefits hugely from the GM crops grown in the rest of the world.

“The EU is the world’s biggest net importer of agricultural goods and we rely on shipments of key commodities to support our livestock system”, Paterson noted.

With the open admittance that Europe benefits from GM products, it remains to be seen the path African leaders will take, as they have been foot-dragging on the issue because Europe had not supported the technology.

Apart from South Africa and Burkina Faso that have taken definite stand on GM, other African countries have been going back and forth on the issue. Although African scientists have thrown their weight behind the technology, the legislation that will regulate the practice has been stuck in the various parliaments.

The African Academy of Sciences during its 9th Annual Meeting in Addis Ababa, Ethiopia identified biotechnology as a powerful developmental tool to tackle food, health, and environmental problems of the continent.

The scientists declare thus: “Available scientific evidence shows that Genetically Modified Organisms, GMOs, are reasonably safe. Hence, African countries should encourage research on and utilisation of GMOs as long as norms articulated in the existing international protocols and conventions such as the Biodiversity Convention, Cartagena, and Nagoya Protocols are adhered to.”

The scientist maintained that Africa was in urgent and dire need to break the seemingly perpetual cycle of hunger, malnutrition, and underdevelopment and urged African governments to take aggressive actions to embrace modern and traditional biotechnology as necessary tools and practical options for Africa’s development.

Modern Technology Can Save Farmers from Poverty: Salimat Garba; 5 May 2014

Vanguard



Leading agriculture experts have attributed hunger and poverty in Africa to the decline in agriculture, adding that growth in agriculture equates to a reduction in hunger and poverty.

According to them, the tremendous decline in Africa's agricultural sector in the past three decades is because of lack of investment, inadequate research and development, pest infestation, poor agronomic practices, climate change and lackadaisical attitude towards biotechnology in agriculture.

Sir Brian Heap, Project Leader, Biosciences for Farming in Agriculture (B4FA) in his words says "just by applying existing and available agricultural advice and technologies, the productivity of African agriculture could double or treble. But new agricultural technologies are being developed and trailed which could achieve even more."

More so, Lord Ewen Cameron, while speaking at the B4FA book launch event at the House of Lords, London, stresses the need for Africa and the world's continuous promotion of improved modern technology because of its ability to enhance food security that no other way can.

Cameron expresses regrets that the financial opportunities in agriculture are not maximally harnessed in Africa, adding that Africans are faced with challenges which are supposed to be opportunities.

"There is a lot of water in Africa but there is little infrastructure for getting the water. There are many hectares of arable lands in Africa but there is land insecurity.

Identifying investment in research and training farmers as the biggest investment a government can make, he points that democracy is very important in the future of agriculture.

"What are the right seeds? How do you get hold of the right seeds? Market Information, mobile phones, technology and internet are very important in democracy," Cameron adds.

For Lord Paul Boateng, the significance of local agriculture should never be forgotten. According to Boateng, while building on local agriculture, there should be adequate investment in Research and Development (R&D) as it is critical to agricultural development in Africa.

He observes that the world is presently witnessing resurgent of R&D in agriculture and that all individual countries are beginning to make headway in the Maputo Declaration.

The lord, however, urges Africa to set its own agenda through the UK parliament and all other friends in Science and Technology.

Furthermore, Hon Owen Peterson, Secretary of State for Environment, Food and Rural Affairs, UK, during the visit of some B4FA fellows to his office discloses that the problem the world will encounter in feeding itself in the next 40 years are very real and something to be prepared for.

“At this very moment, there are one billion people on this planet who are chronically hungry. Are we really going to look them in the eye and say we have proven technology to help, but the issue is just too difficult to deal with, it is too controversial?”

Peterson explains that the world population will soon move from seven billion to nine billion and there will be even fewer resources to feed on.

“It is our duty to explore technologies like Genetic Modification (GM) because they may hold answers to the very serious challenges ahead.”

Positing that GM is not necessarily about making life easier for farmers or making their businesses more profitable, he says it is about finding non-chemical solutions to pests and diseases and fortifying food with Vitamin A so that children in the poorest country will not go blind or die.

“It is about making crops durable enough to survive sustained drought. It is about developing new medicines. It is about feeding families in some of the poorest parts of the world.

“We cannot expect to feed tomorrow’s population with yesterday’s agriculture; we have to use every tool at our disposal.”

The secretary of state, however, expresses dissatisfaction over the disruption of the golden rice trial in the Philippines, stating that it was an act initiated by some well-fed men to deny children in developing countries the right to see and live.

“The golden rice was designed to reduce the rate of children’s death and blindness in the world. GM only proffers solution and adds value but some people have seen it as multinational companies who make poisons.”

“Currently 500,000 children die yearly while others go blind due to deficiencies,” Peterson concluded.

A hungry man, they say, is an angry man and if the problem of hunger is removed from a man’s wants, his entire problems are almost solved. The need to comprehensively solve the challenge of hunger globally cannot therefore, be over-emphasised, observers say.

Ugandan farmers could benefit from biotech gain: Lominda Afedraru; 7 May 2014



A scientist explains the research he is leading on developing a Vitamin A and iron-rich banana. Globally, more developing countries are adopting biotech crops and their commercial value is increasing. PHOTO BY LOMINDA AFEDRARU

IN SUMMARY

Globally, the value of biotech crops has been increasing since 1996 when they were commercialised. This presents opportunities for Uganda.

Farmers in Uganda who intend to grow biotech crops when the law is passed could benefit from the global commercial value that farmers in other parts of the world are already reaping.

In 2013, the total economic benefit farmers realised from sale of their biotech crops amounted to \$116.9b out of total area of 175 million hectares of land leading to a total annual growth rate of three per cent.

The figures are contained in an annual report by International Service for the Acquisition of Agri-Biotech Applications (ISAAA), which also indicates that more countries have adopted biotech crops since 1996, when they were first commercialised.

Increased adoption

The countries growing these crops have increased to 27; 19 of them are developing countries, which planted 14 million hectares more than the industrialised countries.

This is double seven million hectares difference between 2011 and 2012 figures. And the economic gains were \$58b for the developing countries compared to \$59b for the industrialised ones. The principal biotech crops grown globally include soya bean, cotton, maize and canola tested against insect resistance, herbicide tolerance and stacked traits. The latter means having a combination of the different characteristics depending on the purpose they bred for.

New crops were also adopted by farmers in 2013 such as insect-resistant eggplants in Bangladesh, Bt maize in Panama and drought-tolerant sugarcane in Indonesia. Further statistics indicate that US emerged top with an economic gain of \$58.3b, followed by Asia with \$31.7b, Latin America \$25.4b, Africa \$1.3b, and Europe at the bottom with \$0.2b.

Added advantage

Also, 2013 was the second time developing countries were surpassing the Western countries in terms of acreage under biotech crops, noted Dr Charles Mugoya, programme manager at Association of Strengthening Research in Eastern and Southern Africa.

He was making a presentation based on the ISAAA report during the Open Forum on Agricultural Biotechnology in Africa (OFAB), held in Kampala earlier later month.

Quoting Kenneth Quinn, president, World Food Prize 2013, who said “by 2050 the world will require as much food as it has been consumed since the beginning of civilisation”, Dr Mugoya asked: “Where will the food come from, how will it be produced and who will produce it?”

To him, using biotechnology to breed improved varieties of crops to feed the growing population is an added advantage. “To answer the question,” he said “It is the 65 per cent of Africa’s labour workforce employed by agriculture.”

Putting it in Africa’s context, Dr Mugoya noted that the numbers are declining as a result of ageing farmers because the youth are shunning agriculture for jobs in cities. “This means production will have to double, perhaps, triple using fewer and diminishing resources. This is where the option of using more powerful technologies becomes attractive.”

In adoption of biotech crops, the continent continued to make progress with South Africa benefiting from Bt maize and soya beans while Burkina Faso and Sudan increased the acreage of Bt cotton by 50 and 30 per cent, respectively.

Seven countries; Uganda, Cameroon, Egypt, Ghana, Kenya, Malawi and Nigeria are currently conducting field trials in various crops. These include banana, rice, cassava, sweet potato, cowpea and sorghum.

Considering the potential for growth and increasing commercial value, Africa could stand to benefit but there are concerns about impact of biotechnology. But Dr Mugoya enumerates several benefits other than the commercial. One of them is protection of biodiversity through sustainable intensification of crop production.

or instance, globally, biotech crops planted on 1.5 billion hectares saves 13 million hectares of forest and biodiversity therein, which is usually lost every year.

Safe use

In addition, there is need for reduced usage of inputs such as fertiliser and pesticides leading to conservation of soil and water.

Dr Maxwell Otim Onapa, deputy executive director, Uganda National Council for Science and Technology, said Uganda should not be left behind but it needs to put in place mechanisms to support safe innovation and utilisation of biotechnology.

This, therefore, calls for Parliament to pass the biotechnology and biosafety Bill for the safe use of the technology that is not only applied to agriculture but other fields such as health.

