

Biotechnology as a Tenable Solution to Address Hunger in Africa



INTERNATIONAL SERVICE
FOR THE ACQUISITION
OF AGRI-BIOTECH
APPLICATIONS

Proceedings
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webinar held on
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GMO

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TABLE OF CONTENT

Acknowledgment	ii
List of Abbreviations	1
Speakers and Panelists	3
Chapter 1: Preliminaries	4
1.1 Webinar Overview	4
1.2 Objectives	4
1.3 Meeting Design	4
Chapter 2: Opening and Welcoming Remarks	5
Dr. Emmanuel Okogbenin, Director, Programme Development and Commercialization, AATF	5
Chapter 3: Key Speaker Presentations	6
3.1 The role of Biotechnology in addressing crop production challenges in Africa	6
3.2 Enablers of Biotech Adoption in Africa	7
3.3 Trends in Biotech adoption for food crops - Lessons from Argentina	8
3.4 PBR Cowpea commercialisation in Nigeria	8
Chapter 4: Question and Answer: Session with the Panelists	10
Chapter 5: Conclusion	12
Chapter 6: Appendices	13
6.1 Panelists' Profiles	13

Acknowledgment

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List of Abbreviations

AATF	African Agricultural Technology Foundation
ABNE	African Biosafety Network of Expertise
CBD	Convention on Biological Diversity
CSOs	Civil Society Organisations
ECOWAS	Economic Community of West African States
FAO	Food and Agriculture Organization of the United Nations
GM	Genetically Modified
GMO	Genetically Modified Organism
ISAAA	International Service for the Acquisition of Agri-biotech Applications
NARS	National Agricultural Research Systems
NGOs	Non-Governmental Organisations
OECD	Organisation for Economic Co-operation and Development
PBR	Pod Borer Resistant
PDC	Programme Development and Commercialization
R&D	Research and Development
SSA	Sub-Saharan Africa



Speakers and Panelists



Dr. Emmanuel Okogbenin,
*Director, Programme
Development and
Commercialization (PDC), AATF*



Dr. Margaret Karembu,
*the Director of International
Service for the Acquisition of
Agri-biotech Applications (ISAAA-
Africa region).*



Mr. Godwin Lemgo,
*the Regulatory Scientific Affairs
Manager for Africa at Bayer Crop
Science.*



Prof. Martín Lema,
*an Adjunct Professor in the
School of Biotechnology at the
National University of Quilmes,
Argentina*



**Dr. Issoufou Kollo
Abdourhamane,**
Cowpea Project Manager, AATF

Chapter 1

Preliminaries

1.1 Webinar Overview

AATF held its second webinar of the year themed '*Biotechnology as a tenable solution to address hunger in Africa*'. The Webinar brought together a panel of experts to explore practical approaches to promote large scale deployment of biotechnology to enhance food security in Africa. The panel discussion focused on the role of biotechnology in addressing challenges in crop production in Africa; factors that enable biotech adoption; trends in biotech adoption of food crops, drawing on lessons from Argentina; and PBR Cowpea development and commercialisation in Nigeria.

The event moderator was the PDC Director at AATF, Dr. Emmanuel Okogbenin. A total of 103 people attended the webinar through the Zoom platform and YouTube livestreaming. Audiences were drawn from the public and private sectors including seed companies, key agriculture sector players from research centers, Non-Governmental Organisations (NGOs), Civil Society Organisations (CSOs), academia, farmer groups, national research institutions and the media.

1.2 Objectives

The webinar sought to:

- i. Explore the role of biotechnology in addressing challenges in crop production in Africa.
- ii. Highlight factors that enable biotech adoption.
- iii. Highlight trends in biotech adoption of food crops, drawing on lessons from Argentina.
- iv. Share experience on Pod Borer Resistant (PBR) Cowpea development and commercialisation in Nigeria.

1.3 Meeting Design

The meeting was a moderated panel discussion led by Dr. Emmanuel Okogbenin. The panelists were renowned experts on biotechnology development and deployment, carefully selected based on their areas of expertise as presented in Annex 1.

Chapter 2

Opening and Welcoming Remarks



Dr. Emmanuel Okogbenin, Director, Programme Development and Commercialization, AATF

In welcoming participants to the second webinar of the year, Dr. Okogbenin explained that the discussion would focus on biotechnology as a tenable solution to addressing hunger in Africa, drawing on experience and lessons in PBR Cowpea development and commercialisation in Nigeria.

He noted that the application of innovative agricultural technologies has increasingly revolutionised the agricultural sector globally, leading to improved agricultural production. However, Africa has been left behind in this upward trend due to several factors that constrain access to innovations resulting in low agricultural productivity in the region. Dr. Okogbenin observed that adoption of technologies such as biotechnologies, has been identified as critical for increasing agricultural productivity and reducing hunger and poverty in Africa. He pointed out that the benefits of biotechnologies, particularly the genetic modification (GM), have been substantiated by evidence in countries where the technology has been successfully deployed to farmers. However, access to the technology at the farm level has been constrained by several factors relating to capacity for Research & Development, policy and regulatory frameworks, institutional arrangements, and socio-economic conditions.

He noted that AATF working with its partners through the support from USAID, has successfully led the development and deployment of a GM Pod Borer Resistant (PBR) cowpea variety in Sub-Saharan Africa (SSA) that has been approved for commercial use in Nigeria and is on the verge of large-scale cultivation by smallholder farmers in the country. Dr. Okogbenin reiterated PBR cowpea's strong promise based on its current trajectory in providing plausible evidence of biotechnology as a tenable solution for addressing famine and hunger in Africa.

Chapter 3

Key Speaker Presentations

3.1 The role of Biotechnology in addressing crop production challenges in Africa



Dr. Margaret Karembu, the Director, International Service for the Acquisition of Agri-biotech Applications (ISAAA-Africa region)

Dr Karembu noted that farmers in Africa need new farming technologies to help them address the emergence of new pests and recurrent drought brought by climate change.

The adoption of these new farming tools is considered urgent because of Africa's ageing farming population hence, the need to attract youth back to farming who require efficient, smart and pleasurable tools for farming.

She observed that even as Africa is making advances in adoption and use of new farming tools, the COVID-19 pandemic and resulting economic downturn, coupled with massive outbreak of desert locusts in the Horn of Africa, are exacerbating food and nutrition insecurity for millions of people. Dr. Karembu called for the need for African populace to re-think how they [Africans] produce, process, distribute, and consume food as well as reduce food loss and waste while seeking to maximise the health of humans, animals, plants, and their shared environment.

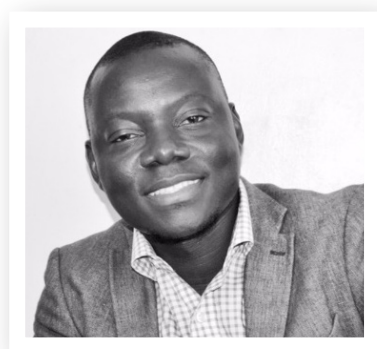
She pointed out that biotechnology, among other tools, is important to meet the 50 per cent increase in food demand by 2050, according to The Food and Agriculture Organization of the United Nations (FAO, 2017) predictions. Further, she noted that biotech crops have shown potential in addressing climate change; food losses and waste; nutrition and health; agricultural productivity and innovation; and transboundary pests and diseases.

She noted that Africa remains the region with the biggest potential to reap from the benefits associated with modern agricultural biotechnology. There has been increased awareness and appreciation of GM crops among African farmers. Thus, the continent has doubled the number of countries planting biotech crops from three in 2018 to

seven in 2019. The countries include South Africa, Sudan, Malawi, Nigeria, Eswatini and Ethiopia, with a total of 3 million hectares under biotech cultivation.

While highlighting lessons from the COVID-19 pandemic, Dr. Karembu called for the need to facilitate transition of biotech crops in research and development (R&D) pipeline to commercial release. This is due to unprecedented disruption of production and distribution of food that has further exacerbated food insecurity due to COVID-19 pandemic.

3.2 Enablers of Biotech Adoption in Africa



Mr. Godwin Lemgo, the Regulatory Scientific Affairs Manager for Africa at Bayer Crop Science

Mr. Lemgo noted that biodiversity, climate change and food security are key challenges to humankind, and sustainable agriculture plays a key role in providing solutions. With global challenges including growing population, limited resources, and pressure on ecosystems, he advised the need to link sustainability to R&D and technologies.

He highlighted political goodwill; legal and policy framework; and predictable decision making as key enablers that facilitate commercialisation of biotech crops in Africa.

Further, he observed that strong in-country stewardship support is critical in facilitating commercialization of biotech crops in Africa. The stewardship support would include having technical capacity and local infrastructure for product stewardship, government support and commitment to product stewardship and the flexibility of seed systems to support stewardship needs.

In addition, Mr. Lemgo stated that enabling innovation through R&D is key in facilitating commercialization of biotech crops in Africa by investing in local R & D capacity. This would involve working through public - private partnerships; opportunities for technology transfer; strong intellectual property protection to support innovation, local capacity and infrastructural to boost the effectiveness of national agricultural research systems (NARS) and finally, enabling environment for biotech innovation. He said a risk-proportionate, science-based and well capacitated policy and decision-making environment is also essential in facilitating commercialization of biotech crops in Africa.

3.3 Trends in Biotech adoption for food crops - Lessons from Argentina



Prof. Martín Lema, an Adjunct Professor in the School of Biotechnology at the National University of Quilmes, Argentina

Prof. Lema noted that Argentina is the third country globally in terms of biotech crop-growing, with 24 million hectares of land under cultivation with biotech crops. He stated that more than a half of export revenues coming into the country is generated from exportation of biotech crops, with the crops' economic surplus standing at 127 billion USD during the first 20 years.

He observed that GM crops don't need to be promoted by governments, but rather to adequately regulate them. He highlighted Argentina's regulatory achievements over the years that have supported the country's adoption of biotech crops: In 1991, Argentina was the first country in South America to regulate GM activities; five years later, first GM crop was approved for commercial release in the country, leading to the first national trial of GM animal in 2005. This led to recognition of Argentina as FAO Reference Center for Genetically Modified Organism (GMO) Biosafety. In 2020, the country had carried out 2,500 field trials, with 60 approved events, four recombinant veterinary vaccines and 22 gene editing products evaluated.

He noted that the country has enjoyed implicit trust on biotechnology with lack of rejection that could hamper its deployment. This is coupled with functional & working, politically stable regulation with agri-food innovation as a positive value add to national development. He cited lack of propaganda on GM-derived foods as another way that has propelled acceptance of GM crops in the country.

3.4 PBR Cowpea commercialisation in Nigeria



Dr. Issoufou Kollo Abdourhamane, Cowpea Project Manager, AATF

Dr. Issoufou noted that Pod Borer Resistant (PBR) Cowpea will increase food security and combat hunger in Nigeria, adding that large scale adoption of PBR Cowpea will boost the crop production in Nigeria and improve yields by 70 – 400 per cent compared to

the conventional varieties, with reduced use of pesticides by farmers from ten sprays per cropping season to just two sprays. The cultivation of Bt cowpea is best optimised under Integrated Pest Management strategy.

Dr. Issoufou cited the success recorded with PBR Cowpea in Nigeria as a proof of concept for national scientists to use in convincing leaders to increase support to agricultural research and development.

He urged scientists not to work in isolation from the society as they are accountable for their successes and failures. According to him, partnerships is critical for quality result as no single organisation can undertake the development and commercialisation of GM crop alone.

Dr. Issoufou appealed for key stakeholders including national association of farmers, private seed companies, decision makers, professional associations, and national academy of sciences to build a broad-based support for agricultural biotechnology on the continent. He highlighted challenges experienced during the PBR Cowpea development process.

As part of lessons learnt from the PBR Cowpea development process, he pointed out that the project that the capacities of NARS was enhanced through trainings to allow them to play their role effectively in the projects and collaboration with the Open Forum on Agricultural Biotechnology (OFAB) was crucial for effective communication to achieve the project goals at a minimum cost.

Dr. Issoufou noted that Nigeria will leverage the commercialization of PBR Cowpea to promote Agricultural Biotechnology adoption in West and Central Africa. This would include having a representative from Nigeria to the success of PBR Cowpea as an example to convince other countries and regional bodies such as AUDA-NEPAD and Economic Community of West African States (ECOWAS) to promote agricultural biotechnology. Further, he said it is more imperative to use PBR Cowpea lessons to convince the Nigerian Government to invest more into agricultural research and development in the country.

Chapter 4

Question and Answer: Session with the Panelists

Q: Please share with us your insights on how governments and other stakeholders can enhance youth inclusion in the context of agricultural biotechnology?

The youth have been brought up in both rural and urban areas, but those in rural areas have seen their parents struggle with old farming methods where agriculture was associated with poverty. One way the narrative can change is if the young people are able to access better tools and ways of farming to demystify the fact that agriculture is poverty-driven activity and get young people to start participating in agriculture as a business to earn a living. Through this, the youth will quickly adopt the use of these technologies. Further, existing policies are facilitating adoption of these farming technologies. Secondly, there is need for value addition to farm produce to make the youth appreciate that agriculture can be a business venture.

Q: It has been several years since South Africa released GM crops. What did they do right and what lessons can Africa learn from South Africa's experiences?

South Africa was able to create an enabling environment for this technology early on when the rest of Africa was still hesitant to embrace the technology. The country does not have a perfect regulatory system, but the system is functioning and able to make decision on these technologies, what they have works for the country. Further, the trust that the people had in the regulatory system could have facilitated adoption of the technology early on. Besides, the people were able to familiarise themselves with the technology and understand how it works. However, the country is not out of the woods yet. It is still grappling with challenges from civil society activism and grass root movement advocating against the technology – like what other countries are facing. In addition, South Africa adopted Food and Feed Approach where the crops approved were going to the feed sector of the economy besides consumption. Besides, the country wanted to be competitive through exports of its biotech crops. These are some of the factors that could have made South Africa to adopt the technology faster than the rest of the countries in Africa.

Q: How should developers of biotech react to superficial publications and surveys that suggest dislike for biotech products?

If farmers are discouraged from adopting biotech products due to publications, they should be exposed to experiences in other countries like the USA and Brazil. For instance, in Argentina, there have been benchmarking visits of farmers and African policy leaders to learn from Argentina's experience where they are taken to the fields and supermarkets where the products are sold. In addition, there have been random street surveys in Argentina where consumers are asked whether they could eat GM crops and the answers are always affirmative. This means there is a gap between street surveys on consumption of GM products by farmers/consumers with the academic publications. There is need to expose farmers to other sources of information.

Q: What has been the greatest success factor and lessons towards release of PBR Cowpea in Nigeria?

The success factors in release of the PBR Cowpea in Nigeria was majorly pegged on a good product that was being offered to farmers to help them tackle the challenges of Maruca pest. In addition, there was good coordination of the project by AATF to ensure everybody was doing their work on a timely manner to deliver the product to farmers. Besides, addressing oppositions and propaganda from anti-GMOs activists was key to get the product out. This was effectively coordinated by OFAB and the advocacy team who organised seeing-is-believing tours for Nigerian policy makers to other countries to appreciate the product in the field. The project also leveraged on farmers associations who were vocal in supporting the product deployment in the country.

Chapter 5

Conclusion

The panelists noted that the application of innovative agricultural technologies have revolutionised the agricultural sector globally, leading to improved agricultural productions. However, Africa has been left behind in this upward trend due to several factors that constrain access to innovations resulting in low agricultural productivity in the region. The adoption of agricultural technologies has been identified as critical for increasing agricultural productivity and reducing hunger and poverty in Africa.

Further, the panelists observed that farmers in Africa need new farming technologies such as biotechnologies to help them address the emergence of new pests and recurrent drought brought by climate change. The adoption of these new farming tools is considered urgent because of Africa's ageing farming population hence, the need to attract youth back to farming who require efficient, smart and pleasurable tools for farming.

For effective development and deployment of biotechnology, there is need for political goodwill; legal and policy framework; and predictable decision making as key enablers that facilitate commercialisation of biotech crops in Africa. Further, for the technologies to reach the farmers, strong in-country stewardship support is critical in facilitating commercialization of biotech crops. The stewardship support would include having technical capacity and local infrastructure for product stewardship, government support and commitment to product stewardship and the flexibility of seed systems to support stewardship needs.

Drawing from the Argentina experience in biotech adoption, the panelists observed that GM crops don't need to be promoted by governments, but rather to adequately regulate them by creating an enabling and regulatory system that supports commercialisation. They cited the success recorded with PBR Cowpea in Nigeria as a proof of concept for national scientists to use in convincing leaders to increase support to agricultural research and development. The panelists urged scientists not to work in isolation from the society as they are accountable for their successes and failures. It was noted that partnerships are critical for quality result as no single organisation can undertake the development and commercialisation of GM crop alone. The panelists appealed for key stakeholders including national association of farmers, private seed companies, decision makers, professional associations, and national academy of sciences to build a broad-based support for agricultural biotechnology on the continent.

Chapter 6

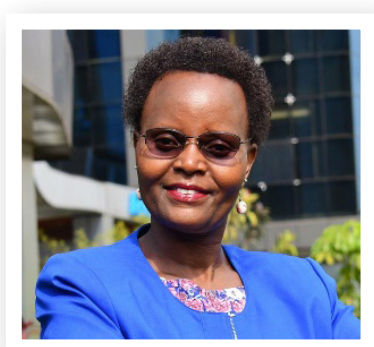
Appendices

6.1 Panelists' Profiles



Dr. Emmanuel Okogbenin, Director, Programme Development and Commercialization, AATF

Emmanuel Okogbenin, a well-trained scientist in plant breeding, genetics, and genomics with good background in agronomy, and physiology, has experience spanning over 23 years working in and leading several research projects in cassava at both International Agricultural Research centres and NARS. He holds a Ph.D. in Molecular Genetics/Plant Breeding from the University of Ibadan. As the Director of PDC, Emmanuel identifies opportunities for agricultural technology interventions, assesses the feasibility and probability of success of project concepts, identifies sources of appropriate technologies, negotiates their access and deployment, and provides overall leadership in the implementation of AATF's project portfolio.



Dr. Margaret Karembu, the Director of International Service for the Acquisition of Agri-biotech Applications (ISAAA-Africa region).

Dr. Margaret Karembu (MBS) is the Director of ISAAA-AfriCenter (International Service for the Acquisition of Agri-biotech Applications – Africa region and pioneering chair, Open Forum on Agricultural Biotechnology in Africa (OFAB – Kenya chapter). She is a senior level environmental science management specialist with extensive experience in technology transfer, environmental impact audits and modern biotechnology applications on small-scale agriculture. A science educator and communication trainer, Margaret has actively been involved in strengthening capacity for science communications and policy outreach for informed choices on modern

biosciences in Africa. She has significantly contributed to the biotechnology discourse through presentations in many international fora and working papers on modern biotechnology, including the Convention on Biological Diversity Biosafety COP-MOP negotiations (2010-2018). She is also the principal convener of the Africa Biennial Biosciences Communication symposium (ABBC symposium), Editor in chief of DrumBeat, a monthly e-newsletter on Africa Bioscience Trends and founding chair of the African Women for Biosciences. These platforms provide stakeholders an opportunity to share experiences on modern biosciences and policy implications of emerging bioscience trends. She is very passionate about science and a strong believer in the power of innovations for transforming African agriculture into efficient and competitive enterprise for women and small-holder families. In 2020, Margaret's efforts were recognized with a conferment by Kenyan President with a State Honour - Moran of the Order of the Burning Spear (MBS). She previously served as Council chair and vice-chair of the Cooperative University of Kenya and Meru University of Science and Technology respectively. Margaret holds a PhD degree in Environmental Science Education from Kenyatta University, where she taught for more than 10 years prior to joining ISAAA.



Mr. Godwin Lemgo, the Regulatory Scientific Affairs Manager for Africa at Bayer Crop Science.

Mr. Godwin is currently the Regulatory Scientific Affairs Lead for Africa at Bayer Crop Science. In this role, he identifies and addresses regulatory challenges through engagements with regulators, scientists, academics, policy makers and many other

stakeholders to promote sound science, defend the safety and benefits of agricultural technologies and champion science-based regulatory processes. Godwin also doubles as the Head of Regulatory Science for East Africa in charge of securing and maintaining product approvals to sustain license to operate. He has a background in Food Science, Nutrition and Biosafety of Agricultural Biotechnology. Prior to joining Bayer, Godwin worked with Africa Union's (AU) Development Agency (formerly NEPAD Agency) in a project called the African Biosafety Network of Expertise (ABNE) which assist's AU member states to establish functional regulatory systems to safely harness Biotechnology for Africa's development. As a program officer, Godwin was responsible for planning and implementing strategic policy and capacity building interventions in all ABNE focused countries with specific focus on Ghana, Cameroon, Zambia, Mozambique and emerging Anglophone countries thus gaining considerable insight into the biotech regulatory landscape of

Africa. His involvement at the international level as NEPAD's delegate to both the Organisation for Economic Co-operation and Development (OECD) Task-Force for safety of Novel Foods/Feed (or Task Force) and the Working Group on the Harmonization of Regulatory Oversight in Biotechnology (Working Group) provided additional insights and perspectives. Godwin is passionate about Modern Ag. and believes that unlocking Africa's agricultural potentials will amongst other things require deliberate efforts by policy maker to create enabling environment for innovative agricultural technologies to thrive.



Prof. Martín Lema, an Adjunct Professor in the School of Biotechnology at the National University of Quilmes, Argentina

Prof. Martin Lema is an Adjunct Professor in the Biotechnology School of the National University of Quilmes, Argentina, with 20 years of academic experience in teaching, research, technology transfer, and entrepreneurship. He counts with 15 years of experience as a policymaker in agricultural biotechnology, including 8 years as former Director of Biotechnology in the Argentine Government and former Chair of its National Biosafety Commission up to the year 2020. Among other achievements, he led processes leading to this Commission being recognized as FAO center of Reference for GMO biosafety, and to issuing of the first ad hoc regulation for genome editing applied to agriculture in the world. Besides, he has been acting as an Argentine delegate to biotechnology-related negotiations in Convention on Biological Diversity (CBD), Cartagena Protocol, World Trade Organisation, CODEX, CBD, OECD, and FAO. Finally, he accounts for 30 technical and scientific publications in different aspects of biotechnology (research, education, policymaking, biosafety).



Dr. Issoufou Kollo Abdourhamane, Cowpea Project Manager, AATF

Dr. Issoufou Kollo Abdourhamane holds a Doctorate degree in Plant Pathology from Texas A&M University, USA; a Master's in Plant Pathology and Bachelors in Plant Protection from Purdue University, Indiana, USA. Before joining AATF, Issoufou worked for the West and Central African Council for Agricultural Research and Development CORAF/WE CARD) where he was the Coordinator for the Australian Agency for International Development (AusAID) Par.

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