

OPEN FORUM ON AGRICULTURAL BIOTECHNOLOGY, UGANDA CHAPTER

Farmer Leaders' Held at the Uganda National Farmers' Federation Conference Hall on March 23rd 2013, Kampala



**REPORT OF THE FARMER LEADERS' OPEN FORUM ON BIOTECHNOLOGY HELD
AT THE UGANDA NATIONAL FARMERS' FEDERATION CONFERENCE HALL ON
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FARMER LEADERS' OPEN FORUM ON AGRICULTURAL BIOTECHNOLOGY

Held at National Farmers Federation Kampala **23/03/2013**



1.0 Introduction

With support from the African Agricultural Technology Foundation (AATF) under the auspices of the Open Forum on Agricultural Biotechnology in Africa, SCIFODE and UNCST in collaboration with the Uganda National Farmers' Federation organized a one-day workshop for district farmers' association leaders from across the Country. A total of 112 participants from more than 70 districts distributed across the Country participated in the workshop. This was enabled by SCIFODE's good collaboration and tenancy with Uganda National Farmers' Federation that accepted to convince the farmer leaders to stay for a further two nights to attend the one-day farmers' forum on agricultural biotechnology, after their two-day Farmer Leaders' Council meeting that preceded the forum. SCIFODE was to take care of extra two nights' accommodation, plus a day's allowance for NEC members. The forum was a great opportunity at which farmers' views on the Proposed National Biotechnology and Biosafety Bill were received, processed and submitted to the Parliamentary Committee on Science and Technology. The UNCST and its partners ensured that a sufficient number of copies of the National Biotechnology and Biosafety Bill were available and each farmer leader took a copy of the bill.

The objectives of the Farmer Leaders Forum on Biotechnology and the National Biotechnology and Biosafety Bill 2012 therefore comprised of the following:

1. To update farmer leaders on biotechnology research progress in the country and globally
2. To receive and address farmers' concerns on use of modern biotechnology in agriculture
3. To obtain farmers and farmer leaders input views as regards to modern biotechnology and on the proposed National Biotechnology and Biosafety Bill 2012

Anticipated Outputs

- Overall enhanced farmer leaders' understanding on issues of biotechnology and biosafety
- Farmers views and perspectives on biotechnology and the National Biosafety Bill 2012 documented.

2.0 Welcome Remarks

Mr. Makara welcomed the participants to the meeting and gave a brief background of the Open Forum on Agricultural Biotechnology (OFAB). He informed the participants that OFAB started in 2006 and 2007 in Kenya and Uganda respectively and is currently conducted in 7 countries in Africa. It is funded by the African Agricultural Technology Foundation (AATF) and in Uganda is hosted by the Uganda National Council for Science and Technology (UNCST) with which SCIFODE collaborated to implement it. It is an open forum where ideas and information are given openly. In Uganda it has been held on a monthly basis since 2007 and a wide spectrum of stakeholders including legislators, farmers, scientists and others have gone through it. This specific forum has been organized in collaboration with the Uganda National Farmers' Federation (UNFFE), to disseminate information on biotechnology to you as farmer leaders such

that you can similarly disseminate it to members of your farmer organizations. We have requested one of the lead scientists to come and discuss present the subject matter to you, such that you can hear from the horse's mouth, why they are using biotechnology in their research work and how it will address your challenges as farmers. We would like you to understand that the biotechnology and biosafety bill which is currently before Parliament is meant to provide a mechanism of assessing safety of these products such that they can be delivered to you. This workshop will therefore require that you take a copy of the bill you have been given, read it and if possible ask your Member of Parliament why he should support and expedite it. We thank the UNFFE for cooperating with us and we expect that you will have some recommendations to legislators and scientists by the end of the workshop.

3.0 Official Opening Remarks

The President of UNFFE welcomed participants and thanked them for finding time to come and attend the sensitization workshop on agriculture biotechnology. He noted that after the farmers sacrificed to leave their gardens, it's important that they get all the necessary information there is. He cautioned the farmers that they will at times be asked things they don't even know and advised them to take this opportunity to learn more about the subject of biotechnology to reduce the knowledge gap. He informed the farmers that he has personally appeared before the parliamentary committee on science and technology where he gave his opinion as a lay person and not as a scientist.

The president also talked about three levels of biotechnology. That is:

- i. Traditional Biotechnology which has lived with man for ages. He gave an example of use of yeast a living organism in wine production and in the transformation of the local juice production into "tonto" a local beer,
- ii. Mid-level Biotechnology where he gave an example of tissue culture products that give us disease free planting materials. The tissue culture products are currently on market for banana, mushrooms, cassava.
- iii. Advanced/Modern biotechnology. This involves genetic engineering. Example is current maize field trials under the WEMA project in Kasese. Modern biotechnology needs a law in place to regulate. A bill on biotechnology and biosafety which was recently presented by Minister of State for Finance and Economic is currently going under parliamentary process.

The president also noted that biotechnology gives us a way of protecting crops against major disease in banana, cassava and maize. He asked farmer's leaders to ask questions and give their opinions. Fear of the unknown is what the president of UNFFE told the parliamentary

committee on Science and Technology when he appeared before them in relation to the bill on biotechnology. He asked the scientists present in the workshop to clarify on any likely fears related to biotechnology products.

The President talked about the most common allegations in regard to biotechnology and its products to include;

- i. Roundup Herbicide. The fear is that farmers will only be able to buy seeds from the researchers and producers thus losing their traditional control over the seeds.
- ii. The terminator seeds. The seeds that grow once and cannot be replanted in the next season. The seeds that do not germinate for the second time.
- iii. That GMOs interferes with our health system, among many others.

He said that as the scientists will explain, none of the above fears is real, but mythical. For instance, most of you and I are already used to buying hybrid seed. Terminator seeds never existed and will never exist. From evidence so far gained from more than two decades, GM crops and resultant food are safe and pose no health risks to us. He also asked the farmers to ask for more information on the above and more issues regarding the topic of biotechnology.



The President of the Uganda National Farmers' Federation (Centre) after officially opening the Farmers' Open Forum on Agricultural Biotechnology, prepares to respond to some questions.

4.0 Farmers' Expectations and Concerns

Before the main presentations were delivered, in a random round, key expectations were submitted by the participants and comprised of the following:

- i. To know the definition of biotechnology and GMOs
- ii. Address of the fears on GMOs by the scientists
- iii. Want to learn about the banana wilt
- iv. Benefits and fears that we can get from biotechnology
- v. Know that if research has been conducted to ensure suitability of GMOs
- vi. Fear of the side- effects of GMOs that cause blindness
- vii. Know how long it will take researchers and scientists to bring the biotechnology products to farmers
- viii. Know the difference between cassava mosaic and cassava brown streak diseases of cassava
- ix. Worried about the effects of eating diseased raw cassava common in rural areas
- x. Farmers can't spray their crops because its prohibited and want to know the alternative solutions
- xi. Want to know the advantages of biotechnology
- xii. Farmers also wanted to know the safety of their indigenous seeds

5.0 RESEARCH INTERVENTIONS TO ADDRESS AGRICULTURAL CHALLENGES IN UGANDA: A Case of Cassava Research using Biotechnology Approaches by Dr. Titus Alicai

It is important that there are improvements otherwise crop varieties will disappear overtime due to current and ever increasing diseases and climatic changes. We need varieties that are disease resistant and more adaptive to the environment.

What modern biotechnology does is to mate plants using precise techniques instead of leaving it to nature or conventional breeding.

Mutational Breeding is the subjecting of crops to x-rays to cause both desirable and undesirable changes from which a new variety can be obtained.

Hybrid Technology involves taking one maize variety with different characteristics such as disease resistance in one variety and high yields in another variety and cross them together to get one highbred with both characteristics. Characteristics in this instance will be so concentrated that that yields are high in the first season and go down when the seeds from the yield are replanted.

5.1 Limitations of conventional breeding

The technique is based on flowers but some varieties like cassava take long to produce flowers, some of which are not viable whereas other crops like banana do have fertile flowers at all. In the case of cassava flowers may not mature or get aborted.

Conventional breeding is manually done and comes with a lot of undesired genes. Conventional breeding is good but there are some challenges it cannot address yet sustained food supply is necessary not to mention income from the sale of surplus for the majority of Ugandans

Population is growing and something has to be done. Food production has to increase by 70% if we are to sustain the food supply. In addition, climate has changed, there is environmental degradation, reduced agriculture land, declined soil fertility, and current weed control is not working. Due to all these challenges facing farmers, we need new approaches and biotechnology is giving us a new hope and direct solutions to address these major challenges in agriculture sector.

5.2 Definition of Biotechnology

Biotechnology is defined as any technique that uses a living organism to make a product of benefit to man. Examples are Medicine and yeast in the making of wine. Confusion normally comes between biotechnology products and tissue culture products. Tissue culture products are created through conventional ways but the use of biotechnology is just to bulk up the output.

5.3 Definition of Genetic Engineering

This is done by moving a defined gene from one plant and introduces it in another. For example a gene resistant to banana wilt in pepper moved to banana. This has already shown some success at a lab level.

Biotechnology is a development issue. It is used to improve productivity, improve human and animal health, improving the quality of environment due to reduced pesticide use.

Useful traits that biotechnology can move or introduce in new varieties include; Insect resistance. Used extensively in Argentina and Brazil, Fungal Resistance, Virus resistance, Cold/frost resistance and drought tolerant.

5.4 GMOs in the World

GMO started in 1996 and over 400,000,000 hectares of GMOs grown by close to 17,000,000 farmers worldwide. In Africa Sudan and S. Africa, Burkina Faso and Egypt are already growing GMOs crops. Sudan that started in 2012 grew about 20,000 of GMO cotton.

5.5 Cassava Diseases

Africa produces more than half of the world cassava. Cassava growing in Uganda is however faced by cassava mosaic and cassava brown streak. Cassava Brown Streak was first identified on the coast since 1930's, in Mukono in 2004 and from 2006 it started spreading around L.Victoria.

19 cassava varieties have been developed and released through conventional breeding. These are only tolerant and clean planting materials but not resistant to diseases

5.5 Progress made by NARO with GM research

Alicai presented at length the efforts that the scientists are putting in place to generate virus resistant cassava at Namulonge. He indicated that several field trials have been conducted and there are promising lines currently being evaluated. He indicated that the research first focused on cassava mosaic disease but later when Cassava brown streak virus became a very big problem, efforts were redirected to the Cassava brown streak virus and at present CFTs for possible resistant lines are on-going at Namulonge and more are planned for Serere. However, even if they are successful, it will be hard to test the varieties with the farmers, and also it will be difficult to release them unless the National Biotechnology and Biosafety Bill is enacted into law.

Titus went further to give explanations of other research efforts by NARO such as research to produce banana bacterial wilt resistant bananas at Kawanda, vitamin A and Iron enhanced bananas at Kawanda, bollworm resistant cotton at Serere, water efficient maize research on-going in Mubuku irrigation scheme in Kasese and Nutrient use efficient rice at Namulonge in addition to weevil resistant sweet potatoes at the same institute. He gave descriptions of the magnitude of the problems these efforts are endeavoring to address, and the progress made so far.

5.5 Conclusion

Biotechnology is only one of the options to address the challenges of agricultural productivity. Others are conventional breeding, irrigation, soil fertility management among other approaches. However, it should be noted that in some cases, biotechnology is the only option.

GMOs should not be looked at in a lump sum because each is produced for addressing a certain constraint, and thus they should be evaluated or looked at on a case to case basis.

6.0 Highlights of the National Biotechnology and Biosafety Bill 2012-by Ms. Susan Nakabuye

Ms. Susan Nakabuye from the solicitor General's department gave a brief presentation on the proposed National Biotechnology and Biosafety Bill 2012. She highlighted the overall object of the bill as to provide regulatory framework for facilitating safer development and application of biotechnology; to designate a national competent authority; to establish a national biosafety committee and institutional biosafety committees; to provide for mechanisms to regulate research, development and general release of genetically modified organisms and for matters related to that. She emphasized that the spirit of the bill is to ensure that what the scientists are doing, is done in a regulated manner, and that the final products are safe for use by the farmers and consumers. She further gave content in summary of article by article of the bill. She finalized by pointing out that since the farmers had not had sufficient time to go through the bill, it would be unfair to expect direct feedback from them on the content of the bill. She however said that since each of them has been given a copy of the bill, it would be important for them to go read and channel their views through the UNFFE leadership. She welcomed them to make general comments and views on the bill especially its spirit.

7.0 Discussions

7.1 Fake seeds

On the issue of seeds which do not germinate, farmers put the blame on government, UNBS, seed suppliers and researchers. Dr. Titus was quick to point out that researchers are not to blame and that blame should be put on the fake seeds on the market. He challenged farmers through their channels to ask government to improve the seed industry. Maize is no longer a food crop but a cash crop as well and its seed distribution should be by credible institutions. Dr. Titus took the opportunity to inform the farmers of the field trial drought resistant maize currently going on in Kasese under the WEMA project.

Farmers are worried of losing their varieties to multinational companies. Titus explained at length the issue of terminator gene, that it was an idea that was never implemented. Thus, he clarified that there are no terminator seeds and no one can produce and market them, but what they have problems with are fake seeds due to unscrupulous seed traders, that can be sorted if Government decided to enforce the law. Farmers agreed that they were farinlar with

hybrid seeds and you have to buy every season if you are to get good harvests. They are not terminator as some people have opted to brand them, because they can germinate on replanting. Farmers also tend to prefer their traditional variety and wondered what the scientists are doing to preserve it as the risk of extinction is apparent with the current trends in the seed industry. Titus clarified that NARO has a national gene bank and regional botanical gardens for that purpose. Government is also in the process of developing a policy on conservation of such varieties in farmers fields, and to give incentives to such farmers.

7.2 Biotechnology concerns

The other questions that were discussed include; why people around the world are resisting GMOs. In response, Dr. Titus said that fear of the unknown is one of the reasons why people across the world are resistant to GMOs. He further said that this is fear of the unknown is not peculiar to GMOs but to almost all new innovations and change. Gave an example of how people were opposed to the idea of electricity and Mobile phones. The fear is an issue of perceived potential risk which he personally acknowledges but believes they are negligible. People are also resistant to GMOs due to ethical reasons and would like to use crops that are naturally developed. The other are other reasons being competitiveness of nations and trade reasons mentioning that people profiting in current trade may oppose innovations that can have a direct negative impact on their business

People especially in Africa think that Biotechnology is an American ideology to destroy the African indigenous crops. In regard to this myth, Dr. Titus informed participants that it's done by Africans and Ugandans in this case. Having known that biotechnology is not dangerous, he requested members to accept it in addressing the major agricultural challenges.

Dr. Sengooba supplemented by saying that Biotechnology is a specialized technology and people get scared on the mere mention of gene transfer. She advocated for a regulatory system to know what genes are used, when and where for public safety.

Participants were asked to compare biotechnology with medicine technology which has to be tested. Biotechnology practice in Uganda currently works under guidelines given by UNCST. When a GMO product is out, another research starts to demonstrate and ascertain its safety.

Participants were also concerned with likelihood of gene alteration where a new gene is inserted in a variety. The question of where the gene is actually put. According to Dr. Titus, gene insertion is a scientific process and in simple terms genes are inserted in blank spots in the DNA makeup of the recipient. Research has to prove this, how it affects the recipient and people, whether it has produced molecules which cause allergies and many more tests to ensure the complete safety. He emphasized that these researches are done and scrutinized by

the regulatory agencies such as the National Biosafety Committee. If the GMO product fails the safety test, it will not go ahead.

7.3 Gene Discovery and Banana diseases

No gene in banana has been found to be resistant to the banana wilt. However scientists discovered that this disease cannot affect sweet paper, hence the move to isolate the gene for resistance to banana bacterial wilt disease from sweet paper and transfer it into the bananas. This has already been demonstrated to work and has provided some lines of bananas with resistance to the banana bacterial wilt disease. So, our scientists have the capacity to do this work here in the Country on our crops to address the biggest challenges that you as farmers face.

7.4 Cassava Disease

Actual causes of Cassava Brown streak disease were also asked; the other question was why it spreads faster in some regions and even faster in recent days. In response, it was said that the disease is caused by two viruses which block some processes in the plant. It is transferred from one plant to another by a certain insect called a white fly in the same way mosquitos move from one person to another transmitting malaria. It is also transferred by farmers taking and using infected cassava stakes in their fields. He emphasized that the disease has nothing to do with the water and soil as earlier claimed by some farmers.

The rapid spread of Cassava Brown streak was attributed to the growing population. The high spread can also be linked to global warming as warmer temperature support the reproduction of insects. Africa has been referred to as the "hot spot" in regard to disease break out both in plants, animals and in humans case in point being Ebola. NASE 14 was the variety mentioned by farmers as the most tolerant to the disease. Dr. Titus confirmed that and also added that NASE 3 from Nigeria also provides some degree of tolerance tolerant but NASE 14 is highly recommended.

7.5 New Maize diseases and the Striga Weed

Farmers also asked if the scientists were aware of the new maize disease. The response from Dr. Titus was that the disease is known from Kenya and that it's already affecting Busia and Tororo. It's called the **maize lethal necrosis disease** and is caused by a virus. He said that they are working with the team from Kenya and other international partners to address it. For the striga weed, he said that they are working with a team from Kenya again to work out the transgenic approach of dealing with the weed, because it has been a problem for a very long time.

7.6 On the National Biotechnology and Biosafety Bill 2012

The farmers expressed general support for the bill and agreed with the presenter that they needed to have received the bill well in time to make meaningful contributions. They indicated that contrary to what has been paraded in the media, the bill is drafted in good spirit to provide guidance to the scientists and eventually to deliver good quality products to them. They indicated that they will read, consult with members of their associations and generate meaningful and relevant views that can be sent to their Secretary General of the UNFFE, and in consultation with SICIFODE, such views can be delivered to the S&T Committee of Parliament.

7.7 Information Gap on Biotechnology

It was said that there is limited information on biotechnology mixed with negative publicity. Concerning the information gap, it was said that OFAB is working to reduce it. Also participants were informed that most projects have a communication component to provide information and do public relations. It was further said that the government through Uganda National Council of Science and Technology (UNCST) is doing some work to reduce the information gap on biotechnology.

It was found out in the workshop that there are some NGOs that go deep in the rural areas preaching against biotechnology and providing false information to farmers. They even go to the extent of telling farmers not to use fertilizers.

In response, Arthur Makara of SCIFODE from the scientific point of view said that with time, soil has become poorer and that it would not be in good faith if someone told farmers not to use fertilizers. Local fertilizers (compost) have limitation considering that most of us are no longer subsistence but commercial farmers. Emphasis was put on the fact that scientists mean good and that they are the one to discover and identify new diseases.

Workshop participants were also informed that scientists are currently working on crops of importance to Uganda. That is Maize, banana Uganda being the major consumer and cassava. Their work is still under UNCST guidelines and there needs a law to regulate this biotechnology work. There is a relevant bill undergoing parliamentary process. The purpose of the bill is to scrutinize ensuring safety of the work and not to promote the biotechnology par say. It was also commented that biotechnology is safer than other traditional technology since its products go through thorough research and rigorous testing.

8.0 Summary of Views and Feedback from Farmers

- ✓ Overall, the expectation was to get the right information regarding biotechnology. There were several fears carried by farmers especially the fear of the unknown and the harmfulness of GMOs. After the workshop, farmers leaders present have been made aware that GMOs are not harmful and that they are already in some countries like S. Africa and Sudan
- ✓ Known that scientists through their work provide varieties which are tolerant and resistant to diseases and pests.
- ✓ People have negative attitudes towards the technology and such kind of training and sensitization workshop should be taken to the lower level.
- ✓ SCIFODE and partners should solicit more funds to set up nurseries for disease free planting materials, and to use them as a means of delivering information to the grass root farmers.
- ✓ Farmer leaders pledged take the message back to their communities and members of their associations.
- ✓ After understanding the technology, the farmers should support the scientists and the biotechnology bill process to get maximum benefit from the technology.
- ✓ Even if we refuse to do biotechnology, the nature will do it for us.
- ✓ GMO and biotechnology are specialized topic and we need more and more of these fora to be able to effectively talk about them
- ✓ As a caution, do not buy seeds that you do not know about. Request NARO and all of us to be mindful of the seed bank in Entebbe. The gene bank should be guarded, protected and made part of us.
- ✓ Need for GMO regulatory framework, thus the need to call on our leaders to expedite the national biotechnology and biosafety law.
- ✓ Research has to be communicated to the farmers, and this is a good start.

9. Closing Remarks

The closing remarks were made by Hon. Francis Mukama, former Member of Parliament for Kigulu North Constituency in Iganga district and a member of the National Executive Committee of the Uganda National Farmers' Federation. In his remarks, he said that science and biotech are things we live with on day-to-day basis. Informed farmers that things have changed, for instance climate has changed and it would not make to continue with business as usual. As scientists get to work, more and more new things or innovations are invented for our own good. As far as agriculture is concerned, Uganda is lagging behind whereas many other parts of the world have made a lot of progress with modern biotechnology products. He emphasized that science must be given a good place in the agricultural enterprise. He appreciated the organizers and funders of the workshop led by SCIFODE, UNCST and AATF under the umbrella

framework of the Open Forum on Agricultural Biotechnology (OFAB). He thanked the farmer leaders for participating in the workshop, the Government for the efforts it is making to put regulations in place to ensure continued generation of improved crop varieties and animal breeds. He urged Parliament to quickly pass the National Biotechnology and Biosafety Bill 2012 such that farmers can access the technologies that have been generated by scientists using this modern biotechnology approaches. He concluded by urging the participants to make sure that the information and knowledge gathered through the workshop trickles down to the grassroots farmers they represent, and asked SCIFODE and partners to arrange more of such farmer sensitization workshops, preferably across the Country.

9.0 Photo Gallery



10.0 Workshop Programme

Time	Activity
8:00-8:30am	Arrival and Registration
9:00-9:30am	Remarks (UNFFE President, SCIFODE, UNCST)
9:30-10:30am	What is Biotech and how will Biotech crops be integrated in already existing agricultural practices? (Dr. Titus, NARO)
10:30-11:00am	Coffee Break
11:00-1:00pm	Discussion
1:00-2:00pm	Lunch
2:00-2:40pm	The National Biotechnology and Biosafety Bill 2012: Key highlights (Ms. Susan Nakabuye, Solicitor General's Dept)
2:40-3:30pm	Discussions
3:30-4:00pm	Coffee break
4:00-5:00pm	Synthesis of Farmers' Comments & Way forward
5:00-5:15pm	Closing Remarks
5:20pm	Departure

11.0 Programme for the Forum

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