AATF
PROSPERITY THROUGH TECHNOLOGY

Celebrating two decades of delivering innovative agricultural technologies

Contents

Who we are

AATF is driven by the vision of a prosperous and food secure Africa, where smallholder farmers' livelihoods are transformed by innovation. Founded in 2003, AATF believes that the agricultural sector is the foundation of Africa's economic growth and development. The organisation was created in response to a need for an effective mechanism to support access to technology for smallholder farmers in Sub-Saharan Africa.

The AATF goal is to reach 8 million smallholder farmers by the end of 2027, giving them access to transformative technologies directly or through the partnerships that the organisation is building with other stakeholders in the agriculture value chain. The organisation aims to reach 40 per cent of the countries in Sub-Saharan Africa, and to increase the incomes of farmers adopting technologies generated through AATF collaborations by 20 per cent.

The organisation works with its partners to clearly define the real needs of smallholder farmers in Sub-Saharan Africa, and to identify opportunities to address those needs through the transfer and use of new and existing technologies. It works with public and private agricultural research and development institutions to develop and adapt appropriate technologies for smallholders, and collaborates with private sector organisations in order to create sustainable markets.

Food security

The AATF focuses on the most important crops for smallholder farmers, including maize, cowpea, banana, rice, potato and cassava, targeting these in order to improve food security at the household and national levels, and to drive improvements in incomes and livelihoods for farmers.

The first AATF meeting in Kenya in September 2003

Board of Trustees: Left to Right: Vincent Gwaradzinba (Zimbabwe), Eugene Terry (Sierra Leone), Jennifer Thomson (South Africa), Walter Alhassan (Ghana), Godber Tumushabe (Uganda), Shawn Sullivan (USA), Mike Trimble (USA)

Where we operate

AATF has programmes in 24 African countries.

Message from the Board Chair

Prof. Aggrey Ambali

> *"AATF has contributed to the realisation of supportive public polices, adequate regulation and public appreciation and uptake of new technologies such as biotechnology.*

For the many years I have been actively involved in advancement of science, technology and innovation programmes, three key messages have been repeated by agriculture and development experts in support of the role of technology in food security and economic development in Africa: i) that agriculture is critical to Africa's food security and economic development; ii) that Africa has great potential to better its agricultural productivity; and iii) that science and technology can contribute towards enhancing productivity and saving the environment.

These are messages that have reverberated very well with AATF's vision of a prosperous and food secure Africa, where smallholder farmers' livelihoods are transformed by innovation; and mission to achieve real meaningful change for farmers in Africa through access and delivery of innovative agricultural technologies and creation of an enabling environment to support prosperity through farming.

Indeed, at the heart of Africa's agricultural transformation is access to and use of improved and modern technologies that accelerate agricultural growth and foster higher agricultural productivity. Since its inception 20 years ago, AATF has endeavored to contribute to the transformation of Africa's agriculture by accessing and making available an array of state-of-the-art agricultural technologies that address the complex food and nutrition security challenges in Africa.

In line with its mandate of accessing, adapting and delivering appropriate agricultural technologies for use by smallholder farmers in Sub-Saharan Africa (SSA), AATF has played its role in supporting Africa's scientists and farmers gain access to technologies that have potential to make a difference. The institution's efforts have produced significant results over the 20 years. Outstanding progress has been made in several key projects. Ground-breaking deals for technology access have been made and partnerships for technology delivery have been formed that will change the lives of millions of smallholder farmers in Sub-Saharan Africa. I am delighted to note here that progress made over the years is bringing these technologies closer into the farmers' hands.

We have witnessed, on the continent and outside, the effectiveness of new and improved agricultural technologies in addressing key farmer and community challenges including climate change related problems such as frequent droughts and the emergence of new pests and diseases, excessive use of harmful pesticides and chemicals, and low productivity due to low yielding germplasm and degraded soil nutrients. AATF, and its partners, have made their contribution to driving the agricultural transformation agenda in Africa through innovative technology. We have experienced improved technological performance and benefits to farmers.

Moving new technologies from research into farmers' hands takes more than a good product, it requires an enabling environment that supports transactions right across the food value chain – a key part of that being policy and regulations. This is where the work of AATF has and continues to

make the largest difference. Besides successfully negotiating for start-of-the-art technologies, AATF has contributed to the realisation of supportive public polices, adequate regulation and public appreciation and uptake of new technologies such as biotechnology.

AATF's work is driven through partnerships. Partnership formation and management therefore is at the core of its work and is the means by which the institution has realised the great achievements. We have over the years forged and nurtured public and private partnerships across the full food value chain - from farmer level with CBOS, seed producers and dealers, national and local governments, national organisations and institutions, sub-regional and regional organisations, continental bodies and cross continent outfits and technology and financial donors. These and many other partnerships are important for AATF as they allow for harnessing of synergies, alignment of activities, effective and efficient utilisation of scarce resources and, more importantly, they present a united approach towards addressing the food security and the development question in the continent.

The impressive milestones recorded by AATF and its partners will require much more support beyond scientific excellence to reach their end goals. It is therefore my hope that governments in Africa, in recognition of their commitment towards agricultural growth and development as pronounced in the Maputo declaration of 2003 and subsequent other such undertakings, will continue to work with their country scientists and development partners towards enhancement of a supportive science and technology environment. On its part, AATF will continue pursuing its mandate through the participation and support of governments, fulfilling its role of responsible partner and honest broker between technology owners and users and also sharing information with decision makers as required to help them make informed decisions on science and technology.

On behalf of the Board, I would like to express my appreciation to all our investors, partners, and other professionals for working with us over the 20 years. I also thank the AATF Trustees for guidance. Without your support, we would not have achieved the milestones we had set and are proud of. We thank our donors for the longstanding support in pursuit of our mission to transform livelihoods in SSA through agricultural technologies. My special appreciation goes to the AATF staff who continued their efforts and commitment towards delivery of the AATF mandate.

Message from the Executive Director

Dr. Canisius Kanangire

> *"We forged partnerships with 90 partners, implemented 10 projects, addressing various productivity challenges facing 11 crops in 13 countries in SSA.*

AATF has evolved over the last 20 years, adjusting focus, approach and interventions in tandem with evolving opportunities and challenges in African agriculture.

At AATF's inception, Sub-Saharan Africa (SSA) was reeling from high rates of poverty, food insecurity, and low agricultural productivity. Our focus during the inauguration phase, 2003-2006, was facilitating research and development for technology transfer of improved seed varieties.

Over the first four years of AATF's existence, we learnt that the next 10 years would be a period of significant growth and learning for AATF. We were cognisant of the fact that new challenges would come to the fore as we resolved current problems, and that the environment in which AATF operates would likely change. AATF would need to evolve in response to these changing circumstances.

In 2005, we decided to develop a strategy that would guide the work of the institution for at least the following 10 years – a strategy based not only on conceptual principles and innovative ideas as expressed in AATF's business plan, but also very importantly on the organisation's real-world experiences during its first 3 years of operation.

The strategy, Bridging the Gap to New Technologies for Smallholder Farmers in Africa: AATF Strategy (2007–2015) clearly established the organisation's priorities and strategic operational framework, and provided a precise description of the principles that drive the AATF agenda. It also provided the three strategic thrusts it pursued: Technology acquisition and transfer thrust under which AATF focused on negotiating access to proprietary technologies that enhance productivity of agriculture in Africa; forging public private partnerships thrust through which AATF enters into strategic partnerships aimed at project formulation, product development, and product deployment as it pursued its objective of introducing innovative agricultural technologies into African farming systems; and the knowledge management and information sharing thrust through which AATF managed knowledge and information in ways that supported and facilitated identification, development and deployment of appropriate technologies under a conducive policy environment.

During this period, AATF succeeded in accessing agricultural innovations worth hundreds of millions of dollars from the world's largest agribusiness conglomerates, thereby helping address the first of these gaps – access to agricultural technologies that enhance productivity of agriculture in Africa. It is also during this period that AATF curved out its niche as an expert organisation in facilitating capacity building in regulatory compliance, intellectual property management, biotechnology development, agribusiness and stewardship in SSA.

We forged partnerships with 90 partners, implemented 10 projects, addressing various productivity challenges facing 11 crops in 13 countries in SSA. We licensed 30 new technologies for improving African crops (both conventional and transgenic). These technologies greatly impacted on smallholder farmers – for instance, ensuring a 300 percent increase

in yield for maize farmers using StrigAway maize seed in Striga-infested areas, and an 80-90% reduction in aflatoxin contamination in maize and groundnuts from using biocontrol technology in Nigeria. Reflecting back, we are proud to have benefitted 160 million households from the suite of technologies AATF licensed and facilitated.

As we celebrated these achievements, we foresaw many unforeseen developments in the landscape in which AATF operated. We foresaw the emergence of new technologies, institutions and practices that would contribute to the development of robust, food-secure national economies. We anticipated the institution's focus on improved technologies for food crops might expand to non-food and/or export crops or other agricultural enterprises that could also contribute to eliminating rural poverty in Africa. We expected commercial enterprises that serve African farmers such as seed companies and engineering firms to grow in number and strength, providing opportunities for a wider range of partnerships. We also foresaw public research institutions developing closer links with those who can deliver their innovations to the market. We expected Africa's legal and regulatory institutions to become stronger and more experienced, making the facilitation of product development and deployment easier. These foresights informed AATF's next phase, the diversification phase.

Building on our past successes, experiences and lessons learned during implementation of the 2007-2015 strategy, we developed and implemented the next strategy – Transforming Livelihoods Through Innovative Agricultural Technologies: AATF 2018-2022 Strategic Plan. While AATF endeavoured to continue with its traditional role of accessing and adapting innovative agricultural technologies, this Strategy placed more emphasis on rapid and effective deployment of these innovations to optimise impact at the farmer level. Under the new Strategic Framework, we shifted focus to deliver on five new programme areas: Productivity and Stress Management; Mechanisation and Digital Agriculture; Nutrition, Food Quality and Post-harvest Management; Market Systems for Commercialisation; and Policy Environment and Public Participation.

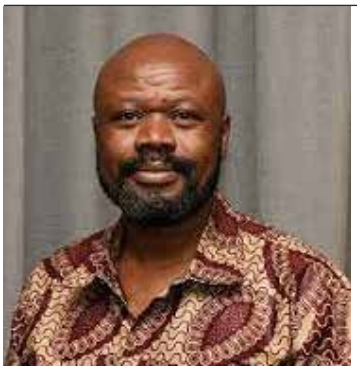
Diligent implementation of this strategy took us to new heights. Based on targets of the strategic plan, AATF attained 120 percent direct farmer reach. Three countries – Ethiopia, Ghana, and Nigeria – deregulated biotech crops. Kenya lifted the ban on transgenic products, facilitating their placement in the market. AATF's advocacy, outreach, and regulatory interventions successfully reached over 47.3 million stakeholders that aided the new improvement in the technology transfer environment. Over 3.85 million farmers accessed AATF technologies. Further, 51 different crop varieties were released.

Again, building on lessons learned and progress made during the Strategic Framework for 2018-2022, we developed and started implementing a new strategy. The new AATF Strategic Framework - Scaling for Impact: AATF Strategy (2023-2027) – outlines an ambitious plan to enhance technology development and commercialisation for African farmers, with the ultimate goal of achieving a prosperous, resilient, and food- and nutrition-secure Africa.

Under this strategy, we have maintained our three strategic objectives but expanded and intensified our interventions.

Through strategic objective 1, we continue to explore the use of innovative technologies to improve the productivity of strategic crops. We have also expanded income streams for farmers through bio-based technologies, such as bio-refineries and pyroly¬sis, to develop products from farm waste such as cassava peels, rice husks and legumes. Under strategic objective 2, we place greater emphasis on enhancing commercialisation and scaling, with a key focus on getting recently approved biotechnology products to market. Through strategic objective 3, we continue to support governments in the formulation and implementa¬tion of regulations that will guide the governance, release and regis¬tration of innovative technologies.

Congratulatory messages from our partners



Dr. Tshilidzi Madzivhandila

Chief Executive Officer and Head of Mission FANAPAN

> *"We are proud of what AATF has achieved and hopes to achieve in future. We promise our unrelented support.*

It has been 20 years of impactful collaboration between AATF and the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN) .Driven by a common agenda of overcoming the challenges low agricultural production and productivity among smallholder farmers in Africa, we signed our first MOU in 2003. Since then, we have worked closely with AATF on access and delivery of appropriate technologies for improved agricultural production and productivity, including creating a conducive policy environment for access, delivery and adoption of proprietary technologies to assist smallholder farmers in Africa transform their agricultural production, and improve their livelihoods.

We have shared a common belief in collaborative partnerships to achieve wider and deeper impact.

For us as FANAPAN and AATF, this natural partnership is about solving few global challenges which are pervasive and complex in nature such as climate change and malnutrition. Therefore, we are ensuring that our institutions are not attending to these complex issues by themselves, but are joining hands to ensure that we are delivering technologies to the hands of the users, the smallholder farmers in Africa.

Our collaborative partnership with AATF is the backdrop of agriculture research and innovation for development, which we are all part of. Early this year, we renewed our MOU with AATF. And the main reason we renewed the MOU is to ensure that we are moving from just signing an MOU, but now moving into joint programming to ensure that our collaboration is meaningful and impactful.

We are proud of what AATF has achieved and hopes to achieve in future. We promise our unrelented support. We are availing our platforms to invite all the stakeholders to know about the technologies that AATF is producing to ensure that those technologies are getting into scale. We are providing the platform to ensure scaling up, to make sure that the policies are supporting dissemination. We are scaling out to make sure that we are attending to new geographies for new people to benefit from the technology. And we are scaling deep to ensure that those that are already using the technologies are benefiting from the use of those technologies.

AATF's excellence is truly inspiring. Congratulations on your 20th anniversary celebrations. FANAPAN remains available for future collaborations.

Lawrence Kent

Senior Program Officer, Bill and Melinda Gates Foundation

> *"We're very happy with the way that AATF has led WEMA and TELA projects because they are complicated, involve many partners, many countries, many challenges.*

I've been with the Bill and Melinda Gates Foundation for 16 years, and interfacing with AATF for every one of the 16 years.

It all started with the development of the Water Efficient Maze for Africa (WEMA) Project 16 years ago. We dialogued with AATF, Monsanto, CIMMYT and national agricultural research systems in Kenya, Mozambique, South Africa, Tanzania, and Uganda to put together a project to bring to Africa a maize that had been genetically engineered to be drought resistant and then insect resistant. AATF turned out to be a sort of a wonderful general contractor that was able to pull together this diverse set of partners from industry, the public sector and national programmes to put together a good project that the Gates Foundation, and at that time, the Howard Buffett Foundation, found worth co-investing in. Since then, AATF has been managing the project very well, making the it very successful, particularly in releasing a set of very good conventional hybrids into the market.

We developed a good relationship with people working at AATF and the several executive directors that have led the organisation over the years. As a result, we've expanded our cooperation into other investments in AATF, such as the Open Forum for Agricultural Biotechnology (OFAB), the Hybrid Rice Project and, more recently, the Pod Borer Resistant (PBR) Cowpea Project. This is all in line with our shared vision of inclusive agricultural transformation in Africa, for that's what we're about, trying to empower smallholder farmers to improve their productivity, and thereby improve their families' nutrition and livelihoods.

No other organisation in Africa as the same level of expertise in biosafety issues and in dealing with regulatory issues as AATF. AATF and its partners have successfully navigated the submission of dossiers that demonstrate the food safety, the feed safety, and environmental safety of these genetically modified maize and cowpea products. As a result, they've received both environmental and commercial approvals from regulatory agencies in Nigeria, South Africa, Ethiopia and Kenya, having determined that key crops such as maize and cowpea are safe for the environment, food and feed.

We're very happy with the way that AATF has led WEMA and TELA projects because they are complicated, involve many partners, many countries, many challenges. But AATF has managed it with grace and with good results, and for that reason, we're very happy that we've been able to invest in the program and see this progress, and we have great hope for the future and the actual rollout of these products over the next year or two.

Congratulations to AATF, a wonderful organisation that›s been making a difference in Africa now for 20 years, and we are very proud to be a partner to AATF in its effort to bring technology and innovations to the farmers in Africa so that they can improve their productivity, their harvest, and their lives.

Stan Blade

Dean of the Faculty of Agricultural Life and Environmental Sciences, University of Alberta in Edmonton, Alberta, Canada, and former Board Member

I had the great fortune of joining AATF Board of Trustees from 2012 to 2018, serving as the Board Vice Chair and also Chair of the Research Committee.

Looking back, I am so impressed by the work of AATF, a remarkable indicator of how AATF has had a focus on the African farmer. Throughout its entire existence, the focus was always on how to improve the lives of farmers, identifying a problem, and then reverse engineering, thinking about the crops and technologies to be improved.

At the very beginning, the key issue was about bringing in unique technologies, especially around transgenic opportunities that would not be available to farmers in Africa unless an organisation like AATF would look at the intellectual property rights, engage with the owners of those intellectual property rights, and then strategise on how to incorporate those technologies into the crops that were so important to African farmers. AATF has done a remarkable job. I am impressed with the work going on in rice, both on the hybrid side and on nitrogen use efficiency and water use efficiency, on cassava mechanisation, strengthening the formal seed system in Africa and ensuring that farmers have access to high quality, remarkable genetics that they can plant in their farms.

When I think about the future, I think that AATF is already there. The organisation started with very basic issues, thinking about how we can actually overcome all of the challenges posed by biotic and abiotic issues that are facing crops and finding the technologies to overcome those problems, whether it be pests like Maruca pod borer in cowpea, or in the case of maize, thinking about all of the other ways to make climate resilient maize that AATF has used over this period of time. The organisation has found all of the right partnerships to be able to deploy new technologies that are being made available to farmers is just a remarkable success.

I know that there will be great opportunities coming up because the innovation pipeline is extraordinary in agriculture and food. We know that there are many challenges that are being faced around food security and food affordability, but AATF, among other like organisations, is actively playing a role in making the success needed to alleviate the challenges.

I would also like to acknowledge the remarkable leadership that AATF has had throughout the years. I had the remarkable pleasure and great honor to serve under two remarkable board chairs, Prof Idah Sithole-Niang who recruited me to the board, and Dr Ousmane Badiane coming in as board chair, and building on the strengths of Idah. I would like to acknowledge Dr Denis Kyetere, who was our executive director during my time as a board member. And now we know that we are going on from strength to strength with the new board chair, Prof Aggrey Ambali, and of course, our Executive Director, Dr Canisius Kanangire. Congratulations to all of you and thank you for the remarkable commitment that you have shown to the organisation. I recognise the tremendous leadership profile that we have had: individuals like Sir Gordon Conway, and founding board chair, and Dr. Jennifer Anne Thomson – great names that, among others, have really contributed to the effort of AATF, working with management, and especially the executive directors, to provide the remarkable success that AATF has shown across the entire continent.

All I can say is that AATF has had remarkable achievements over the past 20 years.

The organisation's work is truly ensuring prosperity through technology, and it has been the hard work, determination, and strategic focus by board members, staff, and all partners that has led to this remarkable success. Well done and congratulations.

John Komen

Assistant Director for the Program for Biosafety Systems

The Program for Biosafety Systems (PBS) is active in seven different countries in Sub-Saharan Africa (SSA) – Ethiopia, Ghana, Kenya, Malawi, Nigeria, Tanzania and Uganda – the same countries where AATF is active, and it is not a coincidence. We have been closely collaborating with AATF in these seven countries since its inception 20 years ago, and we have recorded important successes and impacts from our collaborations, in the safe and judicious introduction of new technologies. Jointly, we have built capacities in developing regulatory policies to guide the introduction of genetically modified organisms in African partner countries.

A classic example of our collaboration is in the introduction of pod borer resistant cowpea in Nigeria. Back in 2008, we were about to give up the introduction in Nigeria because we just could not get a field trial for PBR cowpea approved and planted. During one of the brainstorming sessions, AATF and PBS officers bought the idea to apply for a field trial first at the University of Puerto Rico in the US because they only had a notification duty to the regulatory authorities and had the same agroecological conditions for conducting the trial. In consultation with AATF and government officials in Nigeria, we successfully applied for field trials in Puerto Rico. Upon visiting the trials, the Nigerian officials realised that conducting a GMO field trial is not very different from conducting a variety trial in their country. They consequently issued a field trial permit to the Institute of Agriculture Research in Zaria in Northern Nigeria and I would almost say the rest is history.

In 2019, Nigeria approved the commercial cultivation of the transgenic cowpea, the first GM food crop outside of South Africa to be approved by an African government. This has been a tremendous achievement not just for the introduction of the technology but also the tremendous capacity achieved at the policy, technical and regulatory levels.

Another classic case of collaboration is through the AATF-led Open Forum on Agricultural Biotechnology (OFAB). Through OFAB, AATF and PBS have been collaborating on biotechnology outreach and strategic communications, successfully communicating balanced and factual information on agricultural biotechnology, as well as factual information on biosafety, and food and feed safety issues.

PBS was also launched in 2003 and we have been growing hand in hand with AATF, successfully collaborating over the two decades in influencing development of an enabling policy environment to guide the introduction, adoption and dissemination of new technologies.

From the very humble and early beginnings, AATF and PBS have jointly taken on one of the most important challenges that the African continent is facing – the safe and judicious introduction of new agricultural technologies including genetically modified varieties in African economies.

We can safely conclude that the last 20 years have been a very challenging but very successful adventure for AATF and PBS. Our program has tremendously benefited from the alliance, and we look forward to many more years of collaboration through OFAB, PBR Cowpea, TELA Maize and other projects supported by AATF.

AATF **20-YEAR TIMELINE**

2003

AATF
is established

2004

AATF is launched by Kenya's Minister for Agriculture, the Honorable Kipruto arap Kirwa, and the AATF Board Chair, Prof Jennifer Ann Thomson, at the Foundation headquarters in Nairobi, Kenya

2005

AATF signs a royalty-free, non-exclusive license for the Foundation to use Monsanto's *cry1Ab* gene for the development of insect-resistant cowpea varieties and to sublicense Monsanto's proprietary technology to collaborating institutions that will develop *Bt cowpea* varieties

2006

AATF launches OFAB in Nairobi, Kenya

2007

AATF launches its first strategic framework, Bridging the Gap to New Technologies for Smallholder Farmers in Africa 2007–2015

2008

AATF launches the Water Efficient Maize for Africa project to address the devastating effects of drought on smallholder farmers' maize production

AATF launches the Pod Borer Resistant Cowpea project to develop, test, and deploy transgenic cowpeas resistant to pod borer pests

AATF establishes the Bacterial Wilt-Resistant Banana project

2012

AATF establishes the Cassava Mechanisation and Agroprocessing Project

AATF and the Africa Seed Trade Association sign an MoU to facilitate delivery of certified seed products emanating from AATF projects to resource-poor farmers in SSA

AATF launches the Hybrid Rice: Breeding by Design Project in 2012 to develop hybrid rice with significant yield advantages

2013

AATF celebrates 10th anniversary

2014

Farmers in Kenya harvest the first DroughtTEGO maize crop recording average yields of 4.5 t/ha compared to the 1-2 t/ha that they used to harvest

AATF and Feed the Future launch the StrigAway in Maize Project for improved maize production in Striga-infested regions of Kenya, Uganda and Tanzania

Farmers in Nigeria and Zambia harvest their first bumper cassava crop planted under CAMAP, getting between 28 and 33 t/ha, up from an average of 7 t/ha

2015

StrigAway's first hybrid maize, H528, produced by Kenya Seed Company, is availed to farmers in Kenya

Hybrid Rice Project harvests the first trial of hybrid rice varieties in Busia County, Western Kenya

AATF **20-YEAR TIMELINE**

2017

AATF launches the Qualibasic Seed Company for effective and efficient supply of high-quality foundation seed to small and medium enterprise companies in Africa

2018

AATF launches its second strategic framework: Transforming Livelihoods Through Innovative Agricultural Technologies: AATF 2018-2022 *Strategic Plan*.

2019

AATF launches the Alliance for Hybrid Rice in Africa partnership for the commercialisation and adoption of hybrid rice technology for the benefit of smallholder rice farmers in Africa

Nigeria releases PBR cowpea, 2019 as SAMPEA 20-T

2021

AATF launches the European Union funded Bio4Africa Project to develop biobased products for livestock

Nigeria becomes the third country in Africa to approve environmental release of TELA maize

ECOBasic Seed Company Ltd launch of in Nigeria to produce and supply early generation/-foundation seed to seed companies in West Africa

Launch of Rwanda OFAB Chapter

2022

Ethiopia grants its first environmental release approval to a transgenic food, TELA maize

Kenya lifts the 10-year ban on cultivation and importation of GM crops

Launch of Malawi and Mozambique OFAB country chapters

2023

AATF launches its third Strategic Framework 2023 – 2027: Scaling for Impact

20 years in technology brokerage, development and delivery to smallholder farmers in Africa

For decades until 2000, smallholder farmers in Africa had to make do with low productivity of their major staples – maize, sorghum, millet, cassava, cowpea, and bananas. Although modest research investments resulted in the development of improved varieties, farmers waited for 20 to 25 years to access them.

By the 1990s, the world was beginning to explore biotech to accelerate the breeding cycle and to efficiently drive-up yields. This new breeding concept took a while to get started in Africa leading to further gaps in the continent where the population was rising faster than the rest of the world. In instances where highly improved varieties such as hybrids were developed, the lack of seed companies to produce early generation seed and certified seed undermined their adoption.

With the emergence of the climate change phenomenon, there was need to strengthen breeding pipelines for new traits to enhance adaptation of new varieties. The disruptive effects of climate change often resulted in increasing heat and drought stresses, increased events of flooding, high pest pressures, poor soil conditions, and weed population dynamics that further took its toll on Africa's food productivity with the continent becoming a high net food importer. However, innovative technologies required to achieve some of these traits were protected by intellectual property rights (IPR) which further aggravated the situation for

agricultural research systems in Africa as they lacked the capacity and requisite conditions for intellectual property management of such technologies.

The continued state of poor agricultural productivity weighed down on the social and economic development of Africa. With agricultural GDP ranging from 15-33% from a sector that employs roughly 70% of its labour force, any economic renaissance of the continent would require an agricultural transformation driven by science, technology and innovations. Agricultural and development experts affirmed that smallholder farmers critically needed access to new and bet¬ter agricultural technologies to transform their farming and to undertake it as a business. And this is precisely what the founders of AATF had in mind in establishing the organisation to access, develop, adapt and deliver appropriate agricultural technologies for sustainable use by resource-constrained farmers in Africa, through innovative partnerships and effective stewardship along the entire agricultural value chain.

This is a mission AATF has relentlessly pursued over the last 20 years, negotiating for ground-breaking deals for access to an array of state-of-the-art agricultural technologies and forming partnerships for their delivery to millions of smallholder farmers in Sub-Saharan Africa (SSA) aimed at fulfilling the the United Nations (UN) Sustainable Development Goals (SDGs), the Comprehensive African Agricultural Development Programme (CAADP) and lately Africa Agenda 2063. AATF has undertaken initiatives driven by public private partnerships in disease and pest management, modern breeding, soil fertility management, resource use efficiency, climate change adaptation, mechanization, hybrid vigour, post-harvest management, and seed systems development including exploring novel deployment strategies to create competitive value chains based on agribusiness concepts. The changes being created by the organisation's interventions are bringing transformation to the production of the main staple crops with significant improvement in the lives of millions of smallholder farmers who have adopted AATF products as exemplified by the case studies below.

More food and income for cowpea farmers

Cowpea, one of the most important food grain legumes in SSA and the major protein source for people both in rural and urban centers, is grown on 12.8 million hectares. SSA accounts for 87% of the world production. In spite of its significance, grain yields had remained low averaging 0.3 tonnes/ha mainly due to Maruca pod borer that reduces grain yields by up to 80% if not controlled.

AATF efforts to develop and deliver improved pod borer resistant (PBR) cowpeas started way back in 2003. In 2005, it made a significant breakthrough when it signed a royalty-free, non-exclusive license with Bayer (then Monsanto) for the organisation to use Monsanto's Cry1ab gene for the development of insect-resistant cowpea

varieties. Subsequently, AATF sublicensed the proprietary technology to collaborating institutions – the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Australia, and the International Institute of Tropical Agriculture (IITA) in Nigeria – to develop Bt cowpea varieties.

In 2008, the Pod Borer Resistant (PBR) Cowpea Project was established to develop, test, and deploy transgenic cowpeas resistant to pod borer pests. The project is an international public-private partnership, that brings together CSIRO, IITA, the Network for the Genetic Improvement of Cowpea for Africa (NGICA), the Institute for Agricultural Research (IAR) Zaria, Nigeria, the Savanna Agricultural Research Institute of the Council for Scientific and Industrial Research (CSIR-SARI) Tamale, Ghana, the Agricultural Research Institute of Burkina Faso (INERA), the Kirkhouse Trust, Program for Biosafety Systems (PBS), the Lilongwe University of Agriculture and Natural Resources (LUANAR) and Bayer.

For close to 11 years, the project developed and tested promising transgenic PBR cowpea lines in Burkina Faso, Ghana and Nigeria. Efficacy results showed that transformed cowpea suffered little or no pod damage from Maruca vitrata.

In 2019 after several years of trialling to generate robust data required by regulatory bodies, the project finally received approval, registration, and commercial release of the first transgenic cowpea variety in Nigeria (released as SAMPEA 20-T), and the world in general, bringing a real time solution to a major problem faced by farmers in the continent. The release is even more significant for Nigeria's food security, cowpea being a staple crop in the country and an important source of protein for over 200 million people. Once fully adopted, the PBR cowpea is expected to increase Nigeria's local production to meet local demand that is currently filled through imports of about 725,000 tonnes, costing over US$ 628 million annually.

Over 10 seed companies have been licensed to produce certified seeds. The current yield levels of the PBR cowpea range from 1.0 to 1.5 tonnes/ha. AATF has facilitated the production of over 36 tonnes of seed, sufficient for 18,000 farmers. The next generation of seed is expected to yield about 2 tonnes/ha. PBR cowpea yields under farmer field growing conditions have now more than doubled with performance ranging from 100-300% yield increase in Africa.

Ghana is expected to release its first variety in 2024 and introgression into several varieties is also making rapid progress.

87%

of world cowpea produced in SSA

80%

of cowpea grain yield losses due to Maruca pod borer

Farmer's Voice

New era of celebration for Nigerian Cowpea farmers

Nigeria's quest to increase beans production to meet national demand received a major boost last year with the introduction of Pod Borer Resistant (PBR) cowpea variety by scientists at the Institute of Agricultural Research (IAR), Zaria, in collaboration with AATF.

Previously, beans farmers in the country experienced low yield following the devastating attack of Pod Borer Insect called Maruca Vitrata which can destroy about 80 per cent of beans on the field, their attempt to keep the insect pest away took a great toll on their finances as they had to buy chemicals to spray their field fortnightly.

A trip to Sokoto State where farmers had planted this beans variety in the last planting season shed more insight of how PBR cowpea variety farming is gradually becoming a gold mine for farmers.

The farmers said they almost quit beans farming due to frustrations of having their beans destroyed on the field after more than 90 days of investment that will become a waste following insect attacks.

In Shagari Local Government, Idris Saminu, 47, who said he has been into beans farming for about 17 years, noted that he has not experienced good yield until he planted the PBR beans variety.

Saminu, a father of four said he had since enrolled his children in a public school within their local government from parts of the proceeds after selling the beans he harvested.

The farmer hinted that he would increase his farm size from the current five hectares to about 10 hectares so that he can make money to commence house construction.

"This new bean variety helped me very well. I have five hectares; I want to increase it to 10 hectares by next year. If you look you will see that I have already started building my house gradually, I want to build a house where my family will live comfortably," narrates Saminu.

"My children are now going to school because I have started making money from beans farming unlike before where I will plant, insects will destroy them on the farm. I was frustrated, I left the farm and ventured into selling firewood to feed my family', he says.

Bridging the rice yield gap in Africa

Africa's annual rice consumption is 21 million tonnes, yet annual production in is only 14.5 million tonnes, leaving the continent to import rice worth USD$ 1.7 billion annually.

With support from the Bill and Melinda Gates Foundation, AATF launched the Hybrid Rice: Breeding by Design Project in 2012. Its goal is to improve food security and livelihoods among smallholder farmers by developing hybrid rice with significant yield advantages and creating sustainable hybrid rice agrobusinesses to support farming of the crop in SSA. Until now, hybrid rice was only sourced outside the continent and seed companies had no access to parental lines due to intellectual property issues. There were no indigenous hybrid rice technologies in SSA. Over six years, the project bred hybrid rice using both 2-line and 3-line hybrid rice technologies.

The project has facilitated the development and release of eight high yielding hybrid varieties in Kenya which have been licensed to three seed companies (Afritec, SeedCo and FeshCo). In 2022, over 12 tonnes of seed were produced and sold. The varieties are high yielding, early maturing with good grain quality, and are giving farmers over 10 tonnes/ha compared to 3-4 tonnes/ha for the best commercial varieties in the market. The next generation of varieties are anticipated to yield about 12 tonnes based on initial tests conducted. In addition to its own products, AATF, through the Alliance for Hybrid Rice in Africa (AHyRA) platform which it coordinates, is facilitating farmers access to six more hybrid rice varieties developed by other partners. Through the Alliance, the project expanded its operations from the pilot countries of Kenya and Tanzania into Benin, Rwanda, Senegal, Togo and Uganda where testing of hybrid rice is on-going for commercial release.

14.5

million tonnes of rice Africa produces annually

10

tonnes/ha: the yields farmers are harvesting from the new 2-line rice hybrids compared to 3-4 tonnes/ha from the commercial hybrids

Farmer's Voice

From fields to fortune: How new hybrid rice varieties are transforming the lives of farmers.

Mr. Mutisya Kariuki, a small-scale farmer from Nderwa village in Kirinyaga County, Kenya, has been a rice farmer for the last 20 years. During this period, Mutisya, just like other farmers in the area, relied on traditional rice variety known as Pishori to feed their families and communities.

Mutisya says the highest number of bags he has ever harvested is 23 from his one-acre land, barely enough for family consumption to last them to the next planting season. He faced a declining yield and mounting financial stress. But as the world changes and climate becomes increasingly unpredictable, farmers are now turning to new hybrid varieties to secure their livelihoods.

I couldn't believe the difference," Mutisya recalls. "The hybrid rice variety produced twice as much as my traditional variety and was more resistant to drought and pests from the last planting season in August 2022."

He says he harvested a total of 46 bags from his one-acre piece of land, the same plot he used to get around 23 bags of Pishori variety. This translated to a total of 4,600 kilogrammes. From the harvests, Mutisya sold all the 4,600 Kgs, each at Ksh.70, earning him approximately over Ksh 320,000.

He used the proceeds to pay school fees for the whole year for his grade five daughter. In addition, he says that he was able to pay off his debts, save the balance, and provide a better life for his family. In addition, Mutisya used the proceed from the sale of the straws to buy a bicycle for her daughter's use for school.

The success of this new hybrid variety not only transformed Mutisya's harvest, but also his life. Now, he is the village hybrid rice 'consultant' who provides insights to the local farmers on how to properly grow and manage the hybrid rice to ensure maximum yields.

Climate-smart maize for smallholder farmers

Over 300 million people in SSA depend on maize for food and livelihoods. For some countries, it is a strategic crop in the food systems and the base crop in intercropping systems. Because of its high significance in the diet of many African countries, it is the preferred food of choice and it has a high profile in the political frameworks of many countries on the continent.

The yields of maize can be severely impacted by drought. In 2008, with the support of the Bill and Melinda Gates Foundation and Howard G. Buffett Foundation, AATF initiated the Water Efficient Maize for Africa (WEMA) Project to address the devastating effects of drought on smallholder farmers' maize production.

The WEMA project started with Monsanto evaluating promising elite maize inbred lines it previously developed and similarly for high-yielding local germplasm (adapted to tropical mid-altitude agro-ecologies of SSA) developed by the International Maize and Wheat Improvement Center (CIMMYT) under its Drought Tolerant Maize for Africa (DTMA) project. DTMA explored conventional breeding. In a period of 10 years, the project partnership developed new drought-tolerant African maize varieties, branded as DroughtTEGO®, exploring a combination of genetic improvement strategies (including pedigree-based breeding, marker assisted selection, marker assisted recurrent selection, genomics and genetic engineering) to accelerate genetic gains.

By 2014, farmers in Kenya harvested the first DroughtTEGO maize crop with an average yield of 4.5 tonnes/ha, outperforming previous varieties grown by farmers that yielded 1-2 tonnes/ha. The WEMA partnership has so far released 124 DroughtTEGO® varieties in seven countries in Africa. The yield of the released TEGO hybrids is 5.5–6.3 tonnes/ha which is 33-54% higher relative to commercial check hybrids. In Kenya and Uganda, the cultivation of DroughtTEGO® led to a significant yield increase of 69% while income generation was enhanced by 75% among DroughtTEGO adopters relative to non-adopters. These DroughtTEGO® hybrids are now the primary source of climate smart maize hybrids being deployed under Technologies for African Agricultural Transformation (TAAT) programme of the African Development Bank (AfDB).

TELA Maize Project is re-enforcing dreams and hopes

To fast-track commercialisation and deployment of transgenic maize hybrids to smallholder farmers in SSA, AATF established the TELA Maize Project in May 2018 in efforts to build on and accelerate developments made under WEMA. The project made strides towards testing and commercialisation of transgenic drought-tolerant (DroughtGard® trait) and insect-protected (Bt trait) maize hybrids (TELA® maize hybrids) in the target African countries. Kenya, Ethiopia and Nigeria have approved the environmental release of TELA and have either concluded or nearly completing national performance trials that are required for their commercial release.

5.5-6.3

tonnes/ha: yield rage of DroughtTEGO maize hybrids, which is 33-54% higher than the commercially available hybrids

124

DroughtTEGO® released since 2014

Farmer's Voice

It's Not Witchcraft – It Is the TELA Maize Seed

TELA maize products are transforming livelihoods at household level in Matibidi village, Mpumalanga province in South Africa. Meet Mr Sam Maebela, a seasoned grain and vegetable farmer who realized exponential increase in his maize yield from the 1 drum (200kgs) he harvested from 1.5Ha in June 2017 to 17 drums (3400kgs) from the same piece of land in the same period in 2019; translating to a highly significant yield increase of 1600%.

Mr Maebela planted the insect resistant (Bt) TELA® maize hybrids varieties that are suitable for mid-altitude regions with relatively dry conditions such as Mpumalanga Province. The TELA Maize Project varieties (WE6206B, WE6207B, WE6208B, WE6209B and WE6210B) were approved for commercialization and released to farmers in South Africa at the end of 2016 after a decade of excellent breeding work under the Water Efficient Maize for Africa (WEMA) Project, now known as the TELA Maize project.

When the dreaded fall armyworm (FAW) attacked maize farms in Matibidi Village, many farmers abandoned their farms because of the heavy infestation.

The Mpumalanga Department of Agriculture partnered with the Agricultural Research Council (ARC) and supplied TELA seed to farmers in Mpumalanga province including Mr Maebela.

"Before planting the TELA Maize, I could not harvest anything especially the maize", this seed that I got was very helpful because it does not get attacked by insects. I harvested more than 17 drums and there is no one in my area that has harvested as many drums as me. Drought coupled with the FAW infestation meant most people did not harvest anything

while I harvested. In fact, the community is now scared of me because they think my produce was actually via witchcraft. I do not prevent anyone from coming to see my produce, in fact I am not scared to be called a witch. A lot of people no longer come to this yard because they fear me. They say I practice witchcraft, but I am not worried. I just want them to see the maize, that's all" said Mr Maebela in a recent monitoring visit made by the ARC.

The chief in Matabidi village in reaction to the witchcraft concerns raised by the community visited Mr Maebela's farm.

"I let him inspect the maize and all I heard from him was "ahhh so much maize!! I am coming to get three or four drums". I said to him he's more than welcomed"

The TELA maize varieties are creating real impact for farmers and communities.

"Now I see this maize, it is very beautiful maize, I really like it. I am certain that anyone that comes here will be very impressed. Do you see how many drums are here? Today I have so much yield and it is no longer just for me and my family. I would really appreciate having only four drums for me and my family and we will be ok for the rest of the year. It is too much, it is for me and anyone else from our community that is hungry"

The long-term goal of the TELA Maize project is to make drought-tolerant and insect-pest protected maize available and affordable to smallholder farmers in Sub-Saharan Africa. Drought-tolerant and insect-pest protected maize varieties will help produce more reliable harvests and better grain quality due to reduced insect damage for smallholder farmers like Mr Sam Maebela. This means that they will be able to harvest enough to feed their families, have a surplus which they can sell to increase their incomes, and help strengthen local communities and countries.

Taming MLN disease in eastern Africa

In response to Maize Lethal Necrosis (MLN) disease that was threatening to wipe out maize yields in East Africa, AATF under the WEMA project undertook the screening of over **3,000** pre-commercial hybrids and lines for resistance to Maize Chlorotic Mottle Virus (MCMV) that causes MLN. The screening identified tolerant lines that were then used by CIMMYT in the WEMA breeding programmes to develop new MLN tolerant lines that have been released in SSA. CIMMYT has so far developed 19 MLN tolerant varieties which are now commercialised in East Africa. Under another USAID-funded project led by CIMMYT, AATF co-partnered with the Alliance for Green Revolution in Africa (AGRA) in 2012 on MLN Management in East Africa to support production of MLN-free seed in Ethiopia, Kenya, Rwanda, Tanzania and Uganda. The project was implemented with the NARS of these countries.

The project impacted seed distribution by establishing standard operating procedures that seed companies followed to ensure the disease was significantly reduced in the region, thus mitigating the devastating effect the disease would have unleashed on the maize value chain and food insecurity given the importance of maize in the diet of Africans in the region.

Facilitating research support and novel tools for partners

AATF has facilitated research support and brokered technology access for national and international partners for the overall benefit of smallholder farmers in Africa. For instance, the Aflatoxin project received research support from AATF to address aflatoxin control in crops especially maize and groundnuts. The IITA-led project developed Aflasafe, a product that effectively controls aflatoxin and reduces health hazards associated with food poisoning from the fungus Aspegilus flavus. The product is now commercialised, creating improved export market opportunities for the crops.

In 2005, AATF successfully negotiated for two genes (plfp and hrap) from Academia Sinica, Taiwan for use in the project royalty free. These genes facilitated the establishment of the Bacterial Wilt-Resistant Banana Project in 2008 led by IITA with additional funding from USAID. The genes were soon extended for use in Ensete and cassava research in the Resistance to Major Bacterial Diseases in Sub-Saharan Africa Project implemented by IITA, alongside the Ethiopian Institute of Agricultural Research (EIAR), the Kenya Agriculture and Livestock Research Organization (KALRO) and Uganda's National Agricultural Research Organisation (NARO), with stewardship support and intellectual property management of the transgenes (Pflp, Es-Pflp and Hrap) by AATF.

More recently, in 2018, the International Potato Centre (CIP) in partnership with AATF initiated the Development and Testing of Transgenic Potato with Resistance to Bacterial Wilt using pflp genes along with the elongation factor receptor (EFR) gene, which has been reported to enhance resistance to the disease. Potato Bacterial Wilt Disease is found on 74 percent of the farms in Kenya and can cause yield losses of up to 100 percent.

AATF also accessed three genes for rice improvement and these were alanine aminotrasferase gene for nitrogen use efficiency; Sodium antiporter gene for salinity tolerance; and Isopentenyl Transferase for water use efficiency.

Non-seed-based technologies

While seeds reflect the genetics that drive the yield potential of varieties (about 60% in total contribution to productivity), the environment also plays a major role in the final outcome of crop performance through its association and interaction with genetics. Smallholder farmers in Africa face challenges with soil management leading to huge variances in yield of improved varieties on farmer's field and on research station. With support from the Foreign, Commonwealth & Development Office of the Government of the United Kingdom (formerly Department for International Development), AATF introduced mechanisation to improve field management operations (See page xxx on cassava mechanisation). Cassava was the first target but was later expanded to other crops such as maize and fodder plants.

Next steps

Innovative and proprietary technologies which were hitherto not accessible in Africa have been availed to stakeholders through AATF's initiatives. However, their efficient integration and right applications are what makes the difference between countries that are dominating global agricultural trade and those that are faced with malnutrition and food insecurity. With globalisation of processes and international trade, the pathways for the smallholders farmer as significant players in the sector and the fulfilment of the UN SDGs and Africa Agenda 2063 will depend on the adoption of these creative and innovative technologies that can enhance productivity, explores less resources for more outputs, improve efficiency to support less cost in production and deliver quality products. AATF, with the technologies it has facilitated in the continent, will be seeking to demonstrate the success of technologies in countries and out scaling for stronger reach to drive a continent-wide success. The next 20 years of AATF should see the development of superior technologies that can support robust durability for sustainability and long-term impacts for improved livelihoods. Commercially successful smallholder farmers adopting these technologies will move Africa into an era of new economic growth and development.

Emmanuel Okogbenin
Director Technical Operations, AAT

20 years of improving seed systems in Africa

AATF was founded on the premise of delivering to smallholder farmers a diversity of improved varieties and high-quality seeds of their preferred crops that are adaptive to climate change and related biotic and abiotic stresses. This was driven by the fact that at its inception in 2003, millions of smallholder farmers in SSA were suffering low crop yields and even crop failure either due to the use of low-quality seed, or unavailability of better performing varieties.

A combination of factors, including inefficient seed production, distribution, and quality assurance systems, as well as bottlenecks caused by diverse seed policy and regulations in Africa colluded to deny farmers the benefit of quality seeds and improved genetics.

AATF was cognizant of the fact that consistently producing adequate quantities of high-quality seed and delivering them to farmers on time, requires a robust seed system – a complex web of individuals, organizations and institutions involved in the development, multiplication, processing, storage, distribution, and marketing of seeds. Our first task was therefore to establish a robust seed system. We started off in 2005 with holding consultations with stakeholders in the seed sector that were aimed at facilitating the implementation of functional regulatory frameworks to govern the development and deployment of improved varieties and quality seeds along the entire seed chain; and providing product stewardship during seed production and deployment.

In spearheading the development of a functional seed system in SSA, AATF worked with partners throughout the product development lifecycle, identifying products in the research and development pipeline and helping to shepherd them towards commercial release, including product allocation, licensing, seed production, and promotion and marketing.

Our management of quality seed production

A critical component to realisation of quality certified seed is foundation seed, also known as early generation or parent seed. Through experience, AATF found that over 80% of the independent seed companies that service Africa's smallholder markets have difficulties with production and maintenance of quality foundation seed resulting in a low and inconsistent supply which has a knock-on impact on the production of certified seed. This in turn is costing farmers and seed companies the opportunity to fully benefit from new improved varieties that are critical to raising farm productivity.

To address this gap, AATF set up the QualiBasic (QBS) Seed Company in 2017 to specifically produce foundation seed to meet the needs of various seed companies and in the process help them improve their certified seed quality and output. QBS is the first foundation seed production company in SSA. In addition, AATF set up ECOBasic Seed Company in 2021 to also specifically produce and supply foundation seed to seed companies in Nigeria and West Africa.

Another essential component to assuring quality seed is the capacity of seed companies, and contracted seed growers. AATF therefore undertakes training of commercial breeders and seed production specialists for the sustainable transition of the improved seed from research to private companies for efficient delivery to farmers. AATF trains the breeders so that they can initiate breeding programmes based on their organisation business priorities as well as the available germplasm. The seed companies further engage in seed production, establishment of demonstration sites and marketing of the seeds to farmers for grain production.

Proper management of the seed production and management process is critical to success with regards to quality seed availability. To this end, AATF places a major premium and emphasis on certification systems and regulatory standards at all stages of seed production, processing, and distribution.

At the regional level, regionally harmonized seed regulations are being domesticated to achieve the desired goal of seed security in the region. The on-going AATF efforts on harmonization of seed regulations by the Common Market for Eastern and Southern Africa (COMESA), the Southern African Development Community (SADC), the Economic Community of West African States (ECOWAS), and West and Central African Council for Agricultural Research and Development (CORAF) will greatly improve trans-boundary movement of seed across countries, and avail more improved seed to farmers in Africa.

Farmer's Voice

Farmers embrace high yielding, fast-maturing DroughtTEGO maize varieties to boost productivity

Maize farming was becoming a source of major frustration for Ann Aloo, a smallholder farmer in Kisumu County of Kenya. For her, growing maize in the semi-arid western Kenya region has been hectic due to unpredictable weather and inaccessible climate-smart farm inputs.

For a long time, the farmer says she could only harvest 135 kilos of maize from her quarter acre farm, until late last year when DroughtTEGO maize, a water-efficient maize variety that is suitable for her area, was introduced to her. Now she can harvest at least seven 90 kg bags (630kgs) from the same piece of land after harvest in January 2020 following a short rainfall in 2019.

Aloo's situation mirrors that of Ben Wamukhuna from the neighbouring Kakamega County. Wamukhuna says he used to produce at least two 90 Kg bags per quarter acre, translating to 180 kgs. Currently, the same piece of land produces about eight 90 kg bags with DroughtTEGO maize varieties, giving him 720kgs in total.

Aloo and Wamukhuna are among nearly 2,000 farmers in the Western Kenya region who received over 10 tons of climate-smart maize seeds varieties for farm demonstrations at the beginning of this year.

The farmers say they prefer the DroughtTEGO maize over other varieties for its early maturity, high yielding, and large cobs.

The difference, 20 years on

AATF has greatly contributed towards better production and distribution of quality foundation and certified seed in SSA. With support from international donor agencies and partners like UKAID, USAID, the Rockefeller Foundation, and the Bill & Melinda Gates Foundation (BMGF), AATF forged partnerships with over 40 licensed seed companies to multiply, package and distribute high quality certified seed.

Since its inception, AATF has facilitated the production of 37,270 tonnes of certified seed of major staple crops in SSA such as maize, cowpea, rice, soyabean, groundnuts, and beans. These were availed to farmers for cultivation, reaching about 3.6 million farm-households and benefitting about 22 million people in the 23 countries of operation.

Over the years, the Foundation has worked with 7,034 value chain actors who included seed companies, agro-dealers, seed producers, grain traders, and processors to create market systems supportive of agricultural development. The Foundation strengthened the capacity of 106 companies in 10 countries and 124 extension agents to enhance their speed and effectiveness to deliver certified maize seed to smallholder farmers.

Through WEMA, smallholder farmers in SSA hard hit by prolonged droughts, disease and pest outbreaks that have resulted in crop failures, accessed over 9,300 tonnes of high-yielding climate smart maize seed. Farmers in the Republic of South Africa have accessed over 300 tonnes of transgenic maize seed produced through the TELA project that is coordinated by AATF.

Since it was first reported in Kenya in 2012, the Maize Lethal Necrosis (MLN) disease spread fast and was threatening maize production in eastern Africa. In Kenya for instance, it had affected up to 300,000 maize farmers by 2013. In the worst hit Rift Valley of Kenya, at least 70% of the maize crop was affected. The disease affected 75,000 Ha in the Long Rain season of 2012, leading to yield losses of between 50% - 100% and an estimated financial loss of approximately US$23.3 million to small holder farmers according to the Ministry of Agriculture and Livestock development, Annual report, 2014. Through the Maize Lethal Necrosis (MLN) Management in East Africa project, a partnership of AATF, AGRA, CIMMYT and seed companies, the disease was finally contained. Kenya Seed Company for instance, initiated certified seed production and marketing in 2018 where more than 300 tonnes of certified seed of H6506 for commercialization was available in 2020. Commercialization of the second-generation MLN-resistant hybrids commenced in 2020 in East Africa and currently going on.

Ravaged and devasted by the Maruca vitrata legume pod borer insect, farmers in Nigeria now have access to seeds of the first genetically modified Pod Borer Resistant (PBR) cowpea, released in December 2019 as SAMPEA 20-T. The cowpea was developed through an AATF managed public private partnership. The release

is very significant for Nigeria's food security, cowpea being a staple crop in the country and an important source of protein for over 200 million people. Maruca causes the largest preharvest damages, reducing grain yield by up to 80% and lowering quality of the grain.

In Kenya, farmers accessed 35 tonnes of seed of high yielding rice developed through AATF's Hybrid Rice: Breeding by Design Project. The seeds are produced and marketed by private seed companies that participated in the product development process.

Through QBS, AATF has supplied 396 tonnes of foundation seed to over 30 customers in 10 countries to plant 15,840 ha of certified seed crops since its inception in 2017.

The Foundation established the Seeds2B project to deliver cutting-edge seed varieties that increase smallholder farmer's productivity and reduce their vulnerability to climate change through technology scouting, analysis and product registration. By 2022, AATF and its partners had sourced and delivered 12 varieties of soyabean to 15,940 smallholder farmers in Africa supplying them with 510 tonnes of certified seed. In addition, 27,272 farmers were supplied with 1,092 tonnes of certified groundnuts seed from five varieties. About 6,000 smallholder farmers also benefited from the 150 tonnes of certified seed of two been varieties supplied by licensed seed companies in Africa.

Indeed, it has been a journey that has seen Africa's seed systems evolving from a largely informal system, characterized by farmer saved seed, into a combination that includes the formal systems, which promote breeding of improved varieties, production, and cultivation of certified seed. Jonga Munyaradzi

Jonga Munyaradzi
Seed Production Manager, AATF

AATF's 20 years' efforts in transformation of cassava production in Sub-Saharan Africa

Growing up in a cassava producing region of Zimbabwe, tending the crop was one of the routine farm activities for our family. While I enjoyed the delicious tuber, either raw or cooked, I dreaded the planting, weeding, and even harvesting. It was a process full of drudgery. Equipped with only the hoes, it took our family of seven, more than a week to prepare our one-hectare farm for planting. Weeding was dreadful as you had to endure either the dew and the mud, or the dust. You had to be extremely careful with the hoe lest you damage the developing tubers or injure your leg. Harvesting was equally a manual challenge requiring skills in uprooting the tubers. And for decades, this is how it had been for over 500 million farmers across Sub-Saharan Africa (SSA) producing this staple food crop that is also their major source of income. So, it was a pleasant assignment for me to support the organisation in mechanising cassava production - the different it makes to the whole process is just amazing!

By the time I joined AATF in 2008 as an Agribusiness Specialist, cassava production was still reeling under drudgery and low production just averaging 9.0 MT/ha despite the availability of improved cassava varieties with high genetic yield potential of 60-80 tonnes/hectare. Lack of mechanisation in production was the biggest contributor to the low yields. For instance, from our studies, we established that the equipment most farms owned in Nigeria were hand hoes (95%), shovels (74%), machetes (90%), and wheelbarrows (90%), and in Uganda they had hand hoes (98.6%), axes (80%), and machetes (66%).

We believed that mechanisation would increase productivity; decrease cost of production; reduce drudgery in farming; improve the timeliness and efficiency of farm operations; improve the quality and value of work and processed products; provide employment (entrepreneurship) and sustainable rural livelihoods; and provide agriculture-led industrialisation and markets for rural economic growth.

In 2010, we embarked on formulating the Cassava Mechanisation and Agroprocessing Project (CAMAP) and completed in 2011.With financial support from UKAid/the Department for International Development (DFID), CAMAP field activities kicked off in 2013 with Nigeria and Zambia targeted as project pilot countries while Mozambique, Malawi, Ghana, and Uganda were earmarked for scaling out.

The prioritisation of the project countries was based on the level of cassava production, and existence of government policies for the cassava sub-sector in the respective countries. Other factors influencing the selection process were importance of cassava in the countries, magnitude of productivity constraints, the production levels, intervention by other cassava players, levels of technology adoption, and potential for market development. Nigeria was chosen being the leading cassava producer in the world, producing upwards of 52.4 million tonnes annually as of 2013. Uganda was selected as a medium level producer (ranked 7th in Africa), with a production of 4.8 million tonnes annually in 2013. Zambia was selected as a representative of small producers (ranked 10th in Africa), with 1.3 million tonnes of production annually in 2013.

AATF partnered with national government institutions including the National Root Crops Research Institute and the National Centre for Agricultural in Nigeria; the National Crops Resources Research Institute in Uganda; and the Zambia Agricultural Research Institute and the Department of Agriculture in the Ministry of Agriculture in Zambia. Other partners included farmer groups and cooperatives, cassava buyers and agro-processors, mechanisation services providers, input suppliers, transporters, and financial institutions.

We delivered a wholesome package of key activities ranging from linking farmers to mechanisation service providers and processors, introducing high yielding and disease resistant cassava varieties, building capacity of farmers to practise farming as a business based on best cassava agronomic practices, and linking farmers to markets mainly off-takers and processors. Farmer capacity building activities included training them on good agronomic practices such as use of improved varieties, land preparation, weeding and harvesting, use of inputs such as fertilisers and herbicides, timely and efficient execution of farm operations, and post-harvest management. In addition to training the farmers, we also trained mechanisation service providers on tractor operations, machinery servicing and maintenance, business management skills, record keeping, financing and customer care.

With CAMAP being a partnership, we did not have to strive to develop new varieties. Instead, we leveraged and promoted at least 10 improved varieties previously developed by various institutions across the three countries. The main varieties promoted included TME419, developed by IITA in Nigeria, Mweru and Bangweulu, developed by ZARI in Zambia, and NAROCASS1, Nase 19, Nase 14, and Nase 3 developed by NARO in Uganda. These varieties were principally selected because of their high yield potential, preference by off-takers and processors, and their straight tubers which made the cassava varieties suitable for processing.

With market linkages established and farmers satisfied with the mechanised options, we next focused on easing farmer linkages to tractors. We therefore developed and launched digital platforms as part of Digital for Agriculture (D4Ag) solutions. Launched in 2017, the Hello Tractor App was used for tractor management and tracking in Nigeria. The Agridrive App, an AATF initiative launched in 2020, was used to facilitate efficient access of mechanisation services by farmers. Miss CAMAP was used to compile a database on the number of farmers, hectares and processors, and prices of the products.

Farmer's Voice

Cassava Mechanisation and Agro-processing Project inspires hope in Nigeria

The Cassava Mechanisation and Agro-processing Project (CAMAP) has opened a new world of opportunity for many cassava farmers in Osun state, Nigeria. One of these farmers is Mrs Kikelomo Amusan who never thought that at any given day in her life she would ever cultivate anything in excess of one acre of the cassava crop. However, all this changed when CAMAP activities kicked off in the state in May 2013.

Mrs Amusan was fortunate to be among the first 50 beneficiaries to participate in the Project after adequately satisfying the elaborate selection criteria which included ownership of one hectare of well stumped land with a good access road; and willingness to contribute both in kind and in cash for weeding and any other activity such as firebreak clearing. She was very excited to have been selected since she has been leasing a one hectare farm for a number of years and could see great prospects with participation in the Project.

Everything was going well for her since all the necessary inputs for cassava growing which included quality stem cuttings, fertiliser and pre-emergence herbicide were availed by the project on time. It was not until when the ploughing tractor was deployed to her farm that everything turned against her. Her landlord decided to block her from accessing the farm. She tried by all means to request the landlord to allow her continue preparing the land but her pleas fell on deaf ears.

Her misfortune did not dampen her resolve to participate in the Project activities. She immediately decided to move on and look for another piece of land. However, the new piece of land she found required a lot of work to prepare as it was near virgin land after lying fallow for over six years. It was overgrown with bushes

and shrubs big enough for charcoal production. She immediately swung to action and by the time she was through with land clearing, she had paid Naira 26,000. The process included clearing a road wide enough to allow for the movement of equipment into her farm which is about 200 metres off the road. By this time all the other participating farmers land had already been ploughed and harrowed and planting was underway. This meant that she had to look for a tractor to plough her land since the National Centre for Agricultural Mechanisation, one of the Project, who are providing the ploughing and harrowing tractors had already returned them to their station in Ilorin, Kwara state. This posed another seemingly insurmountable hurdle to her efforts. Had it not been for the quick intervention of the Cabesi- the area traditional ruler, who sourced another tractor for her, Mrs Amusan could not have realised her dream.

As if that was not enough, by the time land preparation was over, all the planting materials that had been delivered to her initial farm had dried up. She had to move with speed and obtain fresh cassava cuttings if she was to catch-up since planting in the other 49 farms had already been completed. Luckily she managed to get some materials which were not of as good quality as the ones used by other farmers. Despite all the tribulations, her land was planted on 20 May 2013 and Mrs Amusan cannot hold back her joy as she watches her flourishing and healthy cassava crop grow. She looks forward to the day a tractor drawn cassava harvester will drive into her farm to reap what she painfully sowed.

This is a true story of resilience and fortitude. If all the farmers were as determined as Mrs Amusan, Africa would have enough cassava for her consumption and the export market.

The impact

Reflecting, it has been an impactful 10 years. We have witnessed a drastic reduction in time taken to complete farm operations, an indication of increased efficiency and more effective execution of the operations. While it took 160 to 530 manhours/ha to do manual harvesting, it only took 1 to 2.54 hours when using mechanised harvesters. Equally while manually planting one hectare took 41 manhours, this was reduced to 0.7 to 1.7 hours using mechanised equipment.

Most significantly, through CAMAP, farmers increased their cassava yields and consequently the revenues. At the project inception in 2013, the mean yield (fresh cassava) was 10 MT/ha in Nigeria, 11 MT/ha in Uganda and 12 MT/ha in Zambia. The yields across the three countries improved to 18.6 MT/ha in Nigeria, 21.3 MT/ha in Uganda and 21.4 MT/ha in Zambia. With the realised benefits of mechanisation and other project interventions, farmers increased land under cassava production by 72.14% in Nigeria, 157.58% in Uganda and 59.61% in Zambia.

As expected, mechanisation in cassava production truly instilled efficiency in cassava production and brought gains for farmers, proving that AATF's 20 years of dedicated efforts have not only transformed cassava production in Sub-Saharan Africa but have also improved the lives of millions of farmers across the region. The journey from labor-intensive, low-yield cassava farming to mechanised, high-yield production has not only increased productivity but has also empowered farmers with the tools and knowledge needed to thrive in the ever-changing agricultural landscape. The lessons we've learned along the way underscore the importance of holistic approaches, capacity building, and market linkages in driving agricultural transformation. As we reflect on these accomplishments, we are committed to continuing our mission to uplift the livelihoods of cassava farmers and ensure food security in Sub-Saharan Africa. The story of CAMAP is one of resilience, progress, and hope for a brighter future in African agriculture.

George Marechera
Business Development Manager, AATF

20 years in pursuit of creating enabling regulatory environments for testing and commercialisation of GM crops in Sub-Saharan Africa

Despite the impressive account of genetically modified technology and other modern agricultural innovations in other developing regions of the world in adopting countries, efforts to roll out GM products in African countries had virtually stalled due to prohibitive national policies and regulations as well as ambivalent national policies, legislation and public concerns about the safety of GM products to human, animal and environmental health. It was clear from the onset that AATF had to work closely with and where necessary persuade African governments to consider the GM technology as one that can contribute to realization of the dream of a food secure Africa free of famines.

Our approach

Being launched at a time when biosafety and environmental issues were at the forefront of national, regional, continental and global agenda, the idea of influencing national leaders and decision-makers to embrace biotechnology was a daunting undertaking for AATF and partner institutions. Realising the magnitude of the task ahead, AATF prioritized management of regulatory affairs in all its projects. That partly explains why the Foundation created a dedicated unit for management of public policy and regulatory affairs right from inception. I am honoured to have managed the unit right from its inception.

Managing regulatory affairs at AATF is a specialised enabling function for project implementation that encompasses continuous scanning of the policy and regulatory environment in target countries to identify regulatory bottlenecks likely to hinder testing and deployment of technologies and products. AATF leads the formulation and implementation of country specific strategies, plans, tactics or schemes for navigating the regulatory hurdles in order to secure approvals for product testing and deployment. Since such approvals typically specify conditions to be adhered to, AATF and partners routinely go through a training drill of 'dos and don'ts' – all geared to ensuring compliance with approval requirements

Our impact

Reflecting over the last 20 years, it has indeed been a journey punctuated with ups and downs, hits and misses, achievements and disappointments working with governments and other partners to catalyse enactment laws and regulations while also facilitating effective implementation of policies, regulatory systems and processes essential for development, testing, uptake, and utilisation of compelling GM products.

Back in the days, public opinion on GM technology in many parts of the world, particularly in Africa, was still steeped in controversy. The inclination in most African countries was was the promulgation of new laws and establishment of new institutions to regulate GM technology.

Public opinion on GM technology in many parts of the world, particularly in Africa, was still steeped in controversy. As a result, public policy on GM technology in most African states was laced with precautionary regulatory overtones. In these circumstances, regulatory regimes had emerged that implicitly assumed that all GMOs presented high risks unless proven otherwise, an approach which often required inordinate amounts of information and data to be included in the safety dossier for regulatory clearance. This precautionary regulatory approach had become a real challenge to progressive development and adoption of GM crops in Africa, even when such crops—especially those with traits for tolerance to pest and climatic stresses— could immensely benefit smallholder farmers on the continent.

Gains in policy and regulatory reforms

At AATF's inception in 2003, only South Africa, inspired by potential benefits of modern biotechnology, had commercialised GM crops in Africa with the first commercial cultivation of GM cotton in 1998. The country had adopted a National Biotechnology Strategy, a comprehensive policy framework that created incentives for the advancement of the biotechnology sector.

Taking cue from South Africa and encouraged by the prospect of revitalising its cotton sector to make it more globally competitive, Burkina Faso adopted a policy on biotechnology and biosafety through a Ministerial Decree in June 2004 that enabled the development of regulations and guidelines on biosafety. This step was followed by the enactment of the biosafety law in the National Assembly in early 2006. The law established L'Agence Nationale de Biosecurite (ANB) as the national competent authority on biosafety with a mandate to provide biosafety oversight, thereby fulfilling Burkina Faso's obligations as a party to the Cartagena Protocol on Biosafety. After several years of field trials, the country approved the commercial growing of Bt cotton in 2008. . However, progress dramatically slowed down in Burkina Faso through anti-technology advocacy groups calling for stringent regulatory oversight for GM crops. It took the intervention of AATF throught the launch of OFAB Country chapter in that country in 2012 to stem the anti-GM wave!

Our efforts to have other African countries establish enabling regulatory environments for developing, testing and commercialising biotech products were gaining momentum. Through OFAB project, AATF supported amongst other efforts: the passage of the Biosafety law in the two houses of Parliament in Nigeria in 2015; the amendment of Biosafety Regulations in Tanzania in 2015; the revision of the Biosafety Decree in Mozambique in 2014 and the adoption of Biosafety Regulations in 2017.

It is worth noting that we have worked with those African countries that have not developed and adopted explicit biosafety laws and regulations to establish substantive regulatory instruments – such as national environment regulations, food and drugs laws, and plant quarantine laws – that can be invoked to regulate the development, importation and commercialisation of GMOs.

Influencing favorable amendments to enacted policies and laws

Interventions by AATF and partners do not just stop at enacting policies and laws, but stretch to ensuring that any subsequent amendments are not prohibitive. For instance, acting on heightened anti-GM lobby efforts, Burkina Faso was compelled to draft an amendment to its biosafety law ostensibly to strengthen the legal status of ANB and increase its autonomy. This move, which culminated in Parliament passing the revised biosafety law in December 2012, almost introduced strict liability and other restrictive provisions on potential damage arising from GMOs. Through the timely intervention of AATF and partners, we ensured that the government did not ratify or implement this law as it would have stifled the gains achieved in biotech research and development activities in the country.

Working with partners, we contributed to the process that led Ethiopia to amend its Legal and Regulatory Framework of the Seed Sector, replacing the Seed Law issued as Proclamation No. 206/2000 in 2000 with the revised Seed Law of Ethiopia issued in 2013 as Proclamation No. 782/2013 that allows the introduction of GM seeds. Through our concerted efforts with partners and other stakeholders, the Seed Legislation and Regulations were revised and harmonised with the International Seed Testing Association to facilitate seed imports and exports of diverse crop cultivars. Prior to that we had supported the amendment of the country's Biosafety Proclamations (Proclamation No. 655/2009 to usher in the workable Biosafety Proclamation No.896/2015) that has permitted development and commercialization of GMOs in Ethiopia.

We are proud that through our combined efforts with partners, we have contributed to the establishment of conducive regulatory environments that have allowed smallholder farmers to grow a several GM crops - Bt cotton to Bt maize, and cowpea - in nine countries– Burkina Faso, Ethiopia, Egypt, Eswatini, Ghana, Kenya, Malawi, Nigeria, and Sudan

But challenges persist

Several African countries are signatories to the Cartagena Protocol on Biosafety and thereby exercise a guarded and precautionary approach to the implementation of GM technology. However, undue precaution in handling GM crops has in some instances turned out to be an Achilles heel that has hampered progress in some of these countries. For instance, in 2012, Kenya in applying the precautionary measures banned GM food imports in a move that appeared to be manifestly dysfunctional in a country that adopted a national biotechnology development policy in 2006 and enacted a biosafety law in 2009. Similarly, in Uganda, where several GM crops have been tested in CFTs for several years, advances in modern biotechnology applications are potentially at risk of stagnation due to the precautionary considerations fueled by the on-going sensational GM debates that have stalled the enactment of the biosafety law.

Some other African countries have taken the extreme policy of either consciously or inadvertently positioning themselves to prohibit the adoption of GM crops. For instance, The Republic of Benin has maintained a series of 5-year moratoria against activities in GM crops, including research and development since 2003.

Regulatory systems hardly exist at regional levels. For instance, only one regional economic community, COMESA has made sufficient progress toward harmonization of biotech policies and regulations.

Without AATF and other stakeholders' activities to support and influence the enactment of the policy, legislative and regulatory frameworks, African governments not only risked failing to enact a Biosafety Law that lays down legal and institutional frameworks for governing genetically modified organisms, but also risked enacting one that bans commercialisation of modern biotechnology.

All in all, it has been an interesting walk, with ups and downs, gains and misses, exciting moments and some that made me outright sad knowing what farmers in SSA were missing out on ... but we have managed to support governments achieve some fantastic changes that give us at AATF courage to soldier on.

Francis Nang'ayo

Senior Manager, Policy and Regulatory Affairs Manager

Applying the art of strategic communications to deliver transgenic agricultural technologies to smallholder farmers in SSA

AATF was unveiled in 2003, 7 years after commercialization of the first genetically modified (GM) crop, 7 years that were characterized by diverse scientific, political, economic, ethical, cultural, and even religious viewpoints that made agricultural biotechnology a contentious public issue. It is a scenario that polarised interested stakeholders of agricultural biotechnology with mixed messages from scientists, academics, activists, industry, and consumers contributing to confusion that could undermine our efforts of supporting development and utilisation of products of modern agricultural biotechnology.

Yet, at the core of AATF business plan was prioritising agricultural productivity in Africa and addressing the challenges affecting smallholder farmers through innovative technologies. We believed that technologies, including proprietary ones, were useful and needed by farmers. It is a belief that was informed and reinforced by developments in the agricultural arena with biotechnology – including genetic modification – proving to be effective in addressing production related stresses thus offering opportunity to contribute towards solving some of the smallholder farmer production challenges. By this time, the global area of transgenic crops had increased 40-fold, from 1.7 million hectares in 1996 to 67.7 million hectares in 2003, with an increasing proportion grown by developing countries. Of these, 20 million hectares of GM crops were grown in developing countries (https://www.isaaa.org/resources/publications/briefs/30/default.html). However, in Africa, it was only in South Africa that farmers were benefiting from growing GM crops.

The need

AATF was created to address a specific niche area – enhancing access, development and use of innovative agricultural technologies by smallholder farmers in Africa. Whereas 'technology' was widely defined to include chemical, mechanical, knowledge and others, a key aspect was biotechnology that included genetic modification and most recently gene editing. There was no way that these innovative technologies could effectively get to farmers without an enabling environment. AATF recognised early on that this was the missing link to realization of the set goals. There were glaring misalignments between the goals and the path towards those goals in form of policies, laws, and regulations. It also dawned on us that there was insufficient political support with conflicting pronouncements and actions from high- level government officials – even where relevant policies and systems were in place.

The founders of AATF must have realized that communications was going to be a critical contributor to the overall goal. Indeed, it was clear that the task ahead was not going to be easy. It was obvious there was deliberate effort being made to ensure biotechnology did not get to market under the pretext of biosafety,

environmental, and food safety concerns. The confusing scenarios around biotechnology as a result of conflicting messages where facts were distorted and confused with opinions needed to be addressed. The way out for us was enhanced information, knowledge sharing and capacity strengthening. We needed to debunk the myths and build confidence among decision makers while encouraging farmers to also in the conversation and testing of the technology. We needed innovative ways of communicating and engaging farmers, policy and decision makers, regulators, entrepreneurs, to ensure formulation and implementation of an enabling environment for development, testing, approval, and commercialization of agricultural technologies that had the potential to sustainably increase productivity, enhance resilience and adaptation to climate change.

Our approach: the birth of OFAB

To help re-direct positive attention towards agriculture biotechnology, we decided to focus on building people's confidence and trust in innovative technologies through strategic communications and advocacy approaches that support sustained awareness and engagement aimed at building meaningful relationships. We envisaged a systematic communications and outreach effort that would allow stakeholders including policy and decision makers in Africa, interrogate the technologies and make informed decisions based on better understanding and with the best interest of their countries in mind. Particularly effective would be a comprehensive, balanced approach that recognized the interdependence of seemingly disparate influencers: policymakers, country and regional decision makers, Afri¬can institutions and scientists, farmers and farmer groups, NGOs, CBOs, religious and community leaders and the media. Together they could form a strong coalition that would be able to address all parts of the debate in a reasonable, pragmatic manner. Therefore, availing a platform that would provide opportunity for continuous conversation on matters of innovative technologies, and that would encourage sharing of views and in-depth discussion on controversial matters as opposed to unbridled debates without facts became a very real option.

AATF established the Open Forum on Agricultural Biotechnology (OFAB) in 2006 and launched it at an event attended by Kenya government officials and various research organization leadership – both local and international. The launch of the platform followed discussions and consultations with a number of partners in the biotech ecosystem with all, including ABSF, AHarvest, ISAAA, and ACTS confirming the idea as beneficial and fit for purpose. To ensure the platform delivered

on the goals of consistent information sharing, the original concept defined OFAB's monthly topical discussions on biotechnology, anchored on a presentation or speech by an expert on the matter. The sessions were well programmed to ensure optimal use of people's time while building opportunity for networking and alliance building for resource optimization. Knowledge sharing and capacity strengthening were central to achieving the OFAB objectives with media playing a key role in dissemination. Although bound by one overall goals of working towards building better understanding of biotechnology as part of empowering decision makers, its focus and operations were to be country specific informed and guided by a country programming committee led by a government institution.

Setting up of OFAB fitted well into AATF's strategic objective of accessing, developing, adapting and delivering appropriate agricultural technologies for sustainable use by smallholder farmers in SSA through innovative partnerships and effective stewardship along the entire value chain.

The platform has provided an avenue for discussions, consultations and actions that go beyond any individual organization but instead pooling the efforts of all and owning results as a community. This has encouraged sharing of strategies, actions, concerns including joint definition of actions to take through structured issues management approaches. It also provides opportunity to celebrate together as progress is made and to encourage each other as we engage with challenging situations.

More governments shift from prohibitive to favorable biotechnology environments

In 2003, only one country on the continent, South Africa, was growing 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 laws. Several other countries like Kenya had policies on biotech but no law. Others like Mauritius had laws but no policies 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.

It has indeed been 20 years of impactful change. We have witnessed a positive growth in the number of countries enacting appropriate policies and biosafety regulations, from less than five in 2006 to the current 11 countries in Africa with Biosafety Laws. In collaboration with partners and other initiatives, OFAB has been able to build capacities of relevant policy decision makers thereby enabling them to make evidence-based decisions on the policies, laws, regulations and institutions their countries need. More countries are commercializing biotech products from only South Africa and Sudan to now six-Ethiopia, Kenya, Malawi, and Nigeria. The project has continued to work with stakeholders in activating and sustaining implementation of laws and regulations where they have not been tested; Safeguarding or maintaining gains or status quo where the system is working; Ensured that approved GM products are efficiently commercialized & used. Moreover, the project has continued to support capacity strengthening, awareness and education for technocrats; on-boarding critical process influencers and building a network of support across key stakeholder communities for counteracting the emotional fear-mongering propaganda that the opposition of GM is pedaling; built a regional network of biotech advocacy supporters, and reinforcement of rapid response and issue management mechanism to clear propaganda against GM crops.

Increased interest in understanding biotechnology (Expansion of OFAB)

OFAB Chapters have spread out across eastern, southern and west Africa regions courtesy of partnerships with national governments. The interest in OFAB grew following the launch in Kenya with several countries, especially those with ongoing biotech research, approaching AATF for partnership in biotech knowledge sharing and outreach. Whereas it was not possible for AATF to immediately commence OFAB activities in those countries due to financial considerations, it was gradually able to spread into nine additional countries. The country chapters include Uganda, launched in December 2007 through partnership with the National Council for Science and Technology (UNCST); Tanzania and Nigeria in 2009 through partnership with the Tanzania Commission for Science and Technology (COSTECH) and the National Biotechnology Development Agency (NABDA) respectively; Ghana in August 2011 in partnership with the Council for Scientific and Industrial Research (CSIR); Burkina Faso in October 2012 with the National Agricultural Study and Research Institute (INERA); and Ethiopia in June 2014 in partnership with the Ethiopian Institute of Agricultural Research (EIAR); Rwanda in with the Rwanda Agriculture Board (RAB); and followed by Malawi and Mozambique in 2022 in partnership with the

National Commission for Science and Technology (NCST) and the Mozambique's Institute of Agricultural Research (IIAM) respectively.

Partnerships for biotechnology

OFAB has over the years forged partnerships with various governments and organisations, keen on supporting enhancement of better understanding and use of agricultural biotechnologies. These partnerships bring together governments and government institutions, research organisations, regulatory organisations, communication and advocacy groups, academia, farmer and community-based organisations, private sector and more at the national, regional, continental and international levels. They each contribute to OFAB's goals based on areas of expertise and interest. It is these partners and the networks they bring that make up the OFAB community and support realization of the mutual interest for the good of the farmer. These networks support outreach efforts at all levels from grassroot to high political and government engagements. They invest time and money and take pride in farmers having access to choices that can make a positive impact on their livelihoods.

Building champions

Identifying and engaging champions of modern agricultural biotechnology has been a key OFAB strategy for building awareness of the technology. Champions serve as the voices of the communities they represent and for OFAB these voices include stakeholders along the food value chain such as politicians and farmers. To strengthen and encourage this voluntary work by champions, OFAB launched an annual programme to recognize individuals who have shown exceptional dedication to promoting science and biotechnology in September 2022, in Accra, Ghana, where 10 biotech champions including Jakaya Kikwete, the former President of Tanzania, were recognized.

Growing a positive relationship with journalists: Increased factual reporting

The media play a critical role in shaping perceptions and public attitudes generally and this role is well recognized in the agricultural biotech arena, in creating awareness, education and understanding of modern agricultural biotechnology.

However, like many other members of society, journalists' awareness and understanding of modern biotechnology was low resulting in equally low media coverage. We therefore made deliberate effort to engage with and strengthen the capacity of journalists on biotechnology to enable and grow their interest in the subject. We have trained 1,171 journalists to date, working with and through country media associations. Journalists were invited to trials and farmer field days as scientists also availed themselves for discussions and interviews providing opportunity for story generation.

In 2017, the OFAB community launched a media Award to recognize and encourage excellence in science reporting and celebrate the vital contribution of journalists in fostering productive discussions on agricultural biotechnology through responsible, professional, and ethical reporting. We have to date awarded 117 journalists across three categories: Print and online, Radio and Television. The Award is backed by a modest Journalism Grant introduced in September 2021 to enable in-depth coverage of agricultural biotechnology issues in Africa.

Reflections

It has been a long and winding journey for AATF and OFAB over the years, marked by significant achievements in the field of agricultural biotechnology in Africa. This strategic approach to communications and advocacy has played a pivotal role in shaping the perception, understanding, and acceptance of modern agricultural biotechnology across the continent. As we reflect on these achievements, it is evident that strategic communication and advocacy have been instrumental in transforming the landscape of agricultural biotechnology in Africa. AATF's commitment to empowering smallholder farmers and creating an enabling environment for biotechnology innovations remains steadfast. With continued collaboration and informed dialogue, we can look forward to even greater progress and sustainable agricultural development across the continent in the years to come.

Nancy Muchiri
Senior Manager, Communications and partnerships

Abbreviations & Acronyms

AfDB	African Development Bank
AGRA	Alliance for a Green Revolution in Africa
BMGF	Bill and Melinda Gates Foundation
CAADP	Comprehensive Africa Agriculture Development Programme
CAMAP	Cassava Mechanisation and Agro-processing Project
CAMBIA	Centre for the Application of Molecular Biology to International
CFT	Confined Field Trial
CIMMYT	International Maize and Wheat Improvement Center
CIP	International Potato Centre
COMESA	Common Market for Eastern and Southern Africa
CORAF	West and Central African Council for Agricultural Research and
COSTECH	Tanzania Commission for Science and Technology
CSIRO	Commonwealth Scientific and Industrial Research Organization Development
DFID	Department for International Development
DTMA	Drought Tolerant Maize for Africa
ECOWAS	Economic Community of West African States
EIAR	Ethiopian Institute of Agricultural Research
IAR	Institute for Agricultural Research
IIAM	Mozambique's Institute of Agricultural Research
IITA	International Institute of Tropical Agriculture
INERA	l'institut de l'Environnement et de Recherches Agricoles
IPR	Intellectual property rights
ISAAA	International Service for Acquisition of Agribiotech Applications
KALRO	Kenya Agriculture and Livestock Research Organization
LUANAR	Lilongwe University of Agriculture and Natural Resources
MCMV	Maize Chlorotic Mottle Virus
MLN	Maize Lethal Necrosis
NABDA	National Biotechnology Development Agency
NARO	National Agricultural Research Organisation
NARS	National Agriculture Research Systems
NCST	National Commission for Science and Technology
NGICA	Network for the Genetic Improvement of Cowpea for Africa
OFAB	Open Forum on Agricultural Biotechnology in Africa
PBR	Pod Borer Resistant (Cowpea Project)
PBS	Program for Biosafety Systems
PIPRA	Public Intellectual Property Resource for Agriculture
QBS	Qualibasic Seed Company
SADC	Southern African Development Community
Seeds2B	Seeds to Business
SSA	Sub-Saharan Africa
TAAT	Technologies for African Agricultural Transformation
UNCST	National Council for Science and Technology
USAID	United States Agency for International Development
WEMA	Water Efficient Maize for Africa

Prosperity Through Technology

Web: www.aatf-africa.org
Email: aatf@aatf-africa.org
Tel: +254-20 422 3700
P.O. Box 30709 - 00100, Kenya
Naivasha Rd, Nairobi.