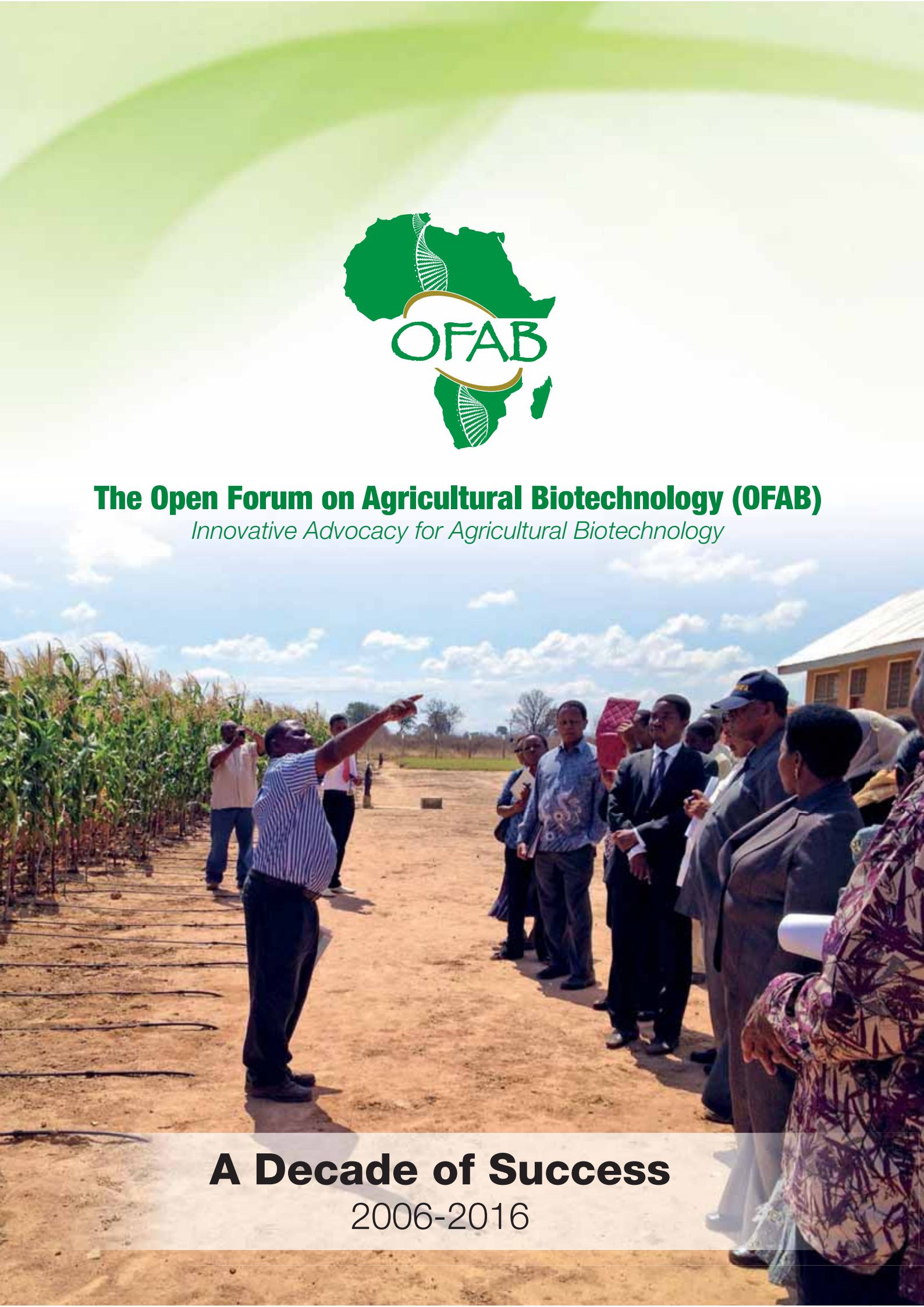
The Open Forum on Agricultural Biotechnology (OFAB)

Innovative Advocacy for Agricultural Biotechnology



A Decade of Success

2006-2016

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AFRICAN AGRICULTURAL TECHNOLOGY FOUNDATION
FONDATION AFRICAINE POUR LES TECHNOLOGIES AGRICOLES

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Foreword

Dr Denis Kyetere
Executive Director
AATF

In 2006, AATF in collaboration with like-minded stakeholders established the Open Forum on Agricultural Biotechnology (OFAB) as a platform for stakeholders in the biotechnology sector to network, share knowledge and experiences, and explore new avenues of bringing the benefits of modern biotechnology to smallholder farmers in Africa. Our aim was to raise understanding and appreciation of agricultural biotechnology among various stakeholders - scientists, policy makers, legislators, journalists, farmers and the public – by providing credible, factual and compelling information on agricultural biotechnology. We also hoped that the increased awareness, understanding and appreciation of modern biotechnology would contribute to building an enabling environment for decision making among the stakeholders.

Today, 10 years later, as we take stock of our activities, we are struck by how far we have come from since 2006. Before then, the level of awareness, understanding and knowledge on agricultural biotechnology was relatively low, causing worries about the future technology on the continent. The OFAB strategy was designed to remedy these.

OFAB has immensely contributed to public awareness, education and acceptance of modern biotechnology among various group including scientists, policy makers, legislators, farmers, regulators and the media. These efforts have had great impact on public perceptions on agricultural biotechnology, and on creating an enabling environment for enactment of appropriate policies and biosafety regulations that support research, development and commercialisation of crops developed using modern biotechnology.
We have witnessed a tremendous increase in the number of countries enacting appropriate policies and biosafety regulations. We now have 21 countries in Africa with Biosafety Laws compared to less than five before 2006. In collaboration with partners and other initiatives, OFAB has been able to building capacities of relevant policy decision makers thereby enabling them to make evidence-based biosafety polices. For instance, in Tanzania, OFAB worked closely with other stakeholders to point out the limitations to biotechnology research caused by strict liability biosafety regulations. We are happy the government of Tanzania was able to review the regulations to allow confined filed trials of biotech crops to continue. Likewise, in August 2015, Ethiopia also revised the restrictive biosafety law and regulations and replaced them with science-based ones thereby opening up the country to move forward with modern biotechnology research, development and variety registration.

This book documents and celebrates what countries have achieved on the foundations of OFAB support. Similarly, it provides very useful lessons and experiences from which other players in other researchers and similar projects can learn from and apply strategies for enhancing knowledge-sharing and awareness on biotechnology that will raise understanding and appreciation of agricultural biotechnology and contribute to building an enabling environment for decision making.

It is evident that there is no single strategy in creating an enabling policy and regulatory environment, in changing public attitudes and perceptions on modern biotechnology. Every country is unique and must therefore develop its own strategy. 'On the other hand, there are a number of similarities and lessons that countries can also share and that the world community can contribute to local decision making processes.
It has not always been smooth sailing. We have

had challenges and we expect more still lie ahead. But through continuous learning from our successes and mistakes, and through working with others, we are managing the challenges. There is plenty to be done as OFAB steps into the next decade. The anti-GMO movement is strong and relentless in its pursuit for total ban of genetically modified foods and crops. They continue to instill fear among the public on the potential risks of modern biotechnology products. It is important that the public gets to know the truth about biotechnology and also about these negative activism by others. OFAB and its partners can contribute to this.

For Africa, the discussion around modern biotechnology should be more about how to harness its enormous potentials and abilities for sustainable agricultural production and food security. I see OFAB focusing more on high-level advocacy and grassroots awareness on benefits of the technology in the next decade.

Dr Denis Kyetere
Executive Director
AATF

Acknowledgements

The African Agricultural Technology Foundation (AATF) and OFAB sincerely thank the Institute for Environmental and Agricultural Research (INERA), Burkina Faso; the Ethiopian Institute for Agricultural Research (EIAR); the Council for Scientific and Industrial Research (CSIR), Ghana; the International Service for Acquisition of Agri-biotech Application (ISAAA), Kenya; the National Biotechnology Development Agency (NABDA), Nigeria; Tanzania's Commission for Science and Technology (COSTECH); and the Uganda National Council of Science and Technology (UNCST) for hosting respective OFAB Country Chapters. The achievements documented in this book would not have been possible without the partnerships and support from these institutions. We congratulate them for the achievements summarised in this book. We sincerely thank all those who have in various ways contributed directly and indirectly to successful completion of this publication. Special thanks to all the OFABKenya, Uganda, Nigeria, Ghana, Burkina and Ethiopia Chapter coordinators and Programming Committee members. We are grateful to all the people who shared stories about how OFAB efforts were contributing to increased awareness, understanding and knowledge about biotechnology, and how these have influenced the formulation of supportive policies and regulatory frameworks necessary for commercialisation of genetically modified agricultural technologies and products. We are very grateful to the Bill and Melinda Gates Foundation (BMGF) for their support to AATF and OFAB in particular, which has been critical in realising the achievements celebrated in this book and also in documenting and publishing this book.

Abbreviations and acronyms

AAB	African Agency of Biotechnology
AATF	African Agricultural Technology Foundation
ABNE	African Biosafety Network of Expertise
ABSF	African Biotechnology Stakeholders Forum
ACMP	Association of Catholic Medical Practitioners
ACMV	African Cassava Mosaic Virus
AFBFI	Africa harvest Biotechnology Foundation International
AFSTA	African Seed Trade Association
AGPMMP	Association of General and Private Medical Practitioners
AICB	Interprofessional Cotton Association of Burkina
ANB	National Biosafety Authority of Burkina Faso
ANVAR	National Agency for the Exploitation of Research Results (ANVAR)
ARCN	Agricultural Research Council of Nigeria
ASARECA	Association for Strengthening Research in East and Central Africa
AU	African Union
BecA	Biosciences East and Central Africa
BMGF	Bill and Melinda Gates Foundation
BXW	Banana *Xanthomonas* Wilt
CBD	United Nations Convention on Biological Diversity
CBSV	Brown Streak Virus
CFT	Confined Field Trials
CIMMYT	International Maize and Wheat Improvement Center
CIP	Centre for International Potato
COMESA	Common Markets for Eastern and Southern Africa
CONSENT	Consumer Education Trust
COSTECH	Tanzania's Commission for Science and Technology
CSIR	Council for Scientific and Industrial Research
EIAR	Ethiopian Institute for Agricultural Research
FAO	United Nations Food and Agriculture Organisation
FEC	Federal Executive Council
GAIN	Global Agricultural Information Network
GMO	Genetically modified organisms
GNA	Ghana News Agency
GNAFF	Ghana National Association of Farmers and Fishermen
GSN	Genetic Society of Nigeria
IAR	Institute of Agricultural Research
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IFPRI	International Food Policy Research Institute
INERA	Institute for Environmental and Agricultural Research
ISAAA	International Service for Acquisition of Agri-biotech Application
KABP	Kenya Agricultural Biotechnology Platform
KALRO	Kenya Agricultural and Livestock Research Organisation
KeBIC	Kenya Biotechnology Information Center
KEBS	Kenya Bureau of Standards
KEGCO	Kenya GMO Concern Group
KEPHIS	Kenya Plant Health Inspectorate Service
MALF	Ministry of Agriculture, Livestock and Fisheries, Tanzania

MESRI	Ministry of High Education, Research and Innovation, Burkina Faso
NABDA	National Biotechnology Development Agency
NACOSTI	National Commission for Science, Technology and Innovation
NARO	National Agricultural Research Organisation
NASC	National Agricultural Seed Council of Nigeria
NBA	National Biosafety Authority
NCRI	National Cereals Research Institute
NCRRI	National Crops Research Resources Research Institute
NCST	National Council for Science and Technology
NEMA	National Environment Management Authority
NEWEST	Nitrogen Use Efficient, Water Efficient and Salt Tolerant
NIFFRR	National Institute of Fresh Water Fisheries
NMA	Nigerian Medical Association
NPC	National Productivity Centre
NRCRI	National Root Crops Research Institute
OFAB	Open Forum on Agricultural Biotechnology
PBS	Program for Biosafety Systems
RECOAB	Network of Biotech Communication Journalists
SCIFODE	Science Foundation for Livelihoods and Development
SEEDPAG	Seed Producers Association of Ghana
SSA	Sub Saharan Africa
TAJF	Tanzania Agricultural Journalists Forum
UBIC	Uganda Biosciences Information Centre
UNCST	Uganda National Council of Science and Technology
UNEP	United Nations Environmental Programme
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USDS	United States' Department of States
WEMA	Water Efficient Maize for Africa

Chapter 1

Introduction

Genetically modified (GM) crops were first approved for cultivation and human consumption in 1996. Over the next 10 years, large and smallholder farmers in developing and developed countries increased the acreage of these crops – mainly maize, soybean, cotton, canola, tomato and potato – from 1.7 to 102 million hectares. This rapid and unprecedented rate of adoption of any new agricultural technology was attributed to the substantial multiple benefits realised by farmers in these countries. However, over the 10 years, South Africa is the only country in Africa that grew biotech crops. By 2006, South Africa grew genetically modified maize, cotton and soybean on 1.4 million hectares.

But why was Africa not embracing biotech crops?

In the same year the first GM crops were commercialised, the United Nations Convention on Biological Diversity (CBD) – an international agreement negotiated by the United Nations Environmental Programme (UNEP) – introduced a biosafety protocol which was negotiated and adopted in 2000 as the Cartagena Protocol on Biosafety. The objective of the Protocol was to ensure that international trade in genetically modified living organisms (LMOs or GMOs) does not destroy the biological environment and human and animal health. The premise was that GMOs were inherently risky and should therefore be handled carefully. By the time most African governments were signing the Protocol in 2000, they believed that agricultural GMOs were inherently risky despite there being no credible scientific evidence linking GM products to any new risks to humans or the environment in countries like United States of America, Argentina, India and South Africa that were growing and consuming GM crops.

This perception that GMOs are risky led to many governments in Africa resisting the technology or embracing an extreme precautionary approach to agricultural biotechnology. It is a perception that was reinforced and perpetuated by lack of credible scientific information on agricultural biotechnology and, in part, misinformation, myths and lies on the risks of GMOs from anti-GMO activists. Most policy and decision makers in African governments and the public in general lacked the requisite awareness, information, understanding and knowledge on agricultural biotechnology.

It was not that there was lack of credible scientific information on agricultural biotechnology. The problem was that scientists were not effectively making available or sharing the vast wealth of information and knowledge they had with other stakeholders. It was more or less a case of lack of effective communication on agricultural biotechnology, a case of not countering the misinformation, myths and lies peddled by the anti-GMO lobbyists and activists who were keen to block the passing or enactment of supportive Biosafety Bills and Laws necessary for commercialisation of GM crops.

Realising that adoption of modern biotechnology is being hampered by lack of accurate and reliable information, knowledge and awareness at all levels of society, AATF mooted an idea to create a platform for information and knowledge sharing. The aim of the initiative was to allow policy makers and key stakeholders to make informed decisions on use of modern biotechnology.

And in September 2006, AATF founded the Open Forum on Agricultural Biotechnology (OFAB) in Nairobi, Kenya. The objective was to ensure that the vast and critical wealth of information and knowledge on agricultural biotechnology

possessed by scientists is made available to policy and decision makers and the general public. OFAB brings together stakeholders in agricultural biotechnology – scientists, policy makers, regulators, farmers, consumers, journalists, the civil society, industrialists, legislatures, religious groups, academia and the general public – to share knowledge and experiences, and explore ways of bringing the benefits of agricultural biotechnology to smallholder farmers and consumers.

Buoyed by the achievements in Kenya, OFAB has since expanded to six other countries: Burkina Faso, Ethiopia, Ghana, Nigeria, Tanzania and Uganda. Each country Chapter is hosted and coordinated by a national agricultural research system, a government scientific institution or an agricultural oriented international organisation.

These are:

- Institute for Environmental and Agricultural Research (INERA), Burkina Faso
- Ethiopian Institute for Agricultural Research (EIAR), Ethiopia
- Council for Scientific and Industrial Research (CSIR), Ghana
- International Service for Acquisition of Agri-biotech Application (ISAAA), Kenya
- National Biotechnology Development Agency (NABDA), Nigeria
- Commission for Science and Technology (COSTECH), Tanzania
- National Council of Science and Technology (UNCST), Uganda

Each country Chapter is managed by a programming committee composed of 10–13 members with interest in science, technology and innovation. Annex 1 details compositions of the programming committees in each of the seven Chapters. The national Chapters are now forming nodes in various regions in each country to extend the networking to the grassroots.

OFAB has also entered into partnerships with key organisations in strengthening the capacity of its collaborators and advocates in creating an enabling environment for adoption of biotech crops in Africa. These include Cornel Alliance for Science (CAS) and the International Food Policy Research Institute's (IFPRI's) Program for Biosafety Systems (PBS).

Before 2006, Africa was awash with propaganda and misinformation on biotechnology orchestrated by anti-biotech lobby groups in and outside Africa. Policy makers and the general public were on the verge of being convinced that GMOs were very risky and should be avoided at all costs.

A decade later, there is a general appreciation among the policy makers and the general public of the benefits of agricultural biotechnology – courtesy of OFAB's awareness creation, sensitisation, education, and information and knowledge sharing initiatives. More governments now appreciate that modern agricultural biotechnology has a major role in helping their countries attain the elusive food insecurity. Indeed, the regulatory environment has changed in the seven countries with OFAB Chapters either through the enactment of new supportive regulatory frameworks or amendment of the previously restrictive regulatory frameworks. They are all at various stages of research, development and commercialisation of GM crops.

In Ethiopia, for instance, the highly restrictive African Biosafety Model Law was finally amended and signed into Law in August 2015 by the President. The signing of the Biosafety Law opened the doors for collaborative research and development (R&D) activities such as the Confined Field Trials (CFTs) for the genetically insect-resistant cotton.

In Tanzania the government also amended the highly punitive Biosafety Law by replacing the strict liability clause with a fault-based clause. Under the new Law, those claiming payment or compensation for damages would have to prove that it was the fault of those who introduced GMOs. Tanzania is now conducting CFTs for the Water Efficient Maize for Africa (WEMA) GM maize.

There has also been a major transformation in the way the media in Africa reports on modern agricultural biotechnology, from sensational to credible, balanced and objective reporting. Through the various capacity building initiatives by OFAB, journalists are now more informed and knowledgeable on the technology and are no longer just mouth pieces of fear-mongering and sensational anti-GMO activists. Through networks created during OFAB interactions, the journalists now have access to credible and reliable sources of information.

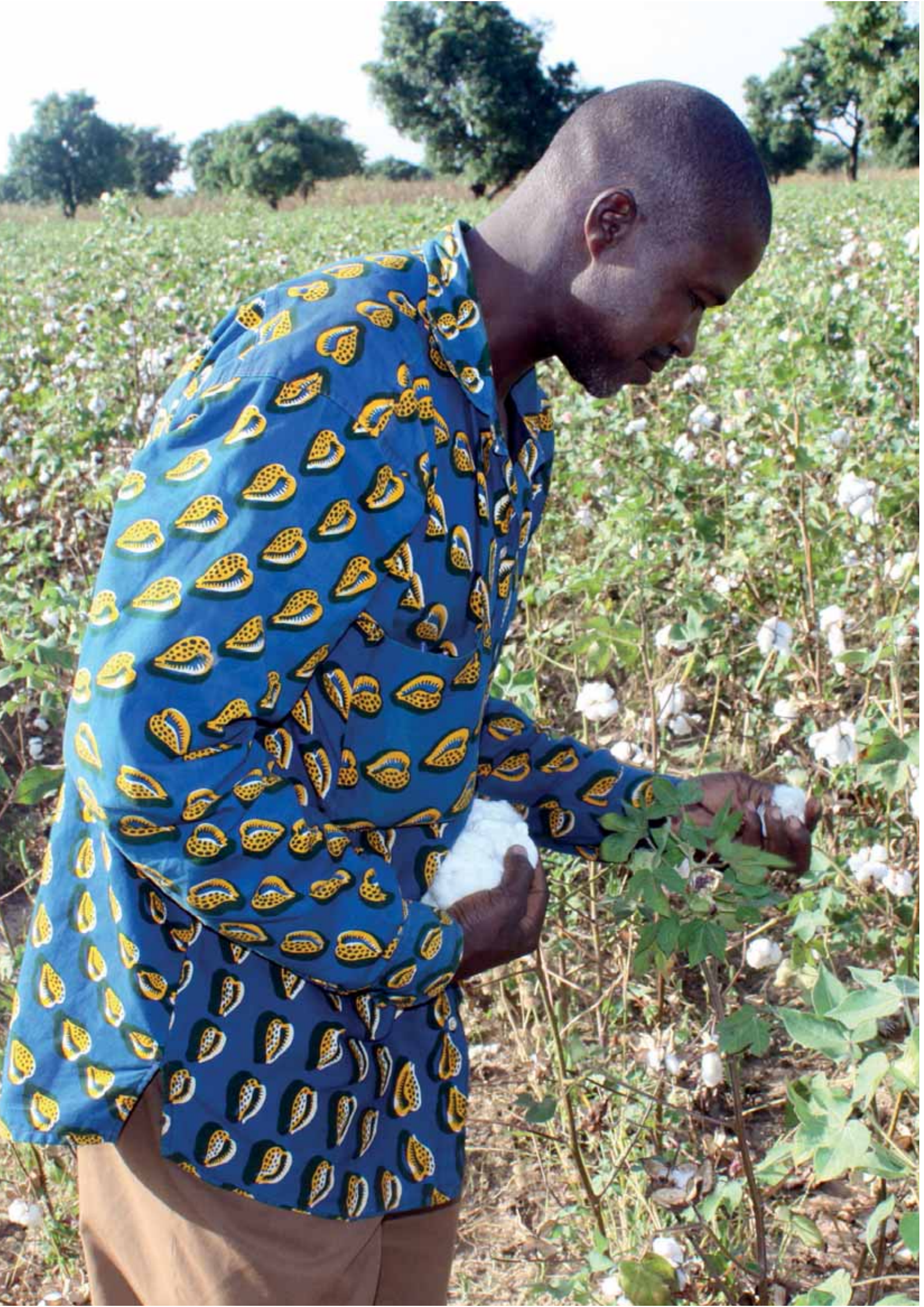
OFAB has successfully provided opportunities for key stakeholders to share knowledge and experiences, as well as explore new avenues for bringing the benefits of biotechnology to the African agricultural sector, especially smallholder farmers.

OFAB has facilitated the flow of information from the scientific community to policy makers, the general public and various stakeholders. It has provided opportunities for key stakeholders at local, national, regional and international levels to know one another, share knowledge and experiences, make new contacts and explore new avenues of bringing the benefits of biotechnology to the African agricultural sector.

OFAB has created a better understanding of services, products, processes, benefits and concerns associated with biotechnology. The Forum has provided opportunities for African agricultural scientists and experts to avail the benefit of their skills and knowledge in solving the continent's socio-economic problems.

OFAB remains an informative platform bringing together various stakeholders in the field of biotechnology and the public to enable interactions, sharing and exchange of knowledge, experience, and exploring new ways of availing the benefits of agricultural biotechnology.

A lot still remains to be done. Only four countries in Africa have ever commercialised GM crops. Today, only South Africa and Sudan continue to plant GM crops. Egypt and Burkina Faso have since suspended growing of GM crops. More effort is needed to ensure more countries commercialise GM crops particularly the 13 countries that are already conducting CFTs and have the necessary biosafety laws in place.



Chapter 2

The Making of OFAB

The beginnings of OFAB were very humble. Two factors influenced its idea the most – the need for information sharing among scientists and with the public and the need to contribute towards creating an enabling environment for AATF biotech projects.

Nancy Muchiri, *Senior Manager, Communications and Partnerships, AATF*

Sometime in early 2006, the then Executive Director of AATF, Dr Mpoko Bokanga, made an observation that resulted in the creation of OFAB. He said that as he travelled to meetings, workshops and conferences in other countries or abroad, he often noticed that scientists from the same countries would engage more deeply at these meetings as they shared their work, work that in some cases was not known by other scientists from the same country. He therefore proposed formation of a forum that would provide the scientists with opportunities to adequately interact, exchange ideas, discuss progress, challenges and other aspects of their careers or work. This forum would also serve as a focal point for the media, law makers and policy makers who have questions and need scientific answers. The forum would complement biotechnology awareness activities being undertaken by others.

AATF management then reached out to relevant stakeholders such as the International Service for Acquisition of Agri-biotech Applications (ISAAA), African Biotechnology Stakeholders Forum (ABSF), African Centre for Technology Studies (ACTS) and Africa Harvest among others on the need for such a forum. The response was overwhelming. They all agreed that such a forum would add value and supported its set up.

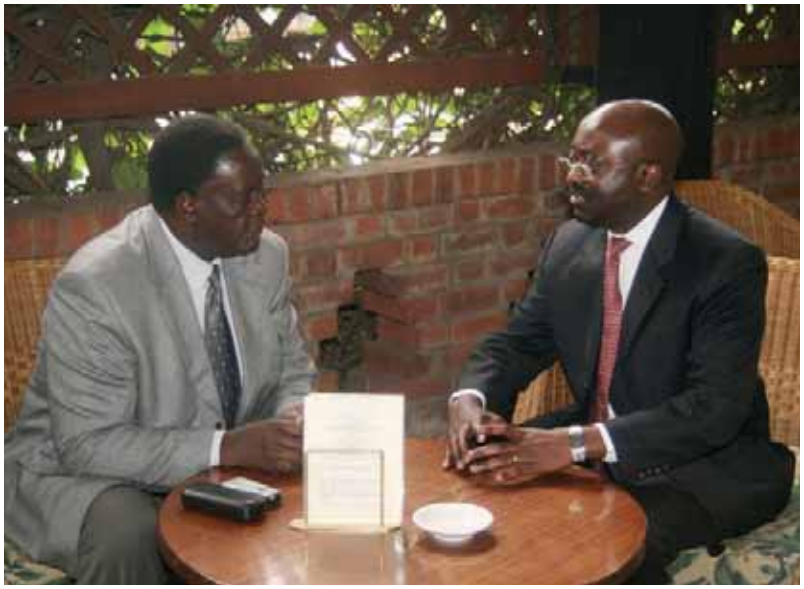
This then set in motion plans to actualise the idea. For the kind of forum that was envisaged it was important that it be consistent, interesting and engaging, relevant to current and emerging issues, respectful of people's time and it should show results. It was also important that it promotes learning through factual information sharing and not debate for the sake of it. OFAB was therefore set up with a *modus operandi* that structured it as a fixed-date monthly event to be held at a designated venue, with a clear and time conscious format that included a topical presentation followed by discussions. Management was through a Programming Committee (PC) made up of about 10 to 13 interested individuals drawn from a wide range of stakeholders with interest in advancing agricultural biotechnology in their countries (Annex 1). The PC is supported by a secretariat led by a substantive OFAB coordinator domiciled at the host institution. The funding came from AATF's core funds.

It is important to mention that not everyone was receptive of OFAB's set up in the beginning. Some people feared getting involved due to the controversies surrounding agricultural biotechnology. However, most of them later joined the forum, and actively participated in the discourse and management.

On 14 September 2006, Dr Noah Wekesa, the then Kenya's Minister for Science and Technology, officially launched OFAB in Nairobi. The reason for launching OFAB in Nairobi was not only the fact that AATF is headquartered in Kenya and it would be most convenient for testing an idea,

but also because the city has a rich and diverse community of scientists necessary for scientific discourse and innovation on agricultural biotechnology.

The launch event also served as the first OFAB meeting with presentations from Messrs Mark Cantley, former Science Adviser European Commission who spoke on 'Public Policy for Biotechnology: International lessons from European Experience' and Wellington Chadehumbe of Triumph Venture Capital (Pty) Ltd, South Africa who spoke on 'Truth, Freedom and Economic Growth'. This first meeting sought to get clarity on the Kenya Government position on biotechnology; establish why Europe is opposed to biotechnology; and to get an insight from a business perspective on biotechnology. Over 70 biotechnology stakeholders including scientists, industry, development partners, government agency professionals, regulators, academics, farmers, journalists, ethicists and



Dr Noah Wekesa, Kenya's Minister for Science and Technology, discusses with Dr Mpoko Bokanga, AATF Executive Director, before the launch of OFAB

Dr Noah Wekesa launches OFAB

Messrs Mark Cantley, former Science Adviser European Commission

Wellington Chadehumbe of Triumph Venture Capital (Pty) Ltd, South Africa

consumers contributed to an exciting discussion. Setting up of OFAB fitted well into AATF's strategic direction and was expected to help AATF achieve its objective: to access, develop, adapt and deliver appropriate agricultural technologies for sustainable use by smallholder farmers in Sub-Saharan Africa (SSA) through innovative partnerships and effective stewardship along the entire value chain. At the time, there were several GM field trials going on in different countries.

What stood out was the need for more engagement from policy level through to farmer and consumer levels to create the much needed enabling environment for development, commercialisation and use of agricultural biotech products especially those produced through GM. Deliberate efforts were therefore made to ensure the participation of policymakers, farmers, consumers and other stakeholders at OFAB events. The interactions revealed existing information gaps among the various stakeholders that had to be addressed for acceptance of biotechnology.

Our desire was that scientists would provide factual information in an authoritative and convincing manner that will engender confidence in those listening.

The growth of OFAB

By December 2007, the second OFAB Chapter was launched in Uganda through partnership with the National Council for Science and Technology (UNCST). This was followed by Tanzania and Nigeria in 2009 through partnership with COSTECH and NABDA respectively. With this expansion to four Chapters, two things that influenced the future of OFAB happened.

(i) AATF and its OFAB partners held their first consultative meeting in 2010 to assess the initiative and discuss how to move forward. A number of great ideas on what else OFAB could do were generated. Key issues discussed included how to navigate OFAB as an entity that can champion agricultural biotechnology in Africa through strategic engagement mechanisms; how to position OFAB strategically to respond to country needs and help shape policy decisions; how to explore ways of decentralising OFAB events and using modern communication means; and how to maintain relevance to the needs and expectations of stakeholders.

(ii) The Bill and Melinda Gates Foundation showed interest in the initiative and sought a conference grant proposal that yielded a pilot grant of USD 200,000 to cover operational costs for 2011. This initial grant was stepped up after a successful year into a fully-fledged three-year project funding of US$ 3.1 million that was renewed in 2015.

The support from Bill and Melinda Gates Foundation was timely and welcome. Interest in OFAB by other countries was growing and new ideas on what could add value to enhancing biotech understanding were being generated. Until then, OFAB's budget – from AATF and other contributions from country government agencies and others like PBS and the United States Department of Agriculture(USDA) – was just enough to cater for lunch and venue for about 40-70 people per event. It was not possible to consider any other activities outside the monthly meetings.

With a better financial standing, AATF continued to expand OFAB to other countries in SSA with similar levels of research and development, policy and regulatory environments, and public perceptions on modern biotechnology. The Ghana Chapter was launched in August 2011 in partnership with CSIR, followed by Burkina Faso in October 2012 with INERA, and Ethiopia in June 2014 in partnership with EIAR. The Zimbabwe Chapter, launched in December 2013 through partnership with the National Biotechnology Authority and AfricaBio, ceased operations due to financial constraints.

In addition to expansion to more countries, other developments took place to enhance OFAB's aims. OFAB became a fully-fledged project at AATF, with a full time project manager and country-specific country coordinators. This greatly eased the work of partnering organisations' staff that had been supporting the initiative up to that time while doubling up

Participants to the first consultative meeting held in 2010

in other roles. In addition, the monthly meeting format was revised to introduce sessions with the larger community outside the towns. Activities were beefed up to include capacity strengthening for policy makers and journalists as needed and more conscious inclusion of farmers, women and youth in the conversation. An exciting addition was introduction of a logo that helped brand OFAB throughout Africa.

OFAB was becoming more exciting and morphing from only a meet-up for scientists, information and knowledge sharing platform to include policy and decision-making advocacy championing for the rights of farmers in accessing agricultural technologies capable of transforming their agricultural practices and livelihoods.

Forging partnerships

To effectively execute this expanded mandate, OFAB has entered into partnerships with other organisations in Africa and outside, keen on promoting acceptance and adoption of agricultural biotechnologies to complement efforts by the country Chapter partners and their associates. OFAB has partnered with the Cornell Alliance for Science in capacity building initiatives for collaborators, and has working relationships with the Program for Biosafety Systems and the ABNE for biosafety related issues and other strategic advocacy initiatives. It has also built relationships with AfricaBio, Cornell Alliance for Science, PBS, ABNE, Africa Harvest, Science Media Centre, Sense About Science, EuropaBio, ISAAAand B4FA, among others. OFAB also has working agreements with the Common Markets for Eastern and Southern Africa (COMESA) and the African Union (AU) on biotechnology. This has helped OFAB in building presence at higher regional policy level in addition to working with respective governments.

OFAB has also built good relations with the media that has resulted in increased and more balanced and factual reporting of agricultural biotechnology.

Challenges and lessons

For science to be well understood and appreciated, we need more scientists to come out

and stand for their work. Through OFAB, quite a number of scientists have come out to speak on what they do. However, these are just but a few. Getting more scientists – especially women - to take ownership of the science, stand for it and talk authoritatively about it is still a challenge in most countries.

Political interferences in policy decisions tend to cause problems as government executives are afraid of implementing the policies for fear of political backlash. A science based decision making supported by the political class would encourage growth.

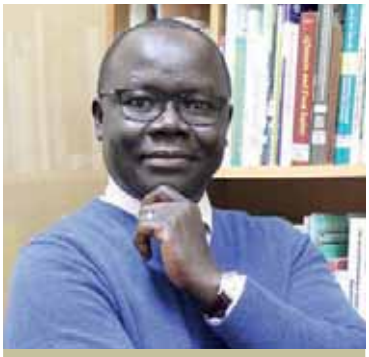
There is still a strong anti-GMO activism in Africa that is thriving on unsubstantiated science, propaganda, myths and lies which are easy to sensationalise, but impossible to address with credible science. We do not expect the world to think homogeneously on a topic like biotechnology but the situation is proving counterproductive. More effort is therefore needed to consolidate the gains achieved over the last 10 years in creating awareness, education, information and knowledge sharing.

One of the key lessons learnt is that OFAB is a good instrument that has earned respect and recognition among the stakeholders in all the countries involved. What is important though is the need to move to the next level and have the activities and achievements inform changes and decisions towards strengthening uptake and utilisation of biotechnology for the good of our farmers and communities.

We are proud that OFAB, which grew from a simple idea is now a well recognised platform owned by the scientific community and country governments and is contributing towards making a difference on how agricultural biotechnology can make a difference to our continent. Indeed, the results are there for all to see. We must appreciate each other throughout the OFAB fraternity – people who believed in and embraced the idea and helped grow it to what it is now. It took a team to get here and it will take a bigger team to go further. We look forward to enjoying the fruits of these many years' of work and to an expanded scope and reach that will include other branches of biotechnology so as to build a full ecosystem.

Chapter 3

Definitely a Decade of Success



Daniel Otunge,
OFAB Project Manager

When AATF established OFAB in 2006, prospects for developing and commercialising GM crops in Africa were not very promising. Only one country on the continent, South Africa, was growing and consuming GM crops. And only two countries – South Africa and Zimbabwe – had in place both the biosafety law and the regulatory frameworks needed to implement the biosafety law.

As Robert Paarlberg rightly observed in his book, *Starved for Science – How Biotechnology is being kept out of Africa*, several other countries like Kenya had policies on biotech but no law; there were others like Mauritius with a law but no policy or regulations; some like Namibia had a national biosafety policy but no law nor regulations. Majority had draft biosafety laws or national policies at best. The rest had not even initiated the drafting processes of the prerequisite policies, laws and regulations.

This lack of the necessary biosafety laws and regulatory regimes was considered a major contributing factor to Africa's failure to adopt agricultural biotechnology yet it was transforming agriculture and livelihoods elsewhere. Due to the substantial multiple benefits, large and smallholder farmers in developing and developed countries worldwide had increased acreage under GM crops from 1.7 since they were first commercialised in 1996 to 102 million hectares in 2006.

It was also established that many governments in Africa were reluctant to enact the necessary laws and regulations because they had been falsely made to believe that modern biotechnology was so risky that it had to be handled with utmost precaution, courtesy of the well-orchestrated misinformation, myths and lies peddled by the anti-GMO lobbyists. The available scientific evidence was ineffectively shared and poorly understood, leading to weak political and public support for agricultural biotechnology.

AATF whose mission is to access, develop, adapt and deliver appropriate agricultural technologies for sustainable use by smallholder farmers in Sub Saharan Africa (SSA) through innovative partnerships and effective stewardship along the entire value chain, in response, established OFAB to facilitate free-flow of credible biotech information from the scientific community to policy makers and the general public.

The aim of OFAB is to enable agricultural biotechnology stakeholders to meet on a monthly basis to get to know one another, share information, communicate research findings and build consensus on issues of public interest. OFAB also offers an opportunity for interaction with influential policy makers, opinion leaders, scientists, journalists, civil society, farmers, and the private sector. It also offers potential for addressing barriers to acceptance of biotechnology that includes safety concerns and misinformation so that policy makers and the general public can receive correct and balanced information on biotechnology. OFAB has four priority objectives:

1. Establish and manage a range of platforms to enhance understanding of biotechnology in agriculture for productivity;
2. Contribute to informing policy decision making processes on matters of agricultural biotechnology through provision of factual, well researched and scientific information;

3. Forge strategic alliances for optimisation of resources through convening and encouraging inter-institutional networking and knowledge sharing in the agricultural biotechnology space;
4. Enhance targeted capacity strengthening that will improve communication across all sectors interested in biotechnology for African agricultural development.

Tilting the tide towards a favourable biotechnology environment

It has indeed been a decade of change. Heightened awareness creation, advocacy and communication campaigns have successfully created better understanding and positive perceptions and attitudes among policy makers and the general public on modern agricultural biotechnology. Advocacy initiatives have yielded tremendous improvements in biosafety legal environments in some countries – from an environment either lacking proper or having restrictive policy, legal and regulatory regimes to one with supportive instruments towards research, development and commercialisation of agricultural biotechnology.

Six of the seven countries with OFAB Chapters have enacted the necessary policy, legal and functioning biosafety regulatory systems for development and commercialisation of GMOs. All the seven are at advanced states of developing and commercialising GMOs.

Kenya, which had been conducting research on transgenic insect resistant maize and cotton using only institutional biosafety regulations and the Science and Technology Act of 1980, finally enacted the Biosafety Act 2009 and the accompanying regulations to enable commercialisation of GMOs. The Water Efficient Maize for Africa (WEMA) insect resistant Bt maize is set for national performance trials after the National Biosafety Authority (NBA) approved its environmental release. Monsanto has applied to NBA for environmental release of the Bt cotton resistant to bollworms following successful confined field trials (CFTs). NBA is also reviewing an application for environmental release of Gypsophila, a flower genetically modified for pink coloration. Other GM crops under CFTs include: stacked drought-tolerance and insect-resistant maize; cassava resistant to Brown Streak Virus (CBSV) and African Cassava Mosaic Virus (ACMV); a virus resistant sweet potato; banana resistant to *Xanthomonas* Wilt (BXW) disease; and a biofortified sorghum with pro-Vitamin A levels, and bio-available Zinc and Iron.

Anthony Olatokun, the Director General of the National Agricultural Seed Council of Nigeria, being interviewed by journalists during the media training workshop held on 13 September 2012 in Abuja, Nigeria

Nigeria enacted an enabling science-based biosafety law in 2015 that legally allowed the country to develop and adopt modern biotechnology. With an enabling law and regulatory frameworks in place, the country approved commercial release of a GM cotton resistant to bollworms. It is also conducting CFTs for several GM crops: cowpea resistant to Maruca insect; biofortified sorghum; Nitrogen Use Efficient, Water Efficient and Salt Tolerant (NEWEST) rice; insect resistant; and herbicide tolerant maize.

In Tanzania, the government amended the restrictive national biosafety legal framework adopted in 2004 to partially remove strict liability clauses which consequently allowed for CFTs of the Water Efficient Maize for Africa (WEMA) drought tolerant GM maize.

Ethiopia, on its part, in 2014 finally amended the prohibitive Biosafety Proclamation and Biosafety Directives adopted in 2009 to a more enabling regulatory regime that has consequently allowed the Ethiopia Institute of Agricultural Research (EIAR) to move forward with developments toward commercialisation of Bt cotton that is already being tried in multi-locations in the country.

Ghana finally enacted Biosafety law in 2011 consequently paving way for CFTs for NEWEST rice and the insect resistance to Maruca pest. Burkina Faso enacted its 2006 Biosafety Law in 2006 subsequently allowing for the cultivation of Bt cotton and a number of CFTs, including for cowpea, mosquitoes and sorghum.

Uganda adopted a biotechnology policy in 2008. It is just a matter of time before the country enacts the-much-awaited National Biotechnology and Biosafety Bill 2012 considering the political support, including the President's own commitment to adoption of GMOs to boost the country's food security. The government also created a standalone Ministry of Science and Technology that is likely to give more focus to the quest to pass the Biosafety Bill. Uganda boasts of robust research and development of GM crops that include: the WEMA drought tolerant and insect resistant stacked maize; banana resistant to BXW; banana resistant to nematode; biofortified banana with Iron and Pro-vitamin A; cassava resistant CBSV; NEWEST rice; and a potato resistant to bacterial wilt disease.

From sensational to factual media coverage

Like many other members of society, journalists' awareness and understanding of modern biotechnology was very low. This greatly impacted negatively on their ability to effectively report on the subject. This was further compounded with anti-GMO lobbyists bombarding the journalists with misinformation, myths and lies on modern biotechnology, which some of the journalists thought was the gospel truth. With scientists shying away from providing scientific evidence to counter the propaganda and even shying away from interacting with the journalists for fear of being misquoted, the media was awash with sensational stories.

However, there has been a tremendous improvement in reporting on biotechnology, from sensational to credible, balanced, factual and objective reporting. Through the various awareness creation and capacity building initiatives by OFAB, journalists are now more informed and knowledgeable on the technology. They are no longer just mouth pieces of fear-mongering and sensational anti-GMO activists. The media is now positively contributing to increased awareness, understanding and acceptance of GMOs in SSA. Through their increasingly factual, positive, scientific and neutral reporting on biotechnology, the media is changing public opinions and attitudes, and in effect, influencing enactment or amendments of policy, laws and regulations on agricultural biotechnology.

In Burkina Faso, for instance, the suspension to grow Bt cotton would have turned out to be a very negative story with profound repercussions on adoption in other African countries. Through factual reporting - laying the facts bare on the issues, benefits and challenges - on the Bt cotton growing in the country, the media became critical in influencing the Cabinet decision to issue a Communiqué to set the record straight: that the problem is not with the technology which the government supports, but with the variety that was producing short cotton fibres that were unpopular with the buyers of the Bt cotton. The Communiqué also clarified that the suspension was to allow the researchers to come up with the appropriate variety that produces the desired fibre length within two years.

In Ethiopia, which is conducting multi-location trials for Bt cotton and laboratory experiments for false banana, OFAB's media engagement strategy has been very impactful. Through training reporters, editors and communication

officers, journalists, media reporting on the trials and biotechnology in general has changed from negative to more science-based, factual and balanced reporting.

Towards overcoming ant-GMO activism

It has not been smooth sailing considering the heightened and unrelenting opposition from anti-biotech groups and organisations that have pitched camp in food insecure and poor nations in Africa and Asia. It is important to note that the anti-biotech activism has been globalised with more or less similar messages against biotechnology on different aspects whether it is about a crop or a law. To an uninformed, their propaganda on food safety, environment, and intellectual property rights (IPRs) are so real. They have manipulated science to portray GM foods as toxic and carcinogenic, even capable of causing sterility. They created fear and despondency in gullible farming communities that multinational seed companies will use IPRs to colonise the seed industry, that growing GM crops will create super weeds and contaminate organic crops, and to the religious, that it genetic engineering technology is unethical as it tampers with nature – akin to playing God. The aim is to ensure that farmers and consumers reject the technology and that governments do not facilitate the commercialisation of agricultural biotechnology either by not enacting the enabling regulatory frameworks, or if they do, they are so prohibitive to the development and deployment of agricultural biotechnology.

Take Kenya for instance, where the anti-GMO activists under the auspices of the Kenya GMO Concern Group (KEGCO) launched a spirited campaign to ensure that the country does not enact the biosafety law. It was a relentless and spirited campaign starting way back in 2004 when the Bill was at the very initial drafting stage and has not stopped even 8 years after the country enacted the Biosafety Act 2009.

The situation was no different in Nigeria. The anti-GMO activists waged unprecedented opposition to the Bill. The Biosafety Bill was passed but not assented to by the President. It had to be repackaged and debated afresh in the Senate and the National Assembly before being finally passed and assented to. OFAB and other key stakeholders overcame the stiff opposition and had the last laugh when it was signed by the outgoing President, Goodluck Jonathan. And the opposition did not end with passing of the Bill. The anti-GMO activists have now shifted gear to fighting the commercialisation of Bt cotton by manipulating and distorting facts about the suspension of growing Bt cotton in Burkina Faso.

The future prospects

The future of Africa lies in a thriving agricultural sector, that is capable of producing enough food, feed and fibre for its people, livestock and industry. That future is untenable without embracing contributions of modern crop breeding technologies, including genetic engineering that have developed crops with desired traits for overcoming major production constraints such as droughts, pests and diseases, low and declining soil fertility among others.

However, ant-GMO activism, unfavorable regulatory regimes, and an unpredictable policy making and implementation environment stand between smallholder farmers and these agricultural boosting technologies. It will be calamitous if Africa misses out on Agricultural biotechnology just as it did on the Green Revolution. It is therefore critical that more efforts and resources are mobilised and utilised in ensuring that Africa embraces modern agricultural biotechnologies.

OFAB will continue with its relentless quest to midwife constructive conversations among stakeholders to help steer the biotech debate away from risks and danger to that of critical examination of how best the continent can harness potential benefits of biotech products for food security and wealth creation.

With continued support from the Bill and Melinda Gates Foundation, OFAB will remain an open, interactive policy advocacy and communication platform that encourages sharing of ideas for common understanding of the potential benefits and limitations of agricultural biotechnology.

Chapter 4

OFAB-Kenya

Historically in Kenya, prior to 1990, there were no concerted efforts to harness biotechnology research capacity in the country to address defined national priorities. However, in February 1990 the Kenya Agricultural and Livestock Research Organisation (KALRO) formerly Kenya Agricultural Research Institute (KARI), held a national conference on plant and animal biotech to raise awareness among local scientists and policy makers on global biotechnology developments. Following this conference, Kenya Agricultural Biotechnology Platform (KABP) comprising ten members representing different stakeholders in consultation with the Kenya Government was established in 1993. KABP conducted the first comprehensive needs assessment and priority setting for biotech development and application in Kenya.

'Over the last 10 years, OFAB-Kenya has created and expanded the advocacy space on biotechnology. It filled a vacuum of inter-institutional networking and sustained interactions on biotechnology.'

Dr Margaret Karembu,
Director, ISAAA AfriCenter

During this period, environmentalists had convinced many governments in the world that modern biotechnology, and particularly genetic engineering, had inherent risks to the environment and human and animal life and therefore had to be regulated. Consequently, the United Nations Convention on Biological Diversity (CBD) – an international agreement negotiated by the United Nations Environmental Programme (UNEP) – introduced the Biosafety Protocol which was negotiated and adopted in 2000 as the Cartagena Protocol on Biosafety. The objective of the Protocol is to contribute to ensuring an adequate level of protection in the field of the safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity, taking also into account risks to human health, and specifically focusing on transboundary movements. Kenya made history when it became the first country to sign the Protocol on 5 May 2002, subsequently ratifying it in 2003, and consequently binding itself to the provisions of the Protocol.

What followed were a series of initiatives to put in place systems, structures and mechanisms for research, development and commercialisation of GMOs in Kenya. Key among them was the establishment of appropriate policies, legislation and regulatory structures that are required in order to fulfil and comply with the objectives of the Cartagena Protocol. However, these initiatives met a well-orchestrated opposition from anti-GMO activism that had increased significantly over the years and was negatively shaping opinion on modern biotechnology, creating fear, mistrust, and general confusion to the public, policymakers and other stakeholders.

It was no longer a debate on whether or not Kenya needs modern biotechnology, how biotechnology can be promoted, supported, and applied in safe and sustainable ways that contribute to improved agriculture and social and economic welfare of Kenyans. The anti-GMO activists turned it into a social and lifestyle debate based on propaganda, myths and lies about unscientific risks to the environment and human and animal health. False scientific studies

such as the Seralini report of 2012, which linked GMOs to cancer only served to stoke the fire on the myths surrounding the technology.

The anti-GMO activism threatened to derail the establishment of the necessary policy, legislative and regulatory environments in Kenya. For instance, in 2004, the activists hired a lawyer to scrutinise the Draft Biosafety Bill with a view of undermining its technical competency. They even went to court seeking to stop Parliament from debating and passing the Bill on the grounds that it would cause unacceptable risks to human health and the environment. With the court dismissing the petition, they went further to introduce an alternative Bill aimed at banning GMOs in Kenya.

However, it became apparent that opposition to modern agricultural biotechnology was not based on scientific facts but on lack of understanding and knowledge of the technology. The level of awareness and understanding was very low among Kenyans, from policy makers, farmers to the general public.

It was not that there was lack of credible scientific information on agricultural biotechnology. The problem was that scientists were not effectively making available or sharing the vast wealth of information and knowledge they had with other stakeholders. It was more or less a case of lack of effective communication on agricultural biotechnology, a case of not countering the misinformation, myths and lies peddled by the anti-GMO lobbyists and activists who were keen to block the passing or enactment of supportive Biosafety Bill and other regulations necessary for commercialisation of GM crops. The language of the scientists was highly technical and there was unwillingness of some to involve other stakeholders in the conversation. There was the need of bridging the gap between scientists and non-scientists, overcoming barriers of perception and building consensus.

Launch of OFAB-Kenya

To address the above challenges, AATF decided to establish a platform that could bring together experts and other stakeholders to share

A section of participants to the first OFAB meeting in Nairobi, Kenya

information and experiences on biotechnology on a regular basis. Thus, on 26 September 2006, the platform was created and ran by AATF with support of a programming committee (PC) made up of representatives of KARI Biotech Center (now KALRO Biotech Center), the International Maize and Wheat Improvement Center (CIMMYT), the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Kenyatta University and the Ministry of Agriculture, Livestock and Fisheries. To ensure synergy of effort, AATF later signed a collaborative agreement with ISAAA AfriCenter that had already established a similar mechanism in year 2003 – the Kenya Biotechnology Information Center (KeBIC) under its global knowledge-sharing network of BICs to host the secretariat of what became known as OFAB-Kenya. The OFAB gained popularity among various stakeholders in Kenya and other SSA countries, leading to requests by scientists from various countries for Chapters to be established in their countries.

The objective was to ensure that the vast and critical wealth of information and knowledge on agricultural biotechnology possessed by scientists is made available to policy and decision makers and the general public. In particular, OFAB would provide stakeholders an opportunity to network, share information, knowledge and experiences, and explore new avenues for bringing biotechnology benefits to end-users.

OFAB-Kenya brings together stakeholders in agricultural biotechnology – scientists, policy makers, regulators, farmers, consumers, journalists, the civil society, industrialists, legislatures, religious groups, academia and the general public – to share knowledge and experiences, and explore ways of bringing the benefits of agricultural biotechnology to smallholder farmers and consumers.

'It is my belief, therefore, that this forum will facilitate a flow of information between those who have the knowledge and those who require it to make informed decisions. As Minister for Science and Technology, it gives me great pleasure to invite scientists, researchers and other stakeholders to take advantage of this forum as an opportunity for sharing knowledge and educating the public,' stated Dr Noah Wekesa, then Kenya's Minister for Science and Technology when he launched the pioneering OFAB-Kenya Chapter.

Dr Margaret Karembu, the Executive Director, ISAAA and the Coordinator OFAB-Kenya notes that the Chapter selects different speakers from diverse backgrounds just to break down the science and address misconceptions around biotechnology and biosafety. Topics for discussion have been wide and diverse, from local and international updates on research, commercialisation, regulations, politics, socio-cultural, ethical and religious dimensions to media and grassroots mobilisations.

The OFAB-Kenya Chapter can be justifiably described as the initial driving force behind the success of all the seven OFAB Chapters. The Chapter emerged with a deep-rooted determination to ensure that Africa and not just Kenya, does not remain excluded from the rapidly emerging biotechnology revolution with potentially unlimited socio-economic benefits and impacts in the fields of agriculture, health, environment, industry and trade.

The Chapter now has a number of achievements key among them the putting in place of the National Biotechnology Policy and Biosafety Law for Kenya.

Policy interventions

The process of drafting the policy and the law started in 2002. By the time OFAB-Kenya was launched in September 2006, Kenya had just approved the National Biotechnology Development Policy. The Cabinet had just received the Biosafety Bill for approval before parliamentary debate.

That it took four years for the country to approve the Biotechnology Development Policy and five years to enact the Biosafety Act was not because the government did not see the urgency in having the instruments in place. Divergent views from various stakeholders risked causing conflict and scuttling the process. It was simply

because of the concerted and spirited anti-GMO activism that had infiltrated even the policy and law making institutions.

The launch of OFAB provided the much needed platform not only for creating awareness, understanding and knowledge sharing on biotechnology but also for outreach activities revolving around the Biosafety Bill to scientists, legislators, farmers, policy and decision makers, industry and the media. In particular, OFAB-Kenya offered opportunities to stakeholders to understand the Bill and debate it.

In July 2007, OFAB-Kenya organised a meeting that was purely dedicated to debating the Biosafety Bill. The meeting brought together over 150 stakeholders drawn from government, scientists, civil society, industry, farmer organisations including organic groups, the media, regulators and development partners. The vibrant discussions exposed serious knowledge gaps and misconceptions on the Bill and modern biotechnology. Experts took the opportunity to clarify arising issues. The workshop, which had started on a tense note ended with a general consensus that the enactment of a Biosafety Law was necessary and crucial for effective governance of biotechnology applications in the country.

In April 2008, Ms Rachel Shibalira, who had drafted the Biosafety Bill, spoke to the Forum on the process of enacting a law in Kenya. This was an eye opener and important to the stakeholders as they understood what they had to do to get the Bill passed.

'In addition, OFAB organised field visits and seeing-is-believing tours to other countries that have commercialised GMOs that helped bring understanding of the technology among many stakeholders,' says Jane Otadoh, Assistant Director, Biotechnology and Biosafety, Ministry of Agriculture, and a member of the OFAB-Kenya programming committee.

The aim was to help the legislators to contextualise how transgenic crops look like and get first-hand account of the benefits and challenges of transgenic crops. These tours were very successful in changing the legislators' mindset on biotechnology. The legislators who had convened in a follow-up workshop in Nairobi in 2007 to share their experiences vowed to support the Bill in Parliament. Having experienced the benefits of such engagements, the legislators called on OFAB-Kenya and other partners to hold more consultative forums even before the Bill is introduced in Parliament. The legislators even went further to form Parliamentary Champions to marshal support for the Bill once in Parliament.

It was through these efforts that Parliament overwhelmingly voted for the Bill. Dr Willy Tonui, Chief Executive Officer of Kenya's National Biosafety Authority (NBA) rightly credits OFAB-Kenya for widening stakeholders' engagement and establishing a framework for consultation processes which played a critical role on the biotechnology policy of 2006, the Biosafety Act 2009, and the formation of the National Biosafety Authority.

Indeed Kenya fully constituted policy, legislative and regulatory frameworks for research, development and commercialisation of GM products. Researchers are now capable of advancing crops that have successfully completed CFTs to commercialisation. For instance, The WEMA *Bt* maize was granted conditional approval for environmental release in 2016 and awaits commencement of national performance trials. The Monsanto *Bt* cotton has also got similar conditional approval for NPTs.

OFAB-Kenya has played a big role in correcting erroneous statements from persons and institutions of high influence. For instance, the European Union (EU) Head of Delegation to Kenya once (in 2015) stated that Kenyan farmers would be blocked from the European market if they commercialised biotech crops. OFAB-Kenya was instrumental in gathering the necessary experts to correct the statement leading to an eventual retraction of the statement from the Head of Delegation.

Awareness creation

Over the last 10 years, OFAB-Kenya has created and expanded the advocacy space on biotechnology. It

Members of a high level delegation comprising members of parliament, ministers, policy advisors and journalists from OFAB countries on a seeing-is-believing-tour to the biotech cotton fields in South Africa in May 2014

filled a vacuum of inter-institutional networking and sustained interactions on biotechnology. We needed a platform where modern agricultural biotechnology issues could be discussed by different stakeholders and key opinion leaders. 'OFAB has provided a platform for scholars to share their expertise in public forums. This has had an impact in the academia as it gives them an opportunity to advocate and communicate their research,' says Dr Richard Oduor, senior lecturer, Department of Biochemistry and Biotechnology, Kenyatta University and Chairman of Kenya University Biotechnology Consortium (KUBICO).

Dr Oduor hails OFAB's strategy of using study and seeing-is-believing tours to create awareness and sensitise stakeholders on the technology and its benefits. For instance, the study tours OFAB organised for scientists, editors, reporters, parliamentarians, religious groups and policy makers among other stakeholders to Spain, South Africa, Brazil and Burkina Faso among others were eye opening experiences to Dr Oduor and other participants on the potential of the technology to transform fortunes of local farmers. The fact that Brazil has a local product demystifies the technology and leads to faster adoption. Taking stakeholders, particularly legislators and Board Members of various regulatory bodies – National Environment Management Authority (NEMA), NBA, Kenya Plant Health Inspectorate Service (KEPHIS), and Kenya Bureau of Standards (KEBS) – has helped not only in sensitising them on the country's scientific capacity on biotechnology, but also managed to build their confidence and appreciation of the work of local scientists in developing GM products.

OFAB has also facilitated seminars such as Next Generation Academic Researchers Network where Dr Oduor is the Chair to share experiences and knowledge on modern agricultural biotechnology, a case of 'educating the educated'. It is a perfect opportunity for young scholars to get listened to considering that they are not usually afforded the opportunity to comment given the rigid structures in universities.

In addition, OFAB-Kenya is reinforcing students' belief and confidence in biotechnology as a promising career path amid onslaught by the anti-GM lobbyists. 'Participating in seeing-is-believing tours, lab visits, being presented with many case studies as well as the opportunity to interact with many people and mentors certainly reinforced my belief that I made the right career choice in biotechnology,' says Kevin Oyale who first participated in OFAB while a student at the University of Nairobi as a leader of the Students Biotechnology Network.

Dr Roy Mugiira, Technical Officer, National Commission for Science, Technology and Innovation (NACOSTI), has been at the forefront championing biotechnology and creating awareness around it. He contends that OFAB-K has created awareness but there is still a lot to be done, especially considering the heightened and well-resourced anti-GMO activism spreading misinformation and lies.

'Planting wrong information in the public can be easy but correcting it is a difficult task contends Dr Mugiira, who once served as NBA's Chief Executive Officer in acting capacity. It is what he has been trying to do over the past decade together with OFAB-Kenya and other stakeholders. A lot of time has been spent trying to debunk some of the myths already planted in the public conscience about biotechnology.

The Seralini report which linked GMOs to cancer was discredited, but not before it did extensive damage on the perception of the technology. Anti-GMO activists in Kenya, not to be left behind, quickly pounced on it, touting it as the ultimate proof that biotech was not safe and those promoting it were up to no good.

Sessions were quickly convened and word spread like wildfire. Within no time, lobby groups wanted the government to ban the use of the technology in Kenya. And their effort was not fruitless. In 2012, the then Cabinet Minister for Health Beth Mugo placed a ban on the importation of GM food crops. The legality of the ban has always been contested but doubts about the technology had already been planted in the public.

'We have also done a lot of awareness creation around the ban on GM food imports in the hope that it will eventually be lifted. Our work is to let people know that it was instituted based on flawed scientific results and bias. Our role is to provide the facts as they are,' states Dr Karembu.

'The Seralini publication was an unfair science activity because the methodology was questioned. The method, interpretation and analysis were wrong. New technologies initially face resistance. And we also see the resistance to GMO's wane with more information. To date no systematic analysis of any GMO products has shown them to be harmful,' notes Dr Mugiira. However, there are still a lot of myths and falsehoods even within the universities. People still have fears stemming from a lack of understanding.

According to Anthony Kioko, CEO, Grain Growers Association, OFAB-Kenya provides a level playground for sharing information and knowledge that has successfully helped shape the message and opinion on biotechnology. 'The essence of OFAB is really to offer everyone a level playing field to air their perspectives so that we can move forward in a process guided by science and research rather than by myths, rumours, superstition, outright lies and misinformation. OFAB-Kenya was instrumental in ensuring that we were not overrun with misleading information by anti-GMO activists as well as enlightening audiences on the politics around GMOs,' he adds.

Kioko lauds OFAB-Kenya for successfully reaching out to farmers and other stakeholders with factual information on modern agricultural biotechnology and engaging them to participate in decisions on adoption of the technology. For instance, OFAB sensitised farmers during the last call by NBA for views and comments on the intended environmental release of the WEMA *Bt* maize. OFAB facilitated a number of forums to allow farmers to get their concerns heard and make informed decisions on modern agricultural biotechnology.

Mugo Makanga, a former CEO at Mwea Cotton Ginneries, is one of the farmers that now

understand and appreciate modern agricultural biotechnology, courtesy of OFAB-Kenya. Mugo was lucky to be part of the seeing-is-believing tours under OFAB to South Africa and Burkina Faso. He was amazed at how the technology had doubled cotton production in the countries, how it was able to protect the cotton from bollworms that contributed to the collapse of the cotton industry in Kenya. It helped him debunk some myths perpetrated by anti-GMO activists. For instance, he discovered that the fear of domination of the seed industry by the biotech companies was misplaced. In any case, he buys new maize seed every season and nobody complains and wondered why they should complain just because it is GM seed. Furthermore buying fresh seed every planting season comes with more advantages, for instance, solving the problem of disease that is common with recycled seed. He has now realised that the debate on biotechnology is exaggerated and there are still a lot of myths. He believes the OFAB-Kenya sensitisation workshops have been critical in creating awareness and educating many stakeholders in the cotton industry on the benefits of the GM cotton. Through OFAB, Mugo is now a knowledgeable champion of biotechnology, a feat that has earned him a trip to Italy to give a presentation at a workshop organised by the United Nations Food and Agriculture Organisation (FAO) from his perspective as a farmer.

Most religious leaders who have had a chance to attend OFAB events have had a change of attitude towards biotechnology. Pastor Peter Muriuki of Kirinyaga Diocese in Central Kenya stands out for his unwavering support for modern biotechnology. 'Modern sciences like biotechnology are just being revealed to us and we ought to take advantage of them to better our lives,' says Pastor Muriuki. He commends OFAB for forging a common understanding among different stakeholders including religious leaders. He calls on religious leaders to seek a better understanding of the place of science in religious texts which he contends is lacking among many.

OFAB-Kenya programming committee (June 2009)

Media outreach

Before OFAB, the Kenyan media was awash with negative, inaccurate and sensational articles on modern agricultural biotechnology. This was largely attributed to the fact that most journalists then had little understanding of the technology, limited interaction with the scientists, and limited access to factual information and biosafety of modern agricultural biotechnology.

OFAB-Kenya therefore made a deliberate effort to engage journalists, an effort that has indeed been very successful in transforming the way journalists report on modern agricultural biotechnology. Through the various capacity building, sensitisation and awareness creation initiatives, journalists have increased their understanding and knowledge of the technology including issues being debated. The practical trainings, linking journalists with scientists, educational tours including to biotech labs, and sharing of simplified informational materials increased the journalists' understanding, knowledge and perceptions. This greatly contributed to the improved reporting on biotechnology both in quantity and quality over the last 10 years.

However, media engagement was not only for the purpose of building journalists capacity. It was aimed at enlightening other stakeholders on how the media operates and how to effectively engage them. In fact, the heightened negative publicity on modern biotechnology was attributed to the fact the anti-GMO activists had developed and mastered an effective media strategy, and recruited their own press champions. OFAB-Kenya brought in experienced and credible journalists to provide insights on how the media operates, the strategies that would work best and the approaches necessary to provide accurate information.

OFAB helped improve radio reporting of biotechnology

Geoffrey Onditi who hosts a Swahili agricultural programme on Radio Taifa of Kenya Broadcasting Corporation (KBC) epitomises how OFAB-Kenya has helped journalists to improve reporting on modern agricultural biotechnology. The one-hour programme, Mali Shambani (Wealth in the Farm), runs every Tuesday after the 9.00 pm prime news.

'It is always important to get people who can effectively communicate, people who are articulate and knowledgeable on the topic. Before OFAB, getting this calibre of people, and especially those who could express themselves eloquently in Kiswahili on scientific issues such as biotechnology was very challenging. Today, whenever I need help, I turn to OFAB-Kenya to provide resource persons and useful informational materials on the topic.

'What is more encouraging is that experts are now more willing to participate in the programme than before. I believe the change of heart is due to our interactions and networking with scientists during the OFAB meetings and other events. We are no longer strangers, but more of partners in a common cause – to educate and spread the word of modern biotechnology,' Mr Onditi narrates.

'However, getting an expert to talk about biotechnology is just one aspect of making the programme successful – informative and educative. Having a host who understands the topic is equally very important. I had very little understanding of modern agricultural biotechnology before OFAB. I am now an expert in my own way, courtesy of participating in the OFAB-Kenya meeting, events and more importantly, in their trainings of journalists. For instance, from the training workshop on science communication, I am now a trainer of trainers for other journalists hosting agricultural programmes in other stations.

'Having enthusiastic experts, coupled with my understanding of the topic has indeed enriched discussions, resulting in increased popularity of the programme. Unlike before, I receive a lot of positive feedback from listeners and particularly farmers eager to adopt the technology. I appeal to OFAB-Kenya to translate some of the information materials to Kiswahili to aid with broadcast,' adds Mr Onditi.

Daniel Otunge of AATF addressing KALRO staff during a seminar to sensitise staff on benefits of agricultural biotechnology.

Way forward

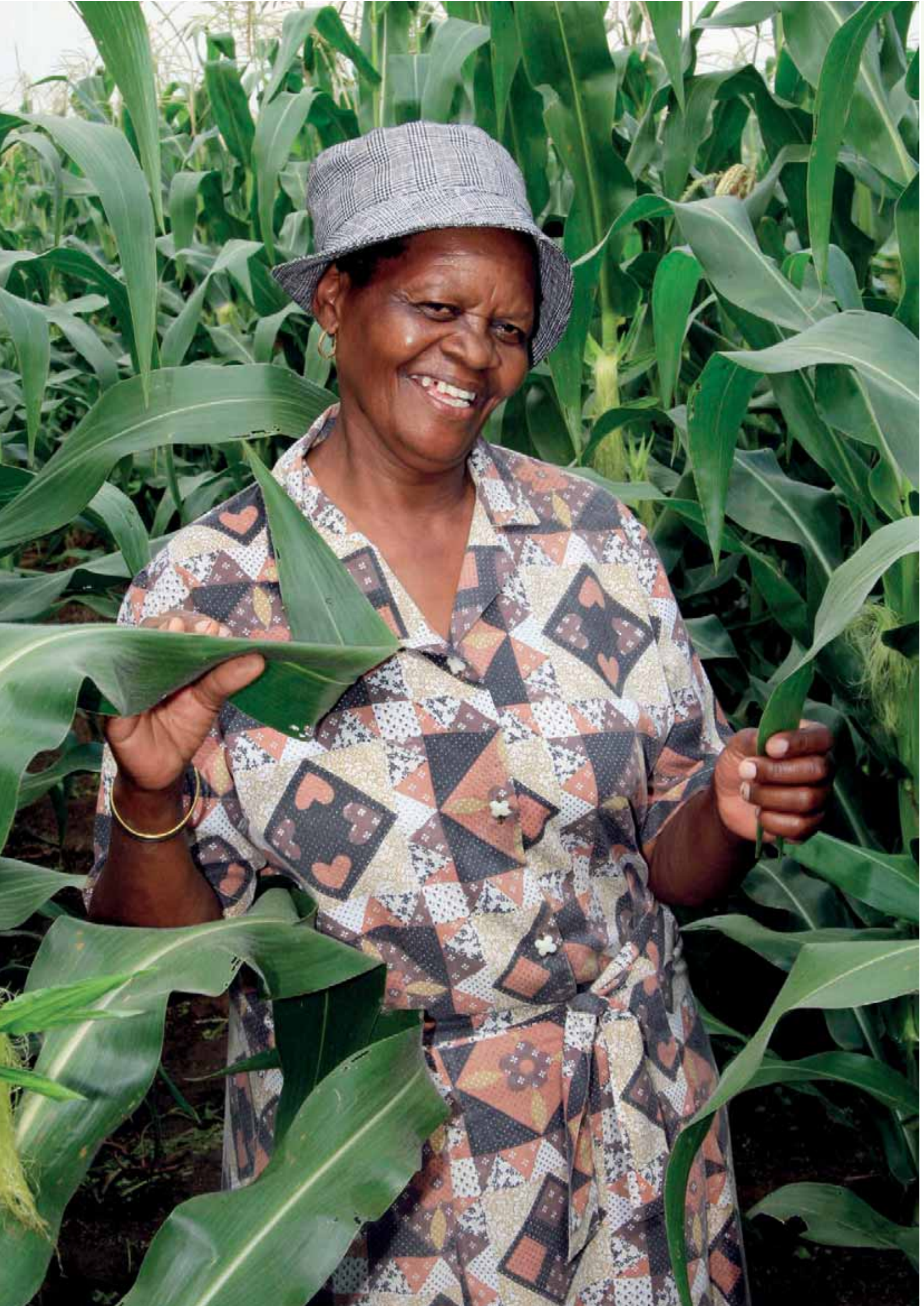
OFAB-Kenya has indeed created and increased awareness and understanding on modern biotechnology over the last decade. This has greatly contributed to the achievements realised in policy, law and regulation, and the vibrant research and development of GM crops in the country.

OFAB may soon have to expand mandate to include creating awareness and understanding on some of the rapidly emerging advances in biotechnology such as gene editing that have a lot more potential and have the ability to address concerns about risks around modern biotechnology, according to Dr Willy Tonui, CEO, NBA.

Having high profile champions rooting for the technology should be part of OFAB's wider approach in the coming years if Kenya is to fully adopt modern biotechnology.

One area that Dr Tonui feels has been lost during the whole debate is biosafety which is broader than GMOs. It is here that issues such as deregulation of GMOs can fall under. For him, there is a lot in the horizon that we should be focusing on now.

One of the key focus areas for OFAB will be ensuring that there is coherent position among government agencies and within key government ministries – agriculture, health, science, and environment – and regulatory agencies such as NBA, NEMA and KEPHIS. This coherent position will also be critical between executives of the regulatory agencies and their Boards of Management.



Chapter 5

OFAB-Uganda

Introduction

Uganda has invested heavily in the development of modern biotechnology over the last ten years. It has more than 13 government-owned modern biotechnology laboratories involved in tissue culture, genetic engineering, vaccine production, artificial insemination, disease diagnostics, and gene discovery among others. It has one of the highest research portfolios or pipelines on GMOs in SSA. The National Agricultural Research Organisation (NARO) is conducting trials on cassava resistant to cassava mosaic virus and the cassava brown streak virus; orange fleshed sweet potato; sweet potato resistant to weevils; NEWEST rice; water efficient maize; maize resistant to stem borers; banana resistant to bacterial wilt, nematodes; a Vitamin A enriched banana; and groundnut resistant to rosette disease among others.

However, Uganda is yet to commercialise any of these products, some of which, like cotton, which have already completed confined field trials. The growth in research and development of GMOs in Uganda has not been in tandem with the necessary legislative, regulatory and institutional developments. While the Government approved the National Biotechnology and Biosafety Policy in April 2008, it is yet to enact the Biotechnology and Biosafety Bill into law that would pave way for commercialisation of GMOs.

'...Biotechnology is to impart certain qualities and legislators who are against it should modernise their thinking...'

*Uganda's President **Yoweri Kaguta Museveni** speaking during World Food Day on 16 October 2015 at the Agricultural Research and Development Institute in Rwebitaba, Kabarole District, Uganda. President Museveni asked legislators to modernise their thinking and work towards enacting the Biosafety Bill into the much awaited Biosafety Law.*

The existing laws and other policies do not provide for the utilisation of modern biotechnology and its regulation probably because these laws were enacted at the time when research and utilisation of modern biotechnology were at its infancy or non-existent. In addition, most sectors do not cover biotechnology in their policies, even where it is relevant, probably because of limited knowledge on the relevance of modern biotechnology in their mandate, and on the available options for its regulation.

The government and stakeholders in the biotech sector are aware that in the absence of an explicit legal framework, efforts to apply modern biotechnology to transform agriculture in Uganda are in vain. While the government fully supports the application of modern agricultural biotechnology, enacting the Biotechnology Bill, which has been in and out of parliament for many years, remains a big challenge.

Awareness creation

By nature of the subject, many of the issues in modern biotechnology and biosafety have scientific and technical underpinnings. Some of these issues related to the development, application and commercialisation of genetically modified crops appear complex to legislators, policy and decision-makers, who also have challenges in seeking and acquiring scientific advice on these issues. Indeed, these issues

appear complex because of the low awareness, understanding and knowledge on modern agricultural biotechnology, not only among the policy and decision makers, but also among many Ugandans, including those opposed to the technology. It is a lack that anti-GMO activists capitalised on to spread propaganda, myths and lies that portray modern agricultural biotechnology as an extremely risky technology that should be completely avoided or strictly regulated.

On 14 December 2007, AATF in collaboration with the Program for Biosafety Systems (PBS), NARO, Uganda National Council of Science and Technology (UNCST), the Association for Strengthening Research in East and Central Africa (ASARECA), the Consumer Education Trust (CONSENT) and the Ministry of Agriculture launched OFAB-Uganda. Other partners include Uganda Biosciences Information Centre (UBIC) and the Science Foundation for Livelihoods and Development (SCIFODE).

The Chapter, which is hosted by UNCST, was the second OFAB Chapter to be launched in Africa after OFAB-Kenya. It was launched when awareness on modern biotechnology was very low, when the actors in the biotechnology sector somehow knew each other, but not so much about what each one is doing. Interactions among various biotechnology stakeholders were generally weak and very informal, as it depended on the initiative of an individual scientist. Interactions with the private sector were even much weaker. The aim of OFAB-Uganda was to create awareness and enhance understanding of biotechnology to inform decision making. It was also formed when Uganda did not have any substantive policy or law on modern biotechnology.

For OFAB-Uganda, it has indeed been a decade of achievements, despite challenges and spirited opposition from anti-GMO activists. The Chapter and its partners have created an enabling environment that contributed to the robust research and development pipelines on GM crops. Through the monthly lunch meetings, OFAB-Uganda provided opportunities for key stakeholders to share knowledge and experiences, make new contacts and explore new avenues of bringing the benefits of biotechnology to the agricultural sector.

Gilbert Gumisiriza, National Biosafety Committee, Uganda, presenting at the AATF side event, 'Taking GM Crops to Market in Sub-Saharan Africa (SSA): Special Focus on Policy and Regulatory Environment', during the 7th FARA Sciene Week held 13–16 June in Kigali, Rwanda

The meetings have also been very effective in engaging and sensitising various stakeholders and partners on modern biotechnology. The stakeholders and partners include parliamentarians, students, farmers, policymakers, researchers, entrepreneurs, industrialists, general public, community elders, chiefs, kings and the civil society.

Over the decade, OFAB-Uganda has conducted meetings in 37 districts and 68 constituencies, according to Philip Chemonges, OFAB-Uganda Chapter Coordinator.

Policy interventions

Over the years OFAB-Uganda, working closely with partner organisations, have laboured to build the capacities of legislators and policy makers to enable them make informed decisions on biotechnology governance structures in the country. This has been done through various methods including capacity building workshops, seeing-is-believing tours, sharing of information materials with credible messages and facts about the technology and face-to-face meetings to discuss pertinent issues. These activities have helped to move forward the Biosafety Bill process. For example, to help kick-start the Bill process after it stalled in parliament in 2013, OFAB in 2014 organised a seeing-is-believing tour to South Africa. The Minister for Planning also responsible for the Bill, Hon Matia Kassaija, was among the participants. After this tour the minister organised a seminar for parliamentarians to discuss the way forward for the Bill. The meeting decided that the committee report should be presented to parliament for consideration. The report was soon presented thereby sparking off discussions on the Bill that almost led to its passage in to law, but due to a heavy parliamentary calendar, the Bill was not discussed despite being listed on the order paper on the last day of parliament. Even so, the Bill was saved so that it did not have to be reintroduced afresh, thanks to intervention by Hon Kassaija. Since then the Chapter has continued to build capacities of legislators to ensure their support for the technology and interest in passing the Bill are sustained. Earlier, similar efforts had led to the promulgation of the National Biotechnology and Biosafety Policy (2008).

Biotechnology and biosafety advocacy efforts of the project and its partners also prompted the government to establish a full Ministry of Science, Technology and Innovation (MSTI) and to make it in charge of the Biosafety Bill and NCST. During OFAB's monthly sessions there was emphasis on the need for food security and sustainable development based on science, technology and innovation, including modern agricultural biotechnology. This, we believe, created necessary condition and the urge for the government to create the ministry.

'This move followed a concerted effort by the members of the Parliamentary Committee on Science and Technology who have been attending OFAB sessions regularly for the past nine years. The committee engaged President Yoweri Museveni who after understanding the impact of the initiative asked them to look around the region and advice,' says Peter Mugirya, the Director for Communication and Partnerships, SCIFODE.

According to former legislator for Kapchora Constituency, Hon Phyllis Chemutai, OFAB-Uganda has done a great job in educating Ugandans, especially politicians, on the benefits and safety of modern biotechnology. It has also worked with elected leaders at constituency and district levels to educate, inform and sensitise grassroots people on the technology. She calls for more efforts by OFAB to be able to cover the whole country. 'OFAB has to spread and intensify its awareness campaigns to all parts of the country so as to help farmers make informed decisions enabling them to benefit from the technology,' Hon Chemutai said.

Hon Amule Doreen Ruth, Amolatar District Women MP, intimated how OFAB opened her eyes to potential benefits of the technology after having been fed with propaganda against the technology. 'I was totally opposed to the technology until OFAB reached out to me and invited me to a workshop where I came into contact with top Ugandan scientists who explained in simple terms what the technology

was all about and why it was imperative for Uganda to adopt and use it. All my concerns and fears were addressed adequately. I then decided to invite the project to my district so that the scientists could also enlighten my people. I also resolved to support the Biosafety Bill 2012. OFAB should continue its good work because I believe some legislators are still opposed to GMOs and the Bill because they do not understand the subject and the technical language in the Bill,' she said.

Mr Ronald Jigawe, Head of Science, Technology and Innovation at UNCST, concurs that misinformation among MPs, especially the new ones, is to blame for continued resistance to the Bill by some MPs. He is however hopeful that concerted efforts by OFAB and like-minded partners would win them over by demystifying the technology and addressing the concerns and fears of the people. Mr Jigawe is optimistic that Parliament will this time round pass the Bill: 'Parliament is bound and has a duty to pass the National Biotechnology and Biosafety Bill because the contentious clauses in the Bill have been corrected and it now needs to be fast tracked.'

Mrs Consolata Acayo, one of the Communication and Information leads at the Ministry of Agriculture, Animal Husbandry Industry and Fisheries, while praising OFAB's efforts in educating the public on biotechnology over the years, called on Ugandan legislators to stop relying on unproven views from the anti-biotech groups. 'The debate on biotechnology revolves around the hypothetical risks and questions related to value, safety and impact yet activists raising these issues are not scientists and keeps on misleading the public,' she added.

Teaming up with university students to popularise modern biotechnology

Prof George Bazirake, a former Dean, Faculty of Science, Kyambogo University, supported OFAB's move to partner with varsity experts to help demystify the technology, saying this helped to convince policy makers of existing local capacity to handle biotechnology.

One of the OFAB champions Owen Singura, a fourth year student at Kyambogo University in Kampala, wants Parliament to promptly pass the Biotechnology and Biosafety Bill. 'I study biotechnology and due for graduation in December 2016, unfortunately the law that is to allow the commercialisation of the technology seems stuck in Parliament,' Singura, told his Bunyangabu County legislator Adolf Mwesige.

Singura was in his rural home and met the legislator who promised to team up with fellow legislators to pass the Bill later in 2016. He has been engaged in biotechnology awareness creation campaigns within the college and in secondary schools in Uganda.

At the university, the second largest in Uganda, he has led a Biotechnology and Research Club, with members involved in mushrooms, coffee and catfish farming. 'We create awareness on the importance of biotechnology and its role in the development of our country in neighbouring secondary schools,' Singura said.

Singura observes that in 2013 alone, 90 students took biotechnology as their major core subject at the university, signs that the subject is gaining popularity amongst students in the country. He however regrets that the legislators have dilly-dallied in passing the Bill into Law to enable graduates practice the science.

Singura has used all avenues including opening a Facebook page, writing letters to the editor pages in the daily newspapers, and still calls on legislators to pass the long overdue Bill.

'The delay is the reason behind our engagement in sensitising the youth on the benefits of biotechnology because we believe that biotechnology has advances that are capable of saving farmers from making loses as well as creating additional jobs,' he says.

He says that a lot of research work has been going on at the national research institutes yet many people are unaware of the development. The campaign has taken them to Nabisunsa Girls Secondary school besides several other schools nearby.

'We participate in the annual national science congress and also compete in essay writing competitions,' he noted. Singura calls for the diversification of awareness campaigns to cover remote rural regions to enable the farmers get to learn the benefits of the technology.

Media engagement

The Chapter has had a close working relationship with the mass media, including training workshops and seeing-is-believing tours. These engagements have been very successful in building the capacity of journalists to effectively report on modern biotechnology, and consequently help in creating awareness, understanding and appreciation of the benefits of biotechnology.

Ms Lominda Afedraru, a journalist with the *Daily Monitor*, Uganda says that the increased and better coverage of modern biotechnology in terms of quality and quantity is due to the improved knowledge of the journalists on the subject, courtesy of the OFAB-Uganda capacity building initiatives. This is particularly so for journalists belonging to science associations as they already have an interest in science reporting. Cultivating and nurturing good working relationships between scientists and journalists has also been a major factor in improving coverage of modern agricultural biotechnology in Uganda.

While the continuous trainings and involvement in OFAB-Uganda events and activities like the monthly lunch meetings has been critical in enhancing the understanding of modern biotechnology by science journalists, it has been an eye opener for others, ensuring that they cover the science objectively from a point of knowledge. This is important as most of the times editors assign reporters with no knowledge of biotechnology resulting in biased and inaccurate reports. Ms Afedraru, a beneficiary of the OFAB capacity building initiatives, says that journalists require more awareness campaigns on the subject to be able to tell the story clearly. She appreciates OFAB monthly meetings adding that the opportunity has enabled her to make good news sources on the subject.

Moving forward

OFAB-Uganda will focus on a sustained advocacy engagement of Parliamentarians to empower them pass the Biosafety Bill. Devolving awareness creation and knowledge sharing initiatives to the grassroots remains a priority. Engaging people in rural areas will enable them to understand and appreciate the unlimited potential of the science behind biotechnology. Outreach to rural media also remains on the priority list for the Chapter.

Chapter 6

OFAB-Nigeria

Introduction

Like many other African countries, food security remains a challenge in Africa's most populous nation with over 180 million people, according to Population Reference Bureau. Likewise, the government of Nigeria recognises the importance of agriculture in driving the country's economy. Production constraints like drought, erratic and inadequate rainfall, insects/pests and diseases, poor soils, and lack of improved agricultural technologies are the main contributors to low agricultural productivity in Nigeria.

***Goodluck Ebele Jonathan**, the former President of Nigeria, signed the National Biosafety Agency Bill into Law on 21st April 2015 paving way for more research and uptake of biotech crops in Africa's most populous nation*

The government of Nigeria had long recognised biotechnology as a powerful and promising technology capable of delivering a wide range of economic, social and environmental benefits. By 2001, the Federal Executive Council (FEC) had approved Biosafety guidelines to fast-track and encourage research and development of GMOs and regulation of modern biotechnology in the country. In April 2001, FEC approved the National Biotechnology Policy followed by the establishment of the National Biotechnology Development Agency (NABDA) in November 2001 to implement the policy. And on 2 December 2002, the Federal Government inaugurated the National Coordinating Committee to draft the National Biosafety Framework. By December 2006, Nigeria had a National Biosafety Policy and a draft Biosafety Bill.

These developments might have seemed straightforward and uneventful. However, the anti-GMO movement led by Greenpeace and Friends of the Earth mounted very strong and spirited campaigns against these initiatives aimed at creating the necessary policy, legal and regulatory environments for research, development and commercialisation of GMOs in Nigeria. Riding on low awareness and understanding of modern biotechnology among Nigerians, anti-GMO activists turned an otherwise scientific technical issue into a moral, cultural and ideological debate. They systematically manipulated science, created alternative facts, and distorted scientific facts to create fear and despondency on the perceived health and environmental risks of modern biotechnology.

It was due to the opposition that it took nearly four years to pass the Biosafety Policy and draft the Biosafety Bill. It took another six years before the National Assembly could substantially debate and pass the Bill, and another four years before the Bill could finally become law.

OFAB launch

To manage the unnecessary controversy being generated on agricultural biotechnology by the anti-GMO movement, there was need for deliberate, planned and coordinated communication efforts among the various stakeholders in modern agricultural biotechnology. And on 9 April 2009, AATF in partnership with NABDA and Agricultural Research Council (ARCN), launched OFAB-Nigeria Chapter with a mission to enhance knowledge sharing and awareness on agricultural biotechnology that would raise understanding and appreciation of the technology and contribute

to an enabling environment for informed and timely decision making.

OFAB-Nigeria pursues four main objectives:

i. Establish and manage a range of platforms to enhance understanding of biotechnology in agricultural productivity.
ii. Inform policy decision-making processes on matters of agricultural biotechnology through provision of factual, well researched and scientific information.
iii. Forge strategic alliances for optimisation of resources through convening encouraging inter-institutional networking and knowledge sharing in agricultural biotechnology sector.
iv. Enhance targeted capacity strengthening that will improve communication across all biotech sectors interested in Africa.

'… The much awaited signing of the Bill into Law was the strongest indicator that modern biotechnology had been identified as an important tool in helping countries to achieve food security, industrial growth, health improvement and environmental sustainability apart from being a great milestone for NABDA and OFAB...'

***Prof Lucy Ogbadu**, Director General, NABDA*

To effectively execute its mandate and realise the objectives, OFAB-Nigeria has innovatively forged strategic alliances and partnerships with various institutions which include:

- Agricultural Research Council of Nigeria(ARCN)
- State Governments
- National Root Crops Research Institute (NRCRI), Umudike
- Institute of Agricultural Research (IAR), Zaria
- Programs for Biosafety System (PBS).
- Federal Ministry of Agriculture.
- National Agricultural Seed Council of Nigeria (NASC).
- National Cereals Research Institute, Badeggi, Niger State.
- National Productivity Centre (NPC).
- National Institute of Fresh Water Fisheries (NIFFRR) New Bussa, Niger State.
- United States Department of Agriculture (USDA)
- United States Agency for International Development (USAID)
- United States' Department of States (USDS)
- Africa harvest Biotechnology Foundation International (AFBFI)
- African Seed Trade Association (AFSTA)
- The Nigerian Medical Association (NMA)
- The Association of Catholic Medical Practitioners (ACMP)
- The Association of General and Private Medical Practitioners (AGPMMP).
- Schools (Universities, Secondary); Professional Bodies (Genetic Society of Nigeria (GSN); Biotechnology Society of Nigeria (BSN) etc.
- CropLife International

Through the partnerships and alliances, the impacts of OFAB-Nigeria communications and advocacy efforts are now being felt across all sectors of the society. OFAB-Nigeria Chapter has raised levels of awareness; closed the gap between scientists and journalists; and improved regulatory environment on agricultural biotechnology. Bringing the farmers, scientists, researchers and policy makers under the same platform is one major achievement.

Participants to a media training workshop held on 13 September 2012 in Abuja, Nigeria

Key achievements

OFAB-Nigeria has made tremendous progress in establishing and managing a wide range of platforms to enhance knowledge sharing, awareness, better understanding and appreciation of the increasingly important role that modern biotechnology plays in agricultural productivity.

Increasing biotech awareness and understanding

OFAB-Nigeria developed a three-pronged approach that has been very successful in creating and increasing awareness, and in information and knowledge sharing in Nigeria (Figure 1) reaching out to over 6,000 stakeholders. Through the country side strategy, OFAB Nigeria held sessions targeting farmers, civil society groups, and researchers. These sessions have been held in the six major geopolitical zones in Nigeria namely the North-Central, North-West, North-East, South-South, South-West and South-East (Figure 2). The monthly meetings brought together biotechnology experts and other stakeholders for presentations and discussions on agricultural biotechnology. The third strategy was to hold special sessions for policy makers, media, civil society organisations and other stakeholders to discuss and expound on emerging issues.

Besides the workshops, the Chapter also organised field tours for stakeholders to make them have a feel of the GM crops, and understand and appreciate efforts being made to develop GM crops in the country.

The increased awareness and understanding was also attributed to the development and sharing of various information, education and communication materials. The Chapter developed easy to read information materials; produced radio and TV jingles on the safety of GM crops; produced a documentary on the progress of pod borer resistant GM cowpea; the progress made on the development of Nitrogen Use Efficient, Water use Efficient and Salt Tolerant (NEWEST) Rice; the progress made on the development of Africa Biofortified Sorghum(ABS) and a video explaining the status of GM crops in Nigeria.

The awareness and education campaigns also targeted schools. This was guided by the belief that teaching biotechnology needs to start early enough – in schools – to enable children grow with the knowledge on biotechnology. The Chapter even designed exercise books with messages on biotechnology to aid the school-going children begin to interact with the subject early. It further developed a Biotechnology Bulletin for High School Students (Figure 3).

The Chapter's capacity to inform and educate was boosted by having a number of its key network members undergo training by the Cornell Alliance for Science on grassroots mobilisation, science communication and volunteerism.

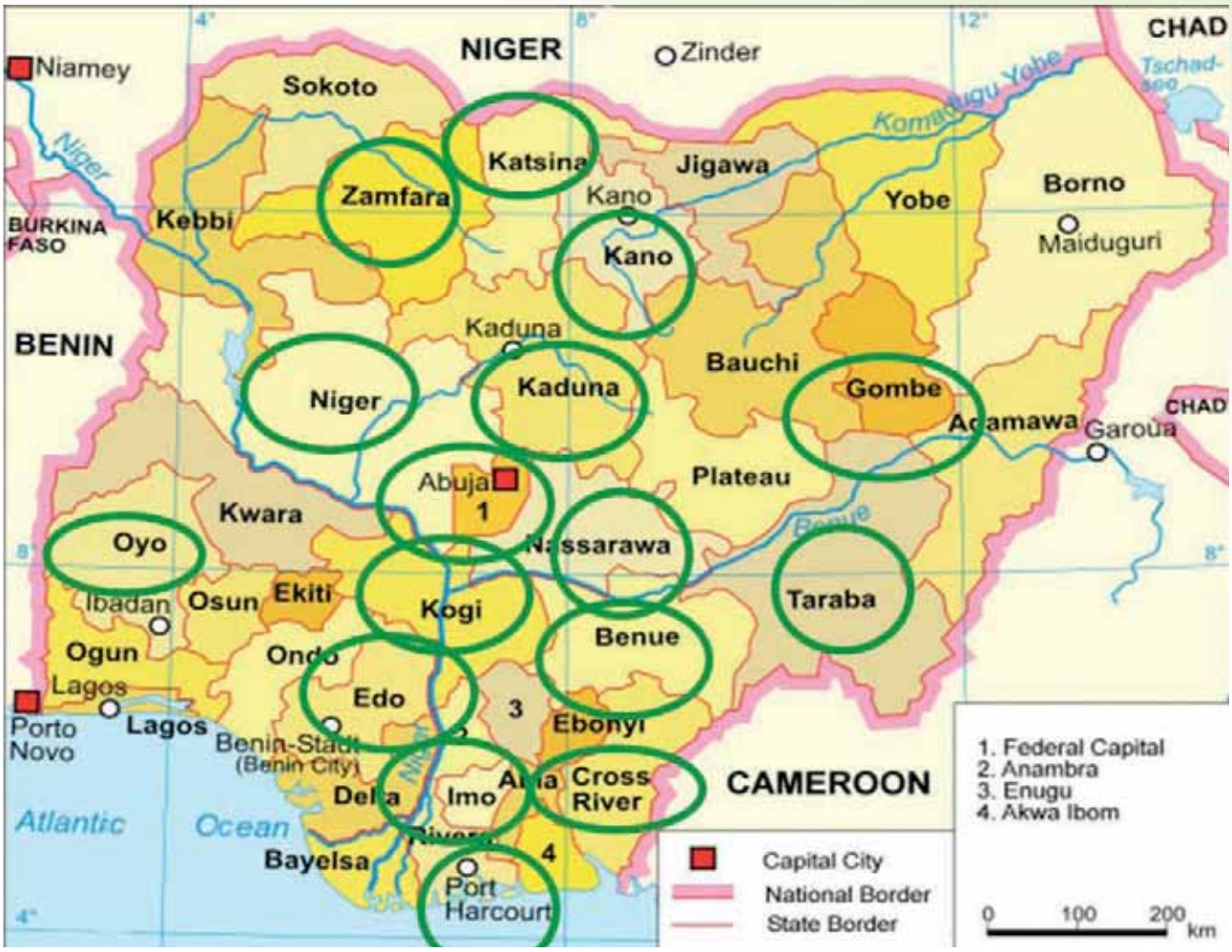
Media liaison

One of the key successes of OFAB-Nigeria was in the area of media engagement that changed the reporting on biotechnology from sensational, biased and inaccurate stories to a more factual, evidence-based and credible one. In addition, there was heightened and sustained credible reporting on agricultural biotechnology unlike before. OFAB's activities, especially the monthly sessions, received widespread coverage in print, electronic and social media.

This was achieved through a deliberate and concerted effort to increase journalists' knowledge and understanding of modern agricultural biotechnology through trainings, participation in OFAB and other biotechnology events such as study tours. The Chapter conducted media tours to the various CFTs of GM crops, particularly the Pod borer resistant cowpea, *Bt* cotton and NEWEST rice. This was critical in fostering communication and understanding of the science behind GM crops.

Tracking, monitoring and analysis of the mass media show that the quality and quantity of stories gathered, packaged and disseminated by Nigerian mass media on agricultural biotechnology has greatly improved. Due to their increased awareness and understanding, most journalists are now able to differentiate between myths, pseudo-science, propaganda peddled by anti-GMO activists on one hand and factual science from credible scientists on the other hand. Where in doubt, they are now able to verify from credible scientists the information they have been

OFAB-Nigeria 3-pronged approach



Target regions of OFAB-Nigeria
Source: B.O. Solomon 2014

provided with. Through interactions facilitated by OFAB, the relationships between researchers and journalists have greatly improved. Scientists who once shied away from discussing science issues with journalists are now open to enquiries and discussions with journalists. The extensive media campaign was essential to curb negative and unscientific propaganda on the utilisation of biotechnology tools and products.

Policy advocacy

When OFAB-Nigeria was launched in 2009, the country had only the National Biotechnology Policy of 2001/National Biotechnology Development Agency (NABDA) and National Biosafety Policy 2006. At that time, it was close to seven years since the process of drafting the Biosafety Bill started and there was little indication that it would be completed anywhere in the near future.

Teaming up with NABDA, the Agricultural Research Council of Nigeria (ARCN), the Biosafety Desk Office, Federal Ministry of Environment in Nigeria, the African Biosafety Network of Expertise (ABNE), Program for Biosafety Systems (PBS), Africa Harvest (AH) and several research institutes in Nigeria, OFAB successfully fast-tracked the passage of the Biosafety Bill at the National Assembly by contributing towards the country's informed policy decision-making processes on matters of agricultural biotechnology through provision of factual, well researched scientific information.

It was not long before efforts by OFAB to influence policy and regulatory environments

BASIC KNOWLEDGE IN

BIOTECHNOLOGY FOR SECONDARY SCHOOL STUDENTS

What is Biotechnology?

Biotechnology is applied biology. Biotechnology uses any living system to produce something useful.

Importance of Biotechnology to our country

- Helps a nation to produce and have more food to eat.
- Helps to make better medicine and other things needed in hospitals to make people well and healthy.
- Helps to produce raw materials needed by industries to make things we need.
- Used in industries to produce or manufacture the things we need.
- Makes our environment or surroundings good for healthy living with fresh air, clean water and food.
- It creates jobs or employment for people.

Government's contribution to Biotechnology in Nigeria

The Federal Government of Nigeria established the National Biotechnology Development Agency (NABDA) in 2001 under the Federal Ministry of Science and Technology. It has the following duties:

- To ensure that many people are trained or educated to be able to use biotechnology for the development of our country.
- To develop methods and tools that are needed for biotechnology activities in the country.
- To create better medicines, better and more food, better raw materials for use in industries, and better industrial products.
- To make sure that Nigeria becomes a very rich and well developed country where people enjoy the benefits of biotechnology.

How can I be involved?

If you study science and then biotechnology, you can become:

i. an ***agricultural scientist*** employed to help the country develop high yielding and good quality food-crops, plenty of good quality meat (cow, goat, chicken, fish etc) and milk.
ii. a ***biomedical scientist*** or a ***pharmacist*** to develop powerful medicines and methods for making sick people become well.
iii. a ***biochemical engineer*** to develop very small living things (micro organisms) for use in industries to manufacture things like alcohol, milk products (e.g. yoghurt drink), bio-fuels etc.
iv. an ***environmental scientist*** to develop or modify bacteria useful to treat wastes and clean up environments that have been contaminated by industrial activities.
v. a ***physicist*** or ***chemist*** to develop and produce biological weapons of war.
vi. a ***computer scientist*** or ***computational biologist*** who uses computer to solve biological problems (bio-informatics).

NABDA, Biotechnology Education and Nigerian Students

The following are some of the things that NABDA is planning for Nigerian students:

- To develop the curriculum (syllabus) for basic biotechnology education.
- To encourage students to become interested in biotechnology.
- To encourage the choice of careers in biotechnology by students.
- To encourage students to develop interests in science and technology.
- To educate students about the values, skills, processes and methods of science and technology.

Open Forum on Agricultural Biotechnology

National Biotechnology Development Agency
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Website: www.nabda.gov.ng

OFAB-Nigeria Biotechnology Bulletin for High School Students

started bearing fruit. By 2011, the Bill had already been debated and passed by the National Assembly and forwarded to the President for assent. However, the President failed to assent to it because the passed Bill was time barred. That is, the tenure of the 6th Assembly that passed it had expired just two days after the passage of the Bill and before transmission to the President. The National Assembly has a rule that 'Bills passed by a preceding Assembly and forwarded to the President for assent but for which assent or withholding thereof was not communicated before the end of the tenure of the Assembly, such Bills have to go back and pass through passage processes again.'

The tireless efforts of OFAB and collaborators finally bore fruit when the 7th National Assembly and the Senate approved the Bill and President Goodluck Ebele Jonathan finally signed the National Biosafety Agency Bill into Law on 18 April 2015 just days before he left office.

A lot of effort was put into influencing and having an enabling policy regulatory environment in Nigeria. Key among them was bringing together policymakers to discuss emerging issues, information and knowledge sharing. The most significant one was when it teamed up with Federal Ministry of Environment and National Biosafety Management Agency, to organise an 'Experts Roundtable' attended by the Ministers of Agriculture, Science and Technology, Defense, Environment and State for Environment. It brought about a change of policy and increased understanding on the science and benefits of GMOs in Nigeria. In addition there were various ministerial briefing activities targeting various Federal ministries.

The project's effort to improve public understanding and acceptance of the science of GM crops involved keying into various councils and professional bodies' meetings including those conducted by National Council on Science and Technology (NCST); Biotechnology Society of Nigeria (BSN); Genetic Society of Nigeria (GSN) Conference; the Catholic Secretariat of Nigeria engaging catholic Priests, Rev. Sisters, Medical Doctors; the Association of Catholic Medical Practitioners of Nigeria; the Association of General and Private Medical Practitioners of Nigeria; the Seed Sub-sector (Nigerian Seed Companies); training the Nigerian Bar Association, Abuja Chapter; Seminars at the School of Life Sciences, Federal University of Technology, Minna on the use and the potentials of GM crops; as well as the national agricultural council meetings that resulted in agricultural biotechnology and biosafety being integrated into the National Agricultural Policy Plan (2016-2020). OFAB Nigeria also used an agricultural extension review and planning meeting in Ahmadu Bello University (ABU), Zaria, in 2016 to adequately engage and enhance their understanding of GM crops.

As one of OFAB's creative awareness strategies towards getting the youth to understand GM technology, the Forum co-sponsored a football match event for students of Nassarawa State University Keffi. The half time during the match was an opportunity to interact on what GM technology stands for as well as its potentials for Nigeria. The winning team was given OFAB branded jerseys and the students were excited about the initiative. They called for more engagements and sought for ways to be part of OFAB's advocacy programmes. Link to Video: https://www.youtube.com/watch?v=fL8aYdyGrNk.

Prospects

Nigeria, considered to be SSA's economic powerhouse, is set to commercialise biotech crops after the NBMA approved the environmental release of *Bt* cotton. The agency also approved CFTs of *Bt/HT* maize. Dr Rose Gidado, coordinator OFAB Nigeria Chapter, strongly believes that if the country successfully commercialises GM crops, other African countries, especially in the West African region, will follow given the country's economic and political influence on the continent.

Chapter 7

OFAB-Tanzania

Introduction

Tanzania is among the earliest countries in Africa to develop and adopt laws and regulations to govern research, development and commercialisation of GMOs. The National Biosafety Framework was adopted in 2004, making the country the fifth on the continent, after South Africa (1997), Zimbabwe (2000), Mauritius (2003) and Egypt to enact laws governing biotechnology. Tanzania adopted the National Biotechnology Policy in 2010, which provides guidelines towards safe application of biotechnology in research and the development of biotechnology-based products and services in all sectors of the economy.

***Hon. Jakaya Kikwete**, former President, United Republic of Tanzania*

***Hon. Mizengo Pinda**, former Prime Minister, United Republic of Tanzania*

The immediate former President of Tanzania Jakaya Kikwete and Prime Minister Mizengo Pinda said in public that Tanzania needed the technology urgently. Apart from ministers supporting appropriate use of the technology, Tanzania set a pioneering trend when for the first time political parties incorporated biotechnology development in their manifestos during the general elections in 2015.

However, like many other African governments, these frameworks were modelled along the African Union's Biosafety Model Law and by extension, the Cartagena Protocol on Biosafety. The underlying premise of these two instruments was that modern biotechnology was risky and had to be approached with utmost precaution. Rather than facilitating, the legal frameworks in essence restricted the development of GMOs. The Tanzanian Law adopted in 2009 had a strict liability clause that virtually prohibited scientists from undertaking any genetic engineering related research and development. It stated in Part VIII section 56 (1) Any person or his agent who imports, transits, makes contained or confined use of, releases, carries out any activity in relation to GMOs or their products, or places on the market a GMO shall be strictly liable for any direct or indirect harm, injury or loss caused by such GMOs or their products or by any activity in relation to GMOs. The strict liability shall cover the whole chain from the applicant (Tanzania Commission for Science and Technology - COSTECH), the person responsible for the activity, which results in the damage, injury or loss as well the provider, supplier or developer of the GMOs or their products.

The Government of Tanzania, like many others in Africa, fully recognised the potential of modern biotechnology in transforming their agricultural production and wellbeing of their citizens. But unaware of the hidden agenda of anti-GMO activists, masquerading as biotechnology experts, the government ended up enacting a law that was not favourable to development and commercialisation of GMOs. The anti-GMO lobbyists succeeded in convincing the decision makers to sneak the strict liability clause in the legal framework. And with the retrogressive clause in place, a heightened propaganda by anti-GMO activists, and low awareness and poor understanding of modern biotechnology among policy makers, the fate of research, development and commercialisation of GMOs in Tanzania appeared sealed.

Participants to the OFAB-Tanzania launch in May 2009 by Hon Stephen Wasira (MP), front row center, then Minister of Agriculture, Food Security and Cooperatives

Launch of OFAB-Tanzania

It was evident that the level of awareness and understanding of modern biotechnology was alarmingly low among Tanzanians – from the general public to policy makers – at the time the government was establishing the regulatory framework. Key stakeholders including policy and decision makers, research managers and scientists had inadequate knowledge on modern biotechnology. This was attributed to the fact that factual information on modern biotechnology was not forthcoming or easily accessible but worse still, that the only information easily accessible was the misinformation, lies and myths that were being peddled by the anti-GMO activists. Biotechnology stakeholders in Tanzania realised that they needed a platform that would facilitate sharing of factual information and knowledge on modern biotechnology while also ensuring public or stakeholder engagement in the development and commercialisation of GMOs in the country. This was in the understanding that stakeholder awareness and understanding was not only critical in successful application of modern biotechnology, but also on the acceptance of the derived products.

On 25 May 2009, AATF in partnership with COSTECH and other stakeholders launched the OFAB-Tanzania Chapter. The Chapter, which is domiciled at COSTECH, aims to create and increase awareness and knowledge on modern biotechnology, and build trust between scientists and society. The ceremony was presided over by Hon. Stephen Wasira, then Tanzania's Minister for Agriculture, Food Security and Cooperatives.

Achievements

Over the last eight years, OFAB-Tanzania has successfully brought together stakeholders in the modern biotechnology sector – scientists, lawmakers, policy and decision makers, industry, the civil society, the academia and journalists. OFAB has provided these stakeholders with an opportunity to interact, share information, knowledge and experiences, and explore new avenues of bringing the benefits of modern agricultural biotechnology to Tanzanians. OFAB efforts to engage the various stakeholders have resulted in an improved modern biotechnology environment in the country. The various sensitisation meetings and the coordinated provision of factual information have increased awareness, understanding and appreciation of biotechnology among the various stakeholders. Stakeholder engagement and participation in OFAB events has profoundly built their trust in modern biotechnology. Strategic engagement of policy makers has resulted in the country revising its restrictive laws to allow for research and development of GMOs.

Participants learning during a grassroots biotech sensitisation meeting in Mtwara District, Tanzania.

Increasing awareness, expanding knowledge on biotech

OFAB-Tanzania has been at the forefront of creating awareness and understanding of biotechnology. It has held various workshops for stakeholders including researchers, university academics, students, the media, farmers, regulators, policymakers, parliamentarians, and the general public among other interest groups. Initially, like in other OFAB Chapters, the discussions took the form of a monthly lunch meeting in the city of Dar es Salaam that provided an opportunity for key stakeholders to know one another, share knowledge and experiences, make new contacts and explore new avenues of bringing the benefits of biotechnology to the African agricultural sector. These activities have since devolved to regional and district towns, rural areas, targeting farmers, university and other college communities in the targeted areas and local journalists. A community dynamic approach is used for maximum impact.

During the forums, scientists make formal presentations or informal discussions focusing on the relationships between science, technology, innovation, environmental protection, policy, trade, social benefits sharing and their impact on socio-economic development. The community forums have been helpful in sensitising farmers about diseases ravaging their crops and available solutions to those diseases. These forums were also critical to building trust among the various stakeholders. Dr Flora Tibazarwa, the immediate former Director Life Sciences at COSTECH hails OFAB-Tanzania for demystifying the science behind agricultural biotechnology.

Policy intervention

When OFAB-Tanzania was launched in 2009, the country had a very restrictive regulatory framework with literally no research and development on GMOs in the country. Today, the country is conducting confined field trials (CFTs) of a drought-tolerant GM maize hybrid developed by the Water Efficient Maize for Africa (WEMA) project. This first GM maize research trial was planted on 5 October 2016, in Dodoma region. The Tanzanian Biosafety Authority in August 2016 granted a permit to COSTECH and the Division of Research and Development of the Ministry of Agriculture, Livestock and Fisheries (MALF) under the WEMA partnership to start the CFTs for the GM maize. In addition, the WEMA partnership has already submitted another application start CFTs for insect-resistant GM maize in the second half of 2017. Besides maize, scientists from Mikocheni Agricultural Research Institute (MARI) and MALF are developing GM cassava varieties tolerant to cassava mosaic disease (CMD) and cassava brown streak disease (CBSD).

All these are now possible because the country, in February 2015, revised and adopted a more enabling legal framework for the acquisition, research, development and utilisation of modern agricultural biotechnology, courtesy of concerted efforts of OFAB and like-minded partners. Through a series of advocacy initiatives, from information and knowledge sharing, education and sensitisation to capacity building, policy makers were able to understand and appreciate

Farmers being sensitised on the use social media platforms to exchange information of farming challenges they face during an OFAB grassroots meeting in Matukupora, Tanzania

modern biotechnology as a tool that has potential to enhance agricultural productivity and consequently improve food security and livelihoods.

The strategy successfully changed the mindsets of the targeted Members of Parliament and other top policy and decision makers in the country. Indeed, it had a turning point when Jakaya Kikwete and Mizengo Pinda, the immediate former President and Prime Minister of Tanzania respectively stated at the inauguration of the genetic engineering laboratory at the Mikocheni Agricultural Research Institute in Dar es Salaam on 19 March 2013, that Tanzania needed to urgently adopt modern biotechnology. This was after OFAB had organised a briefing session by scientists for the immediate former President, his Prime Minister and several cabinet ministers who also vouched for the speedy adoption of the technology in the country.

Hon Adam Kighoma Malima, former Tanzanian Deputy Minister for Agriculture and then Finance, Patron of OFAB – Tanzania, observes that biotechnology offers great hope as it directly addresses challenges faced by farmers in Africa especially the high cost of farm inputs, frequent droughts, lack of water and poor crop varieties. Hon Malima acknowledges that the country had taken that long to embrace modern biotechnology due to misinformation peddled by anti-biotech activists who often portray biotechnology as a dangerous science. He believes that OFAB's intense awareness and education campaigns have helped farmers, policymakers and other stakeholders and decision-makers to gain adequate knowledge on biotechnology, its impacts, as well as the potential for socio economic development.

Dr Alois Kullaya, the WEMA Project's Country Technical Advisor and also a former plant breeder at Mikocheni Agricultural Research Institute, attributes the improved policy environment to the OFAB's policy advocacy efforts.

One of the key strategies for creating awareness, understanding and appreciation of modern agricultural biotechnology has been the seeing-

Former Tanzania President Jakaya Kikwete durng the inauguration of the genetic engineering laboratory at Mikocheni Agricultural Research Institute, Dar es Salaam on 19 March 2013

is-believing tours for policy and decision makers to witness ongoing biotechnology research and development activities in neighbouring countries. These tours have been so effective in changing attitudes towards agricultural biotechnology. For instance, in November 2014, OFAB and like-minded partners organised a seeing-is-believing tours cum fact-finding mission for about 30 Tanzanian policy and decision makers, legislators, scientists and journalists to Uganda. Led by Hon Dr Binilith Mahenge, the State Minister for Environment in the Vice President's Office, the delegation visited the National Crops Resources Research Institute (NCRRI), Namulonge and the National Agricultural Research Laboratories at Kawanda that are conducting CFTs for GM maize, cassava and bananas. The tour had a profound effect on the delegation. Within six months after the tour, Tanzania revised and replaced the strict liability clause in the Environment Management Biosafety Regulations with the fault-based liability. Under the revised law, anyone claiming compensation for damage would have to prove that whoever introduced the GMOs was actually at fault.

Even more notable in terms of entrenching sustainable policies, Tanzania's political parties incorporated biotechnology development in their manifestos during the just concluded general elections.

According to Dr Nicholas Nyange, former Chief Research Officer at COSTECH, one of OFAB's greatest achievements was in successfully advocating for a more enabling regulatory regime for scientists to now carry out full research on GM crops without fear of victimisation and prosecution based on hearsay backed by a non-enabling law.

Empowering journalists

OFAB-Tanzania recognised the crucial role of the media in development, in adequately informing and educating the citizens, in popularising government programs, and in shaping opinions, attitudes and perceptions. OFAB-Tanzania supported the establishing of Tanzania Agricultural Journalists Forum (TAJF) in 2014, with a mission to enhance information sharing and awareness on agricultural practices that will raise understanding and contribute to building an enabling environment for informed and timely decision-making among stakeholders. When launching the forum in 2014, the number of TAJF journalists was less than 20, but currently the number has swelled to more than 100 across the country. OFAB, therefore, engaged the media

as partners in creating an enabling environment for research, development and commercialisation of GMOs.

Just like other Tanzanians, journalists' understanding and knowledge of modern biotechnology was very low, a factor that negatively impacted on their reporting resulting in very sensational, biased and misleading articles on the subject. To change this, OFAB-Tanzania undertook a series of capacity building initiatives including trainings on agricultural biotechnology for journalists, field and study tours. The OFAB events and workshops proved very effective platforms for journalists to get factual information on agricultural biotechnology, interact and build trust with scientists, and generally get to understand issues and facts about modern agricultural biotechnology. This was critical considering the communication barriers and mistrust that existed between the journalists and the scientists.

OFAB successfully mobilised over 40 scientists who came out strongly to own the science and inform and educate journalists and other stakeholders on various aspects of biotechnology while addressing their concerns and questions. Those invited for training and laboratory visits included editors, sub-editors and correspondents.

These media sensitisation and capacity building initiatives have been very effective in changing how the media reports on biotechnology. According to Philbert Nyinondi, the National Coordinator of OFAB-Tanzania, media reporting on agricultural biotechnology has more than tripled to a total of about 240 annually in both print and broadcast media. More importantly, the reports are now more factual and balanced unlike the false, fear-mongering and negative reports that used to be published before 2009.

Gerald Kitabu, TAJF Chairperson and a journalist from the *Guardian* newspaper, is one

Courtesy of TAJF: Farmers' voices recording for broadcasting in major TVs

of the beneficiaries of OFAB capacity building initiatives. The trainings, he notes, have greatly helped create awareness and continuously improved reporters and editors' knowledge on agricultural biotechnology. This has led to a remarkable increase in the number and quality of biotechnology stories being published by many media houses.

Another journalist Elias Msuya from *Mwananchi* newspaper attributes his improved reporting on biotechnology to the trainings he has received from OFAB. 'I first learned about biotechnology when I attended an OFAB meeting. I was really impressed with the factual information presented by the scientists, the potential of the technology to revolutionise agriculture and its associated socio-economic and environmental benefits. I am now capable of differentiating between scientific facts and myths. Through the meetings, I have developed good relations with scientists who are now more willing to clarify issues and simplify technical scientific stuff to me.'

Way forward

OFAB-Tanzania will build on the successful strategies but also seek new strategic approaches in engaging more farmers and the public. This is important considering that opponents of biotechnology and GMOs in particular are also devising new strategies of misleading sections of journalists, farmers and communities including opinion leaders who still do not understand the science and importance of modern agricultural biotechnology. The future capacity building initiatives will be focused to agricultural extension officers, who farmers rely on for information and advice on agricultural technologies.

Chapter 8

OFAB-Ghana

Introduction

The Government of Ghana has long recognised the potential of modern biotechnology in improving agricultural productivity and ultimately food security. However, like many other African governments, the road to embracing the technology and commercialising GMOs has been bumpy, long and winding. Ghana's National Science, Technology and Innovation Policy recognises the great potential of modern biotechnology as a driver of the country's socio-economic development as one that can significantly contribute to food security, poverty alleviation and environmental conservation. It took over 15 years for Ghana to put in place appropriate and transparent decision-making mechanisms for modern biotechnology.

'The government has taken this line of action because it sees great potential in modern biotechnology and has, therefore, cited it in the National Science Technology and Innovation Policy as one of the precision technologies to be adopted to enhance the socio-economic development of the country.'

Minister of Environment, Science, Technology and Innovation (MESTI), ***Akwasi Opong-Fosu*** *(February 2015)*

The government made its intentions to embrace modern biotechnology known way back in 2002, when it established the National Biosafety Committee with a mandate to draft the Biosafety Bill, produce guidelines for the implementation of the Biosafety Law, and to help the government to address biotechnology issues. While the all-inclusive Committee fulfilled part of its mandate in 2004 when it finalised the Biosafety Bill in 2004 and produced the National Biosafety Framework and Biosafety Guidelines, it was not until 2011 that the Bill was finally passed into law. It took another six years for the government to fully constitute the National Biosafety Authority (NBA) to manage the implementation of the Biosafety Act 2011 and initiate the process of drafting necessary biosafety regulations and guidelines.

While successive governments have fully supported modern biotechnology, failure to put mechanisms in place for commercialisation of the technology has partly been due to spirited campaigns and activism against the technology. This has been compounded by the fact that Ghana, like many other African countries, adopted a precautionary approach to modern biotechnology based on the premise that it had potential adverse effects on the environment and health of the people.

Despite the accumulated evidence of the growing popularity of GM crops worldwide due to realised benefits, and lack of any scientific proof of the perceived risks, anti-GM groups led by the-so-called Food Sovereignty Ghana, still managed to convince some law and policy makers in Ghana that the technology was not good for the country. Their campaigns were in part aided by the fact that many policy and decision makers were not well informed and knowledgeable on modern biotechnology. They were confronted with contradictory sources of information yet they need guidance to make the right decisions. Scientific facts were often mixed with social, ethical and political considerations.

What Ghana needed most was capacity building outreach programs that would support science-

The OFAB-Ghana Chapter was launched in Accra Ghana on 18 August 2011

based regulatory efforts and provide accurate information to policy makers and the broader public on the benefits of biotechnology. Increased awareness and knowledge on biotechnology was critical in creating a favorable environment – both regulatory and public perception - for the acquisition and application of modern agricultural biotechnology.

The launch of OFAB-Ghana

The indecision of many Africa governments over modern agricultural biotechnology and its application is mainly due to the intense debates from pro- and anti-GMO groups. Despite the numerous scientific studies and evidence-based fact finding missions that have proved that modern agricultural biotechnology derived products are economically viable, environmentally sustainable and as safe as their conventional counterparts, anti-GM activists continue flaring up the debate on hypothetical health and environmental risks and intellectual property issues.

While majority of Ghanaians are indifferent to GMOs, they are willing to learn and get facts on the technology. There was also need to manage the increasingly vocal presence of anti-GMO groups in the country clamouring for a complete halt of development and commercialisation of any genetically modified products through misinformation campaigns, protests, and civil suits against the government. It was time for biotechnology stakeholders to take a pro-active approach and counter the anti-GMO narrative.

OFAB-Ghana Chapter held awareness creation meetings with the country's Parliamentarians

Against this backdrop, AATF in collaboration with the Council for Scientific and Industrial Research (CSIR), on 18 August 2011, established the OFAB-Ghana Chapter with a vision to promote and sustain a well-informed and interactive society capable of making informed policy decisions on research, development, regulation and commercialisation of agricultural biotechnology products. Its mission is to facilitate and promote dialogue and collaboration among diverse stakeholders in agricultural biotechnology through constructive discourse and networking nationally and internationally.

Like other Chapters, OFAB Ghana brings together stakeholders to discuss, network, interact and share knowledge and experiences about farming in general and biotechnology in particular and explore new opportunities for adopting the technology.

Since its launch, the Chapter has been involved in various outreach activities and communication initiatives aimed at creating awareness and sharing of factual information and knowledge on biotechnology among the stakeholders and target groups with the aim of creating an enabling regulatory environment for research, development and commercialisation of GMOs in Ghana.

Ghana's Traditional Chief: Amakroa Diawuo, Akyempimhene of Domase No. 1 Traditional Area, attending OFAB consultative meeting

The Chapter has successfully conducted awareness creation workshops for stakeholders including lawyers, students, journalists, traditional rulers, community elders, teachers, seed traders, farmers, fishermen, regulators, legislators among other stakeholders all over the country.

Considering the numerous court cases by anti-GMO activists seeking to delay research and development of biotech products, OFAB trained several lawyers on biotechnology to increase their understanding and knowledge of the technology and issues. This was critical for the lawyers to be able to credibly defend the cases from a scientific point of view. In total 40 lawmakers and eight clerks of various parliamentary committees were sensitised on the science and benefits of modern biotechnology.

To cover the country with credible information on agricultural biotechnology, OFAB-Ghana devised a regional outreach approach that targeted traditional kingdoms, with the respective paramount chiefs becoming the main community entry points. This strategy conferred the chief's authority to OFAB's activities making them more believable and acceptable to the chief's subjects. The impacts of the activities were instant with farmers demanding immediate access to the GM crops and chiefs convening meetings with political leaders to request that all be done to avail the innovative crop varieties to their farmers.

Starting with the Asantehene (the king of the Asante Kingdom) in Kumasi in the Ashanti region, the project went on to reach out and create information nodes in all the regions including:

- Wa (Upper West Region)
- Sunyani (Brong Ahafo Region)
- Akwesi Nyarko (Eastern Region)
- Nyankpala (Northern Region)
- Techiman (Brong Ahafo Region)
- Kasseh (Greater Accra Region)
- Juapong, Frankadua, Likpe Bala and Hohoe (Volta Region)

The monthly awareness creation sessions are enabling smallholder farmers and other stakeholders to make informed decisions on

agricultural biotechnology. Farmers and other participants use the forums to seek clarifications on issues surrounding GM crops.

Forging strategic alliances

Advocacy is best done in a coalition of like minds. Thus OFAB-Ghana created and leveraged a number of strategic alliances and networks. To be more effective, the Chapter first went for strategic alliances with key farmer groups such as:

- Ghana National Association of Farmers and Fishermen (GNAFF)
- Nyankpala: Suluduw Farmers Associations
- Seed Producers Association of Ghana (SEEDPAG)
- Savelugu, Wa, and Nadowli Farmers Association
- Savelugu Rice Multi-Stakeholder Platform
- Nadowli District Farmers Association
- Cotton Farmers Association

These associations have been leveraged for sustainable biotech outreach in the country. They also come in handy to defend the technology from anti-GMO activists making it clear to the policy makers and the courts that they are ready to adopt and grow GM crops. For example, GNAFF joined the case against the Ghana Government filed by the activists praying for stoppage of all GMO research activities in the country. The government won the case.

In addition, bolster its operations and deepen its impacts, the project formed synergistic partnerships with like-minded organisations like African Biosafety Network of Expertise, Cornell Alliance for Science, Program for Biosafety Systems, USAID, national seed companies, ministries of Health; Agriculture; Science Technology and Innovation; Local Government; the Attorney General's Department, Ghana Union of Journalists, and University of Ghana, among others.

Through these partnerships, OFAB-Ghana successfully recruited biotech champions and created training opportunities for some members. For instance, some OFAB-Ghana partners have been trained on biotechnology at Cornell University in the US, courtesy of

OFAB team participants at the Cornell Alliance for Science Biotech Global Leadership Program

partnerships with the Cornell Alliance for Science, which helps strengthen the capacity of biotech advocates in SSA.

The Chapter has also made efforts to entrench and promote teaching of modern agricultural biotechnology in secondary and tertiary institutions. It has further assisted in the formation of teachers and students' biotechnology clubs in all the regions of Ghana as listed above.

Seeing-is-believing tours

Another effective strategy for awareness creation and changing attitudes was field visits or seeing-is-believing tours. In June 2014, OFAB-Ghana organised a field trip to the CFTs of NEWEST rice at Nobewam and Premium Food Limited in Kumasi for 30 farmers. The Chapter also organised more field trips to the Western region (Takoradi), Ashanti region (Kumasi), and Northern region (Nyankpala, CSIR-SARI). Farmers from the northern regions visited Burkina Faso *Bt* cotton fields in seeing-is-believing tour. OFAB-Ghana also hosted Burkinabe farmers who were taken to the NEWEST rice CFT in Kumasi.

The field visits gave the participants a real life experience of the potential impact of GM crops on productivity. They developed positive perceptions and attitudes towards the GM crops, an important factor in their acceptance of the technology. For instance, farmers who visited Burkina Faso have been piling pressure on the government to allow for importation of the Bt cotton seeds for them to start planting.

Policy engagements

When OFAB-Ghana was launched on 18 August 2011, Ghana did not have the prerequisite laws and regulatory regimes for commercialisation of GMOs. A lot has since changed and the country is now poised to commercialise GMOs.

Three months after the launch of OFAB-Ghana, the Biosafety Bill that had been in and out of Parliament since 2004 was passed into law. This paved the way for the President to sign it into an Act of Parliament: the Biosafety Act 2011 (Act 831). Through concerted advocacy efforts the Government of Ghana finally inaugurated the National Biosafety Authority (NBA) in February 2015 that was mandated by Biosafety Act 2011 to oversee the regulation of modern biotechnology in Ghana, in line with Ghana's obligation under the Cartagena Protocol on Biosafety.

While swearing in the NBA members, Mr Akwasi Opong-Fosu, who was the Minister for Environment, Science, Technology and Innovation (MESTI), said that: 'the government had taken this line of action because it sees great potential in modern biotechnology and has, therefore, cited it in the National Science Technology and Innovation Policy as one of the precision technologies to be adopted to enhance the socio-economic development of the country.'

Due to the enabling regulatory environment, Ghana is now conducting research on three GM crops. The Crop Research Institute (CRI) in partnership with AATF and the International Institute of Tropical Agriculture (IITA) are conducting CFTs (NEWEST) rice. The Savanna Agricultural Research Institute (SARI) in collaboration with AATF is conducting multi-locational trials for *Bt* cowpea resistant to the *Maruca* pest.

Empowering journalists

Journalists have been a major target by the anti-GMO activists with propaganda against modern biotechnology. They were fed with myths, lies and misinformation which they could not verify or corroborate due to the fact that they also did not have good working relationships with scientists with whom they had mistrust.

OFAB-Ghana therefore initiated a series of capacity building initiatives on biotechnology for journalists while forging mutual trust and relationships between scientists and members of the fourth estate. Journalists were invited to OFAB workshops, not to cover the event *per se*, but as stakeholders to learn and share their experiences on agricultural biotechnology, as participants to interact and network with other stakeholders in the industry.

Castro Zangina-Tong, a long serving journalist with Ghana News Agency (GNA), best captures the transformation in reporting on biotechnology brought about by OFAB-Ghana capacity building initiatives: 'The relationship between journalists and scientists was terrible a few years back as most scientists did not like talking to us, a trend that made most journalists shy away from covering science. However, the relationship has greatly improved since we started interacting with the scientists during the OFAB meetings. We have since formed a formidable working relationship with scientists. They have now found it necessary to answer our calls, clarify issues and provide factual information whenever requested. As a result of the collaboration, scientists are today appearing and engaging interviewers on biotechnology issues in international, national and local languages in radio and television studios.

'The OFAB workshops and particularly the training sessions on the biotechnology and reporting on the subject, have contributed to the increased number of journalists in science writing. Many of us now understand biotechnology and are now able to effectively report on it. Our collaborating scientists are now helping us to get facts right, and to differentiate opinion, myths and lies from scientific facts. Besides scientists, the workshops have also enabled us to interact with legislators and other stakeholders, in effect widening our sources of news. The press conferences organised by OFAB-Ghana have been really helpful in setting the records straight and countering well-orchestrated anti-biotech propaganda disseminated by some national and international anti-GM groups.'

While the level of reporting on biotechnology has indeed improved, OFAB-Ghana will still require training of more journalists to attain a critical mass of writers and editors in the newsrooms. There is need to target newly employed journalists and editors who might not understand biotechnology considering that opponents of the technology are likely to take advantage of such journalists.

Way forward

Considering the growing intensity of campaigns by the anti-biotech groups, OFAB-Ghana will also need to heighten its community outreach and high-level policy advocacy campaigns. The Chapter also plans to expand its network of stakeholders. For instance it will bring on board medical, livestock, professional associations and extension staff.

Chapter 10

OFAB-Ethiopia

Introduction

As early as 1993, Ethiopia had recognised the potential of modern biotechnology in transforming agriculture. The National Science and Technology Policy of Ethiopia that was formulated in 1993 prioritised the application of biotechnology for increased productivity and competitiveness of Ethiopian agricultural products in national and international trade. However, what followed was almost a decade of behind the scenes machinations by anti-GMO activists that kept the development and application of modern biotechnology out of the country.

Consequently, Ethiopia was among the first countries to adopt the restrictive African Biosafety Model Law. To compound matters, the government adopted the Biosafety Proclamation and Biosafety Directives in 2009 that in all intent and purposes banned research, development and commercialisation of GMOs in Ethiopia.

The hard line positions taken by some technocrats holding influential government positions contributed significantly to information and knowledge gaps among key policy makers and stakeholder institutions, not only on the science but also the potential values or contributions of some biotechnological tools and products. It was difficult for them to make informed decisions. Generally, public awareness concerning impacts of biotechnology was negligible to a great extent. These alarmingly low levels of awareness and understanding were ideal environments for anti-GMO movement to thrive, to perpetuate propaganda, lies and misinformation to the policy makers and the public.

The Global Agricultural Information Network (GAIN), in its 2015 annual report, acknowledges that indeed, there was a very small segment of the population who were aware of biotechnology.

The launch of OFAB-Ethiopia in June 2014 has remarkably contributed to the changing

The consultative and training workshop on biotechnology held on 25 May 2016 in Addis Ababa for the Ethiopian House of Peoples Representative standing committees of Agriculture Affairs, Pastoral Affairs, Natural Resource and Environmental Protection Affairs and Science, Communication and Technology Affairs organised by Ethiopian Institute of Agricultural Research (EIAR) collaborating with Agriculture Transformation Agency (ATA), OFAB and Ministry of Environment, Forest and Climate Change (MoEFCC)

biotechnology landscape in the country. The Chapter, which is the the seventh and the latest, is hosted by the Ethiopian Institute of Agricultural Research (EIAR).

Key achievements

Since the launch, OFAB-Ethiopia has developed and aggressively implemented innovative advocacy strategies targeting various key stakeholders. The Ethiopian Government's endorsement of modern agricultural biotechnology as a tool for agricultural transformation in the country is a great milestone. More important is the government's commitment to promoting modern agricultural biotechnology through creation of enabling regulatory environment and initiatives aimed at building both human and institutional scientific capacities. The government is also directly funding various aspects of agricultural biotechnology development.

A case in point is when the government acquired a loan from the World Bank for the construction of a laboratory complex comprising of molecular, animal biotechnology, microbial biotechnology, and plant tissue culture laboratories. The complex also has offices, greenhouses, tunnel house and other support facilities.

Facilitating policy revision

Immediately after it was launched, OFAB and its partners, such as ABNE, embarked on a series of consultative and training workshops on biotechnology for policy makers and other key stakeholders. These consultative and training workshops for policy makers were so successful that, within a year, the policy makers and legislators, appreciated the role of modern agricultural biotechnology. In June 2015, the consultations and training paid off when Ethiopia's Parliament adopted an amendment to the Biosafety Proclamation with the express purpose of laying the regulatory framework to allow farmers to plant GM crops such as biotech cotton in order to meet the rising demand from the rapidly-expanding textile and apparel sector and to buttress Ethiopia's food security.

On 14 August 2015, the Prime Minister assented to the amendments, finally opening the doors for collaborative research and development of GM crops. The country is now conducting multi-locational trials for *Bt* cotton and basic research to transform Ensete (false banana) in a lab and greenhouses at Biosciences East and Central Africa (BecA) in Nairobi in search of bacterial wilt resistant varieties.

This was a major victory over the anti-GM activism community that for long had perpetuated unfounded concern that the cultivation of biotech crops in Ethiopia will result in the country being shutoff to lucrative export markets in Europe, says Dr Endale Gebre, who is the National Coordinator of OFAB Ethiopia. Given the country's economic dependence on

OFAB planning meeting 2016 held in Ethiopia

exports, this is probably the most compelling, but misplaced argument against the technology.

According to the GAIN report, anti-GMO lobby groups discouraged the government from ratifying the newly-revised Biosafety Proclamation citing concerns that the introduction of the technology, even GM cotton, would cause Ethiopia to sacrifice its rich biodiversity and cause irreparable damage to the environment.

Ethiopia which hosts African Union (AU) headquarters, and is the second most populous African nation with 101.7m people in 2016 according to Population Reference Bureau, has been a key target of anti-biotech groups. Even so, successful adoption and commercial release of GM crops will certainly have positive widespread multiplier effects in the horn of Africa region, says Dr Endale.

Media engagements

In recognition of the role of the media as a primary and preferred source of information on science and technology by the public or consumers, OFAB deliberately engaged the media with the aim of providing people with factual and credible information on agricultural biotechnology. Considering the low awareness and understanding of biotechnology among the media fraternity, OFAB Ethiopia conducted media training workshops aimed at improving the journalists' understanding and perceptions of agricultural biotechnology. OFAB has exposed journalists to the science, trained scientists on how to engage with the journalists and facilitated seeing-is-believing tours to countries that have commercialised the technology.

Indeed, there have been great improvements in the quality and quantity of biotechnology coverage in the country.

Through the workshops and other OFAB sessions, journalists get accurate, factual and timely information that help them come up with balanced and credible articles, a clear indication of their newly acquired understanding and appreciation of the science. Unlike before, reporting on biotechnology is now more factual, accurate and balanced devoid of sensationalism.

More importantly, the collaboration has helped create more space and opportunities for science articles in the media houses compared to the past when science and technology articles were hardly carried by the media houses.

However, the high number of trained journalists leaving the media houses is worrying. This calls for more trainings to attain the required critical mass of knowledgeable journalists on agricultural biotechnology, and consequently sustain the heightened and improved quality and quantity of media coverage.

Awareness creation

OFAB-Ethiopia established two nodes countrywide to help create awareness in diverse regions in the country. Besides being centers for information and knowledge sharing, the nodes offer farmers and other stakeholders a platform to raise and discuss issues on modern agricultural biotechnology they consider pertinent. These nodes have strategically been established in places with on-going research on agricultural biotechnology such as the multi-locational CFT sites for *Bt* cotton. Establishing the nodes in far flung rural areas also has the added advantage of fostering local ownership of the process of creating awareness and advocating for acceptance of agricultural biotechnology.

These nodes are established after consultations with stakeholders in the region. For instance, the South Node was established after OFAB held the South Node Establishment Workshop on 16 January 2016, at Arba Minch University. The Node provides a platform for information and knowledge sharing among the Arba Minch and Wolaita Sodo universities, and neighbouring communities. There are plans to establish five more nodes to help create more awareness in diverse regions of the country.

With the awareness campaigns devolving to the nodes, the deliberations during the sessions should increasingly be held in local languages, according to Belete Geda, Biosafety Affairs Officer at the Directorate of Regulatory Authority. This is critical in reaching out to rural people, majority of whom are semi-literate.

OFAB-Ethiopia has also effectively used field visits, study tours and exchange programs to raise awareness, knowledge and appreciation of modern agricultural biotechnology among the various stakeholders in the country including journalists, entrepreneurs, policy makers and biotechnology experts. These field visits, study tours and exchange programs are so popular in changing mind sets that Yohanes Sitotaw, the National Research Ethics Review Committee Secretary of the Ethiopian Ministry of Science and Technology, appeals to OFAB to increase them to enable more researchers to see what other countries are doing with the aim of making them believe in the technology and more importantly emulate the best practices experienced.

And with the growing popularity of biotechnology in higher institutions of learning in Ethiopia, OFAB now plans to introduce the subject in high schools. In addition to intensifying awareness creation about the technology in all schools, plans are underway to have the countries academic curriculum changed to include biotechnology. This is a plan that has been hailed by Prof Tesfaye Sisay Tessema, Director, Institute of Biotechnology, Addis Ababa University. He believes teaching of biotechnology alongside other science subjects in secondary schools will help in early exposure of students to the subject and increase their understanding.

Jeilu Jemal, Animal Biotechnology Research Coordinator at EIAR, praises the OFAB approach that has uniquely created awareness, understanding and appreciation of biotechnology among agriculture students. Since the launch of OFAB in Ethiopia, about 1,000 students have attended OFAB sessions.

Stakeholder engagement

OFAB has successfully engaged various stakeholders in charting the way forward on the development and adoption of modern agricultural biotechnology. According to Dr Endale, this is a major achievement considering that government institutions lacked the capacity and resources in establishing such a platform to engage the various stakeholders with complex and evolving levels of awareness, understanding and perceptions towards agricultural biotechnology.

Through OFAB, the various stakeholders – policy makers, researchers, regulators, legislators, scientists, farmers and journalists – share their experiences and discuss various aspects of modern agricultural biotechnology while generating new, mutually acceptable knowledge, attitude, and practices. It is a platform that has been very successful in improving relations and engagement between researchers, journalists and farmers.

Dr Endale believes that this engagement which has encouraged participation by various stakeholders and fostered understanding, appreciation of agricultural biotechnology and the underlying scientific process has greatly contributed to the review and amendment of the regulatory regime to allow for research, development and commercialisation of GMOs.

Next steps

With a favourable regulatory regime in place, the focus now shifts to efforts to fast-track deregulation and registration of GM crops. This will, to a large extent, depend on key ministries forming an inter-ministerial committee to help fast track issues as they arise without delays. A tight-knit inter-ministerial engagement for making approvals is a critical component for a favourable environment for development of modern agricultural biotechnology, according to Dr Endale and Dr Berga Lemaga, a researcher with the Centre for International Potato (CIP). Dr Lemaga was instrumental in helping to establish the OFAB-Ethiopia Chapter while he was working with the Ethiopian Agency for Agricultural Transformation.

Chapter 11

Lessons Learnt and Way Forward

African governments recognise the potential role of modern agricultural biotechnology in transforming their agricultural productivity, in turning their agriculture from subsistence to commercial and more importantly, in securing the elusive food security. However, the road to commercialisation of modern agricultural biotechnology, and genetic engineering in particular, has not been smooth in Africa. After more than two decades of commercialisation of GM crops, only four countries – Burkina Faso, Egypt, South Africa and Sudan – out of the 55 countries in Africa have ever commercialised GM crops. More efforts are needed to foster greater awareness and understanding to bring about a positive and enabling environment for sustainable uptake of modern agricultural biotechnology.

There is a lot to be learnt from OFAB's ten years of biotech advocacy, lessons that will prove critical in formulating strategies for increased uptake of and better understanding of the changing regulatory environments of modern agricultural biotechnology. Providing factual information is key to fostering understanding of modern biotechnology. However, it is not enough to elicit action especially in a world where opinion is highly divided on modern biotechnology. Engagement of the stakeholders is equally important and a critical factor in changing attitudes and perceptions on the technology. Information sharing, advocacy, communication, grassroots campaigns and networking have been key to OFAB's success in influencing policy and attitudes of the various stakeholders in the seven countries it is operating in.

Engagement with scientists to transform them from mere researchers into champions and spokespersons participating in the biotechnology advocacy and communication campaigns process is crucial to the acceptance of biotech products by various stakeholders in SSA. OFAB will need to continue fostering this transformation to build a strong and effective critical mass of scientists willing to own up to the technology and their research and convincingly share easy to understand information and knowledge with crucial stakeholders like policy makers, farmers and the media.

Identifying and engaging champions of modern agricultural biotechnology has been a key OFAB strategy for acceptance of the technology. Having for instance His Majesty Patrick Ouedraogo, an influential Chief of Mossi community in Northern Burkina Faso, as a champion really helped to rally farmers in the region to overwhelmingly adopt *Bt* cotton. There is need to engage more opinion leaders as influential as His Majesty Ouedraogo as champions from law and policy makers, academicians, researchers, journalists, and other cadres of people who are well-informed, have high credibility in society and are willing to promote modern agricultural biotechnology.

Devolving awareness creation and knowledge sharing initiatives to the grassroots remains a priority. Engaging people in rural areas will enable them to understand and appreciate the unlimited potential of the science behind biotechnology. While OFAB has done a lot in simplifying the technical and scientific language of biotechnology, translating this into local languages will be critical especially as OFAB reaches out to rural populations through its grassroots/community mobilisation initiatives.

While a lot has been achieved on creating awareness and understanding on genetic engineering, OFAB will need to expand mandate to include creating awareness and understanding on some of the rapidly emerging advances in biotechnology such as gene editing that have a lot more potential and have the ability to address concerns about risks around modern biotechnology.

One of the key focus areas for OFAB will be ensuring that there is coherent position among government agencies and within key government ministries – agriculture, health, science, and environment – and regulatory agencies, who at times appear to be reading from different scripts. In addition, establishment of inter-ministerial committees on biotechnology could help fast track product approvals especially for countries with enabling legislative and regulatory environment for development of modern agricultural biotechnology.

Presence of OFAB in other African countries and particularly the 13 countries that are already conducting CFTs and have the necessary biosafety laws in place will be critical in pushing for faster adoption of GMOs in Africa.

In general, advocacy and communication campaigns will have to be sustained over the long term, considering the rising unified anti-GMO activism in Africa. This should be done collectively in a unified form for synergy and greater impact. The project needs to foster and deepen global networks to expand its influence. Pro-biotech groups' capacity building for key stakeholders in modern agricultural biotechnology such as policy and decision makers, journalists, and legislators should remain a key focus area for OFAB. The raised champions and spokespersons should be connected in a global web of foot soldiers for biotech.

Effective media engagement, too, have been found to be central to success in biotechnology advocacy. As the project enters the next decade, more efforts need to be directed towards expanding and strengthening relationships with the media.

Lastly, whereas policies to support development and use of the technology may be wanting in a number of countries, political will has also played a role. Experience shows that for all the lead countries like India, Argentina, Brazil, China, South Africa, Sudan, Pakistan, Burkina Faso, and others that have commercialised GM crops, political commitment and support to adoption of the technology came from the highest echelons of government. Such support is usually followed by establishment of science-based policy and regulatory frameworks that facilitate research, development and deployment of biotech crops. Hence, OFAB advocacy efforts shall remain sharply focused on earning good will of top political leaders to biotechnology in the next decade.

Annex 1

Members of OFAB Chapter Programme Committees

Nigeria

Name	Institution	Position
Prof Lucy Ogbadu	National Biotechnology Development Agency (NABDA)	PC Chair
Mr Rufus Ebegba	National Biosafety Management Agency (NBMA)	Member
Mr Yarama Ndirpaya	Agricultural Research Council of Nigeria (ARCN)	Member
Dr Rose M. Gidado	NABDA	OFAB Country Coordinator
Mr Benserah Aromoralan	National Agricultural Seed Council (NASC)	Member
Prof M. Ishiyaku	Institute of Agricultural Research (IAR), Zaria	Member
Mr Iro Suleiman	IAR- Zaria	Member
Mr Mohammed Ishaq	National Cereals Research Institute, (NCRI) Badeggi	Member
Mr Abu Umaru	AATF	Member
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Ethiopia

Name	Institution	Position
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D r Endale Gebre	EIAR	OFAB Country Coordinator
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Mr Taye Berhanu	Ethiopian Biodiversity Institute (EBI)	Member
Mr Belete Geda	Ministry of Environment and Forestry (MoEF)	Member

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Ghana

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Prof W.S. Alhassan		Member
Prof K. Danso	GAEC-BNARI	Member
Mr Daniel Ofosu	PBS/GAEC-BNARI	Member
Dr Richard Ampadu-Ameyaw	CSIR-STEPRI	Member
Mr Rodney Owusu-Darko	Biotechnology Centre, University of Ghana	Member
Mr Castro Zangina-Tong	Ghanaian Times	Member
Mr Rufai Braimah	CSIR-FRI	Member
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Uganda

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Mr Kimera Henry Richard	Consumer Education Trust (CONSENT)	Member

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Mr Herbet Oloka	Program for Biosafety Systems	Member
Mr Arthur Makara	SCIFODE	Member
Dr Barbara Zawedde	Uganda Biosciences Information Center	Member
Mr Erostus Nsubuga	Uganda Biotechnology and Biosafety Consortium	Member
Mr Ronald Jjagwe	UNCST	Member
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Kenya

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Dr Simon Gichuki	KALRO	Member
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Burkina Faso

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