



AFRICAN AGRICULTURAL TECHNOLOGY FOUNDATION
FONDATION AFRICAINE POUR LES TECHNOLOGIES AGRICOLES



Annual Report 2012

Deploying agricultural technologies for farmers

Better tools, better harvests, better lives



Deploying agricultural technologies for farmers

Annual Report 2012



AFRICAN AGRICULTURAL TECHNOLOGY FOUNDATION
FONDATION AFRICAINE POUR LES TECHNOLOGIES AGRICOLES

better tools, better harvests, better lives mieux s'outiller pour récolter plus et vivre mieux

AATF Annual Report 2012. Deploying agricultural technologies for farmers

ISSN 1817-5813

© African Agricultural Technology Foundation 2013. All rights reserved

The publisher encourages fair use of this material provided proper citation is made

Contributors: Idah Sithole-Niang', Denis T Kyetere, Hodeba J Mignouna, Nancy Muchiri, Grace Wachoro, Abu Umaru, Sylvester Oikeh, Elhadj Moussa Adam, Gospel Omanyia, Daniel Otunge, Charity Mutegi, Leena Tripathi, Amos Kimebur, George Marechera, Joseph Ndwiga, Prince Addae, Francis Onyekachi

Editors: Nancy Muchiri, Grace Wachoro, Monity Odera

Design and Layout: Predon Company Limited (predonltd@gmail.com), Nairobi, Kenya

Photographs: © Cover, page 20 and 50: Ariadne Van Zandbergen/Africa Media Online; Inside front cover Museum Africa/Africa Media Online; page ii Roger de la Harpe/Africa Media Online; page 25, 34: Lori Waselchuk/Africa Media Online; page 30 Paul Weinberg/Africa Media Online; page 40 Greg Marinovich/Africa Media Online; page 45 International Library of African Music/Africa Media Online; all other photographs AATF

Printing: Majestic Printing Works Ltd, Nairobi, Kenya

Cover: Rwandan Intore dancers in Rwanda

Inside front cover: Swazi dancers, South Africa

Table of Contents

Who we are	1
2012 Highlights	5
Message from the Board Chair	11
Message from the Executive Director	15
Imazapyr herbicide registered in Tanzania as country gears for commercialisation of maize varieties to fight the <i>Striga</i> weed	20
Successful <i>Bt</i> cowpea trials pave way for multi-locational testing in Nigeria as Ghana receives approval for first confined field trial	25
Banana cultivar lines with resistance to bacterial wilt disease developed in Uganda	30
WEMA prepares to deploy conventional hybrids and receives permits for <i>Bt</i> maize trials in Kenya and Uganda	35
Ghana and Uganda prepare to conduct rice trials as project generates transgenic lines for testing	40
Aflatoxin Control Project receives approval for on-farm testing in Kenya as demand for bio-control technology rises in Nigeria	45
Cassava Mechanisation and Agro-processing Project kicks-off in Zambia and Nigeria	50
Demand for OFAB grows as a sixth chapter is launched in Burkina Faso	54
Financial report	59
Board of Trustees 2012	62
AATF staff 2012	64



Swazi women dancing in Mpumalanga, South Africa



Who we are

The African Agricultural Technology Foundation (AATF) is a not-for-profit organisation that facilitates public-private partnerships to access and deliver appropriate agricultural technologies for use by resource-poor smallholder farmers in Sub-Saharan Africa.

AATF provides expertise in identifying, accessing, developing, delivering and using agricultural technologies. The Foundation also contributes to capacity building in Africa by engaging institutions on the continent in the diverse partnerships through which it executes its mandate.

AATF is a registered charity under the laws of England and Wales and has been given tax-exempt status in the USA. It is incorporated in Kenya and in the UK and has been granted host country status by the Government of Kenya where it is headquartered.

Vision – what we want for Africa's farmers

A prosperous and a food secure Africa.

Mission – *what we do for Africa's farmers*

To access, develop, adapt and deliver appropriate agricultural technologies for sustainable use by smallholder farmers in Sub-Saharan Africa (SSA), through innovative partnerships and effective stewardship along the entire value chain.

Core values – *what keeps us strong*

The Foundation strives to uphold three enduring core values: Integrity, Dedication and Accessibility. These values guide the decisions, actions and relationships as AATF works towards fulfilling its mission.

Our strategy

The AATF strategic re-positioning is that of a Centre of Excellence in agricultural technology access, development and deployment. The niche is the innovative response to challenges of low productivity in SSA agriculture. This is anchored on three strategic goals:

- access to appropriate agricultural technologies;
- develop and adapt technologies; and
- deploy and commercialise technologies for impact.

Our roots

The model for the AATF resulted from two years of consultations by the Rockefeller Foundation and the Meridian Institute with several African, North American and European stakeholders.

The sessions, referred to as the 'Biotechnology Dialogues', were held to determine ways to close the growing gap between the agricultural science controlled by developed countries and the needs of smallholder farmers in the developing regions of SSA. The involvement of stakeholders in these deliberations was ensured through a Design Advisory Committee (DAC), comprising representatives from African National Agricultural Research Systems, the Consultative Group on International Agricultural Research centres, African seed and biotech companies, the Organisation for Economic Co-operation and Development, crop science corporations and donor organisations. The DAC served as the architect of AATF, defining the major underlying principles and an operational model for the Foundation in addressing food security and poverty reduction challenges. The Committee also elucidated the core rationale for AATF and its fundamental principles, mission and business model.

Governance

AATF is a flexible organisation designed to respond to the changing needs of its stakeholders. The Board of Trustees charts the course by deciding which interventions hold the greatest promise for reducing poverty and increasing food security. The management and staff are responsible for the day-to-day management of operations and project development.

This creates a healthy separation between the setting of priorities and monitoring of progress on the one hand, and day-to-day management and operations on the other. AATF's Board members are distinguished individuals from around the world, while the Foundation's staff are nationals of countries in SSA.

Investors

- The United States Agency for International Development: provides economic, development and humanitarian assistance around the world in support of the foreign policy goals of the United States.
- The United Kingdom's Department for International Development: a department of the British Government that leads Britain's fight against global poverty, delivering UK aid around the world.
- The Bill & Melinda Gates Foundation: guided by the belief that every life has equal value, the Foundation works to help all people lead healthy, productive lives. In developing countries, it focuses on improving people's health and giving them the chance to lift themselves out of hunger and extreme poverty.
- The Howard G. Buffett Foundation: is a private family foundation that works to improve the standard of living and quality of life for the world's most impoverished and marginalised populations. The Foundation's primary funding areas are agricultural resource development for smallholder and subsistence farmers and clean water delivery to vulnerable communities in Africa and Central America.
- Rockefeller Foundation: a knowledge-based, global foundation with a commitment to enrich and sustain the lives and livelihoods of poor and excluded people throughout the world.
- PepsiCo: is a global food and beverage company that supports and invests in the local communities where the company operates, which includes partnering with local farmers, governments and community groups.

Partners

- Agricultural producers and consumers
- National and regional institutions and agencies (NARs, SROs, RECs, ECA, FARA, AU/NEPAD)
- International institutions/agencies (CGIAR, ARIs)
- Local/international NGOs
- Agricultural technology industry intellectual property holders (Monsanto, Arcadia Biosciences, BASF, DowAgro, Pioneer/DuPont, Syngenta)
- African trade and agribusiness organisations
- African governments



Left to right: Denis T Kyetere, Executive Director, AATF, Rhoda Tumusiime, AU Commissioner for Agriculture and Rural Development, and Ibrahim Miyaki, Chief Executive Officer, NEPAD during the AATF–AU MoU signing ceremony in Addis Ababa, Ethiopia in January 2012

2012 Highlights

January

- Dr Denis T Kyetere assumes office as the new Executive Director for AATF on 3 January.
- AATF and the Africa Union-NEPAD sign a Memorandum of Understanding (MoU) in Addis Ababa, Ethiopia on 23 January that will see the two organisations collaborate to mainstream AATF activities into the Comprehensive Africa Agriculture Development Programme.
- The *Striga* Control in Maize Project holds its annual review and planning meeting in Kisumu, Kenya on 31 January that is attended by over 20 participants representing community based organisations and seed companies working on the Project in Western Kenya.

February

- AATF and the Africa Seed Trade Association (AFSTA) sign an MoU on 2 February that will enable the two organisations to work together to facilitate delivery of certified seed products emanating from AATF projects to resource-poor farmers in Sub-Saharan Africa (SSA).

- The Water Efficient Maize for Africa (WEMA) Project holds its fourth annual review and planning meeting from 6–10 February in Polokwane, South Africa. The meeting was attended by over 60 participants with each project team presenting their 2011 activities and plans for 2012.

March

- The *Maruca*-Resistant Cowpea Project holds its planning and review meeting in Accra, Ghana from 1–2 March and reviews progress made in the three project countries of Nigeria, Ghana and Burkina Faso in 2011 and develops the 2012 work plan.
- AATF and the International Centre for Insect Physiology and Ecology sign a partnership agreement on 5 March under the Integrated *Striga* Management in Africa Project to enable the two institutions undertake a survey on *Striga* weed management technologies in Kenya.
- AATF and Japan Tobacco sign a license agreement allowing AATF to access the PureIntro® plant transformation technology for use in the Nitrogen Use Efficient Water Use Efficient and Salt Tolerant (NEWEST) Rice Project.
- Cassava Mechanisation & Agro-processing (CAMAP) Project staff visit Brazil from 12–24 March to survey the available labour-saving production technologies that can address cassava production and processing constraints among smallholder farmers in SSA, identify possible partners and also negotiate for access and transfer of the technologies.



AATF Board of Trustees visit the Bacterial Wilt-Resistant Banana Project confined field trial in NARO, Uganda in April 2012

April

- The AATF Board of Trustees holds its 19th Board meeting in Kampala, Uganda from 18–19 April where members review AATF activity implementation progress and budgets and also receive other management reports. During the meeting Dr Stan Blade was appointed to serve as Vice-Chair to the Board.

The members also



Left to right: Ruth Ssebuliba, Seed Business Development Officer AFSTA, Jane Achando, Legal Officer AATF, Justin Rakaotoarisaona, Secretary AFSTA, Denis T Kyetere, Executive Director, AATF and Gospel Omanyara, Seed Systems Manager AATF during the AATF–AFSTA MoU signing ceremony in Nairobi in February 2012

visited the NEWEST Rice and Bacterial Wilt-Resistant Banana project sites located at the National Agricultural Research Organisation's research stations in Namulonge and Kawanda.

May

- The Open Forum for Agricultural Biotechnology in Africa (OFAB) marks its fifth anniversary since its launch in September 2006 in an event held in Accra, Ghana on 1 May.
- AATF holds a 'Strategy Refresh' workshop in Nairobi, Kenya from 28–30 May, attended by 30 key stakeholders and partners including Board members.

June

- The CAMAP Project staff visit Nigeria from 3–14 June to identify potential project partners. The team also met with the International Institute of Tropical Agriculture, the implementing agency of the Federal Government National Cassava Transformation Agenda and explored possible areas of collaboration.

July

- The WEMA Project undergoes an end of Phase I review from 1–18 July that indicated it had met the objectives set for the phase.

Phase I of the project ran from March 2008 to February 2013. The review was conducted by consultants on behalf of the project donors, Bill & Melinda Gates Foundation and the Howard G. Buffet Foundation.

- The Bacterial Wilt-Resistant Banana Project partners meet from 11–13 July in Kampala, Uganda to review project progress and plan for 2012 and 2013 activities.
- AATF organises a confined field trial (CFT) compliance management training in Accra, Ghana on 24 July to enhance the capacity of teams responsible for managing the *Maruca* Resistant Cowpea and NEWEST Rice projects in Ghana, Burkina Faso and Nigeria.
- The WEMA intellectual property and management team holds its review meeting on 29 July alongside a licensing training in Pretoria, South Africa.

August

- The *Striga* Control in Maize Project holds a planning and strategy meeting in Nairobi, Kenya from 13–14 August attended by representatives from Kenya, Uganda and Tanzania including seed companies who reviewed the status of the Project since its launch in 2006 and also discussed plans for the 2012 short rains and the 2013 seasons.
- WEMA Project product development team members tour trial sites in South Africa, Mozambique and Tanzania to evaluate drought-tolerant conventional trials.



The WEMA Project fourth annual review meeting participants during a field visit to smallholder farms in Limpopo, South Africa in February 2012



Participants who attended the AATF strategy refresh workshop in Nairobi in May 2012

- The *Striga* Control in Maize Project holds a farmers' field day in Tanga, Tanzania on 24 August that was attended by over 200 farmers, project partners and extension personnel.

September

- The WEMA Project holds the second regional stakeholder meeting in Nairobi, Kenya from 10–13 September that is attended by over 40 key stakeholders from the five project countries including members of parliament, policy makers, WEMA champions, seed companies and associations representatives, farmer groups and the media. The stakeholders discussed the Project's plans to deploy the WEMA conventional and transgenic drought-tolerant and insect protected maize varieties as the Project moves into Phase II (2013–2018).
- The WEMA Project deployment team holds a workshop on the WEMA conventional products on 13 September that are expected to be released in 2013. The workshop is attended by 31 participants who also had an opportunity to evaluate promising WEMA conventional hybrids at Kiboko field station in Makindu, Kenya.

October

- OFAB launches its sixth chapter in Burkina Faso on 22 October at an event attended by over 50 participants including representatives from government and biotech stakeholders. This is the first OFAB chapter

in Francophone Africa and it is a collaboration between AATF and the Institut de l'Environnement et de Recherches Agricoles (INERA).

November

- AATF holds a training for researchers and scientists working in various banana projects in the eastern Africa region from 26–30 November in Kigali, Rwanda aimed at building capacity in efficient banana tissue culture processes. The 24 participants were drawn from Kenya, Uganda, Tanzania, Rwanda, Democratic Republic of Congo and Burundi.
- WEMA deployment team holds its review and planning meeting from 12–14 November 2012 in Cape Town, South Africa. The participants drawn from all the partner organisations including the five project countries also developed a draft project deployment strategy.
- The AATF Board of Trustees holds its 20th Board meeting in Maputo, Mozambique from 7–8 November to review the organisation's progress. They visited the WEMA trial sites in Chokwe and also paid a courtesy call on the Director General of the National Agriculture Institute of Mozambique, Dr Inaccio Maposse.
- The *Maruca*-Resistant Cowpea Project partners organise a one-day stakeholder sensitisation workshop on 8 November in Zaria, Nigeria to update them on progress made in the development of the *Maruca*-resistant cowpea varieties. The event was attended by over 200 participants including academicians, scientists, students, farmers, policy makers and the media.

December

- Over 30 journalists attend a workshop to strengthen their understanding of biotechnology and science reporting organised by the *Maruca*-Resistant Cowpea Project in Abuja, Nigeria where the participants had the opportunity to interact with scientists working on the Project.
- The WEMA communication team holds its 2012 end of year review and 2013 planning meeting in Nairobi, Kenya from 3–7 December. The meeting attended by over 10 team members drawn from the five WEMA countries and partner organisations also drafted the communication strategy to support the Project's Phase II activities and deployment.

Message from the Board Chair



AATF is about African farmers and providing them with practical technology solutions because technology offers hope towards reversing the low agricultural productivity trend in Africa that makes it lag behind the global average.

Hunger and poverty go hand in hand. These twin challenges remained matters of concern for African governments and development agencies working in the region during 2012. Stimulating increased food production to enhance food security and create wealth for smallholder farmers and consequently contribute to poverty reduction is a key goal for Africa. Some key messages that were repeated throughout the year by agriculture and development experts in support of the role of technology in food security and economic development in Africa included: 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.

I am happy to report that in line with its mandate of accessing, adapting and delivering appropriate agricultural technologies for use by smallholder farmers in Sub-Saharan Africa (SSA), AATF played its role

in supporting Africa's scientists and farmers gain access to technologies that have potential to make a difference during 2012. AATF is about African farmers and providing them with practical technology solutions because technology offers hope towards reversing the low agricultural productivity trend in Africa that makes it lag behind the global average.

The Foundation began the year on a high note with a strategy refresh exercise in May for which I must thank management on behalf of the Board. Motivation for that refresh came from the realisation that AATF needed to be more responsive to the changing environment and stakeholder expectations while aligning its work with that of other agricultural players in Africa.

Various key stakeholders, including donors, partners, representatives from regional agricultural organisations and the management participated in the exercise. The result of the refresh is a more dynamic strategy that will see AATF focus on appropriate technologies whether proprietary or not. These technologies will provide the organisation with the opportunity to reach even more farmers in SSA faster through availing a larger pool of tools to address their constraints; and expand its reach of farmers to also include resource-constrained and not smallholders only, a definition that is based on size of land. The refreshed strategy will also see the injection of commercial skills into the Foundation's staffing to support its product deployment activities; and the application of impact driven and results based management with a fitting planning, monitoring and evaluation system.

AATF's work depends on partnerships. Partnership formation and management therefore is at the core of its work and is the means by which the organisation achieves its goals. In this respect, the organisation signed memoranda of understanding (MOU) with key continental and regional organisations to support its work across Africa. These include agreements with the Africa Union Commission, the Forum for Agricultural Research in Africa, the Conseil Ouest et Centre Africain Pour La Recherche et le Developpement Agricoles and the Africa Seed Trade Association. These and the various other partnerships entered into during the year are important for the organisation 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 organisation launched two new exciting projects during 2012 – Cassava Mechanisation and Agro-processing Project (CAMAP) and Hybrid Rice Project. CAMAP is focusing on accessing appropriate labour-

saving cassava production technologies for use by farmers and is being piloted in Nigeria and Zambia. These technologies include machinery that includes cassava root planters, diggers and harvesters. The introduction and use of these technologies will stimulate cassava mechanisation along the product value chain that will see increased production of the crop and also reduce post-harvest losses. In addition, the Project will also support the increase of cassava supply from farmers to industries such as those involved in bread and maize flour making in countries whose governments have mandated the use of cassava flour in the two products.

The Hybrid Rice Project's goal is to improve food security and rural livelihood among small-scale producers by developing hybrid rice with significant yield advantage and creating sustainable hybrid rice agrobusinesses to support farming of the crop in SSA. The Project will also focus on the development of private business capability to develop, produce and distribute rice hybrids for their farmer customer base.

For AATF, these new projects are special in many ways. They provide fast access to change-making technologies with potential to quickly and positively impact farmers. CAMAP is also the first mechanisation project for AATF and will without doubt provide great learning and experience for the Foundation.

The current AATF projects continued to make significant and encouraging progress. These successes are outlined in the Executive Director's message and are also detailed in each project's story in this report. I am, however, delighted to note here that progress made during the year is bringing these technologies closer into the farmers' hands. The Board congratulates the management and the project partners for their efforts.

As noted above, AATF made commendable progress during 2012. However, the ultimate success for AATF work will be realised when the products are in farmers' hands. The impressive milestones being recorded above by AATF and its partners will require much more support beyond scientific excellence to reach their end goals. This support will mainly have to do with enhancement of an enabling environment – regulatory, legislative, infrastructural – that is critical to the realisation of products through agricultural science and technology. Combining this support with the scientific excellence evidenced in the project progress will move these technologies from potential to impacts. 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 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.

The Board was delighted to welcome two new members in 2012 – Dr Stanford Blade and Mr Rory Radding. Dr Blade is the Chief Executive Officer of the Alberta Innovates Bio Solutions Corporation (AI-Bio), Canada – a provincial government agency that leads and coordinates science and innovation to grow prosperity in Alberta’s agriculture, food and forestry sectors. He previously served as the Deputy Director General (Research) for the International Institute of Tropical Agriculture. Dr Blade was elected as the Board Vice-Chair during the year. Mr Rory Radding is a seasoned intellectual property lawyer and a partner in the Edwards Wildman’s Intellectual Property Group, USA. Mr Radding is recognised in ‘The International Who’s Who of Business Lawyers’, ‘New York Super Lawyers’ and ‘Best Lawyers in America’. The two are valuable additions to the Board and we look forward to their contribution.

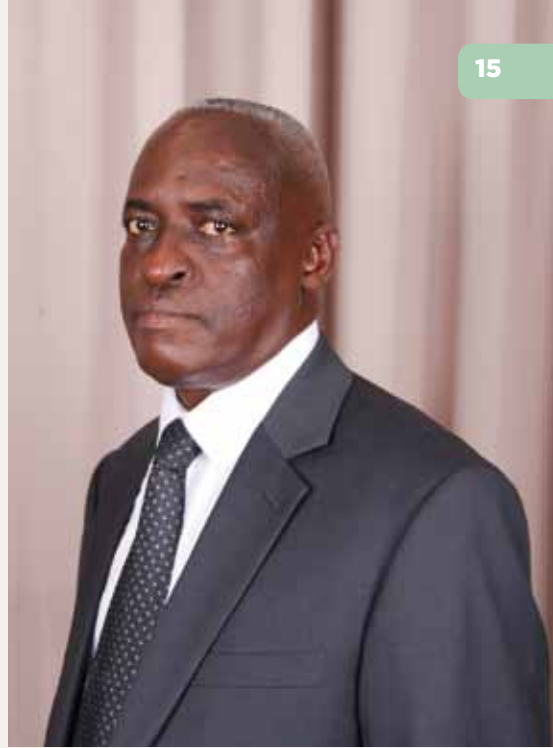
The Board bid farewell to Ms Josephine Okot who left to pursue other commitments and Mr Kevin Nachtrab who completed his term in office. Ms Okot and Mr Nachtrab had served on the Board for six and nine years, respectively. The Board appreciates their contribution to AATF over the years and wishes them well.

On behalf of the Board I would like to express my appreciation to all our investors and partners for working with us in 2012. Without their support we would not have achieved the milestones we had set and are proud of. My special appreciations go to the AATF staff who continued their efforts and commitment towards delivery of the AATF mandate. We are getting closer to the goal – let us all press on.

Prof Idah Sithole-Niang’

Chair, AATF Board of Trustees

Message from the Executive Director



Partnerships are at the heart of AATF operations. As recommended by stakeholders during the strategy refresh, we undertook to not only widen our partnerships and collaborations but to also add value to these partnerships through structuring real action and result based arrangements.

The year 2012 was a busy and rewarding one for AATF. The Foundation realised a number of key achievements amidst learnings that will undoubtedly help grow it into a better, weathered and tested partner in its business.

The Foundation registered growth in various ways during the year. We added two new projects to our portfolio bringing the total to nine active projects; we expanded our geographic coverage into one new country (Zambia) bringing the total number of countries in which we operate to ten; we increased our collaborations across the continent through new and renewal of engagements; and made commendable progress towards enhancing our financial status through resource mobilisation.

Activities for the year were mainly influenced by the strategy refresh exercise carried out in May 2012, following which management was tasked with implementation and I am happy to report that good progress has been made.

One of the landmark achievements for the year was the adoption of the *AATF Monitoring, Evaluation, Learning, Improvement and Alignment* (AMELIA) system that will support the Foundation to realise impact driven and results based management that will help demonstrate our work to stakeholders. The system will help track progress and results and also serve as a planning tool thus ensuring effective and efficient utilisation of staff time. It is proving to be a very useful system and I am certain that it will impact overall approach to planning, monitoring and evaluation.

Ensuring a balance of staff skills and well trained employees is critical to realisation of our mandate that runs across the full value chain from negotiation of technologies, production and delivery of products to farmers. We therefore commenced recruitment of high calibre staff to support deployment and commercialisation of our products. The new staff will join AATF in 2013. This will help us realise a balanced staff of technical, commercial and administrative talent. In addition, we continued capacity strengthening efforts for staff and partners through subject specific trainings and workshops to ensure that we have the necessary skills to carry out our work – details of these are in the project reports. We also undertook internal staff team building activities to enhance cohesion and cooperation and I am happy to report that we closed the year with a more focused, productive and united team that will deliver on the organisation's goals.

Partnership development

Partnerships are at the heart of AATF operations. As recommended by stakeholders during the strategy refresh, we undertook to not only widen our partnerships and collaborations but to also add value to these partnerships through structuring real action and result based arrangements. In this regard therefore, we signed a Memorandum of Understanding with the African Union Commission that will see mainstreaming of AATF work into the Comprehensive Africa Agricultural Development Programme process and another with the African Seed Traders Association that will support the uptake and distribution of seed from AATF projects. We also reviewed and signed new agreements with the Forum for Agricultural Research in Africa and the Conseil Ouest et Centre Africain Pour La Recherche et le Developpement Agricoles that will provide for impactful relationships.

Resource mobilisation

Exciting progress and results were realised in our resource mobilisation efforts. We kicked off our resource mobilisation campaign dubbed 'Africa Thriving: Practical Solutions for Farmers', early in the year with the goal of raising US\$ 85 million within the next five years. We received a lot of interest from prospective investors with the Rockefeller Foundation, AATF's original investor and founder, and PepsiCo, contributing to this goal. To enhance these efforts, we recruited a staff member who will join in 2013. I would like to thank the Board of Trustees, current donors, partners and friends, who joined hands with us in this campaign.

Technology access

The Foundation continued to support the access of new technologies to enhance the development of improved agricultural products for smallholder farmers. During 2012, AATF supported negotiations and access to two key technologies needed by two partnership projects. This includes access to Japan Tobacco Company's Pure Intro transformation technology for use in the Nitrogen Use Efficient, Water Use Efficient and Salt Tolerant (NEWEST) Rice Project. The technology which will be sub-licensed to Arcadia Biosciences, the product development partner in the project, will improve efficiency in generating transgenic lines and thus save time in product development. We also managed to negotiate access to cassava equipment from Brazil for distribution to smallholder farmers to increase mechanisation along the value chain, reduce drudgery and contribute to increasing production and reducing post-harvest losses. With access to these equipment, we were able to launch the Cassava Mechanisation and Agro-processing Project (CAMAP) whose activity implementation began in August 2012.

Progress on projects

We launched two new projects during 2012. The two – CAMAP and Hybrid Rice – provide AATF with an exciting project portfolio that promises faster delivery of products to farmers. Already farmers and government officials in Zambia and Nigeria have shown enormous interest in the CAMAP machinery as it directly impacts the ability to produce more, faster and better. CAMAP is working with various players including government departments, farmers, fabricators, agro-processors, service providers, and extension agents towards increasing cassava yields, market size and incomes from the sale of cassava products, while decreasing the demand

on the labour market and drudgery for women who constitute 75 percent of cassava farmers and processors.

The Hybrid Rice Project is a partnership funded by the Bill & Melinda Gates Foundation (BMGF) that is developing hybrid rice with significant yield advantage that will create sustainable hybrid rice agro-businesses to support farming of the crop in east, west and southern Africa. AATF will continue looking for these quick-win projects that have potential to make faster difference to our farmers while complementing our current long term ones.

The other ongoing projects and programmes recorded significant progress during the year. Below is a summary of progress made – the details are in the particular project reports.

The *Maruca*-Resistant Cowpea Project identified two lines that are showing great promise towards realisation of a *Maruca*-Resistant cowpea. These will be taken into multi-locational trials in Nigeria during 2013. In addition, Ghana will plant its first confined field trial (CFT) in 2013 following approval by the National Biosafety Committee in November 2012.

The NEWEST Rice Project progressed its product development activities and the transgenic rice seeds of selected events are ready for CFTs in Uganda and Ghana during 2013.

The Aflatoxin Bio-control in Maize and Peanuts Project progressed its efficacy testing in Kenya from on-station to on-farm trials giving farmers first-hand experience with the product.

The Bacterial Wilt-Resistant Banana Project evaluated 65 transgenic plants and non-transgenic mother plants for Banana *Xanthomonas* Wilt (BXW) resistance in CFT in Uganda and 12 lines showed resistance to BXW and are being evaluated for second ratoon plants. In addition, work started in Kenya to generate transgenic events for banana varieties important for the Kenyan market.

The Water Efficient Maize for Africa Project successfully completed its Phase I and commenced on Phase II. It entered 29 promising conventional drought-tolerant hybrids into the National Performance Trials (NPTs) in Kenya and Uganda and one hybrid will be released to farmers in Kenya during 2013. In addition, approval was given by the Kenya and Uganda biosafety authorities to conduct *Bt* insect-pest resistance maize CFTs from 2013.

The *Striga* Control in Maize Project received a boost with the registration of the Imazapyr Resistant (IR) herbicide in Tanzania during the year, paving way for commercialisation of the IR maize seed in the country.

The herbicide is used to coat the maize seed giving them resistance to the *Striga* weed.

The Open Forum on Agricultural Biotechnology in Africa (OFAB) celebrated its fifth year anniversary and received a US\$ 3 million boost from the BMGF which enabled it to expand its work and open a sixth chapter in Burkina Faso, the first in Francophone Africa. OFAB is proving to be a useful avenue for sharing information and knowledge on biotechnology where over 50 meetings were held during the year under the OFAB platform in the six countries on different topics of interest to biotechnology in Africa.

The general operating environment during the year supported our work albeit the disruptions that continue to stalk the development and utilisation of innovative technologies, especially biotechnology. Negative voices against use of some technologies have been heard across Africa and abroad. As an African organisation set up to access and deliver appropriate technologies, including biotechnology to increase the agricultural productivity of African smallholder and resource constrained farmers, these negative voices are of concern. We are however encouraged to note the AU/NEPAD's support and commitment towards guiding African governments in their decision-making regarding these technologies. We will contribute towards enriching this process by providing balanced information on biotechnology to support smallholder and resource constrained farmers to access these novel technologies.

I would like to most sincerely thank the AATF Board of Trustees for their invaluable guidance and encouragement; our investors and partners for their support; and the AATF staff for their hard work during the year. I wish to reiterate AATF's commitment to ensuring that our efforts and project partnerships deliver on our promise to smallholder and resource constrained farmers in Africa. I hope you enjoy reading this report.

Dr Denis T Kyetere

Executive Director



A Maasai dance in Kenya

Imazapyr herbicide registered in Tanzania as country gears for commercialisation of maize varieties to fight the *Striga* weed

As the project progresses into 2013, the focus will be to follow up on the registration of the Imazapyr herbicide in Uganda and to support enhanced strategic demonstration work in all the countries to upscale adoption of the technology that is bound to make food security an achievable dream.

Dr Gospel Omanyara, Seed Systems Manager, AATF

Farmers in Tanzania whose maize production has continued to suffer from the infestation of the noxious *Striga* weed will soon have access to Imazapyr Resistant (IR) maize varieties that control the weed. This follows the official registration of the Imazapyr herbicide by Tanzania's Tropical Pesticides Research Institute in November 2012. The herbicide is used to coat maize seed giving them resistance to *Striga*. This makes Tanzania the second country after Kenya to benefit from this technology that is improving maize yields under *Striga* infestation in parts of Kenya.

Striga is a major parasitic weed that infests about 20 million hectares of arable land in Sub-Saharan Africa (SSA). Serious infestation by the weed often results in total crop loss and even abandonment of some arable land, leading to increased food insecurity and rural poverty among an estimated 120 million households in SSA. Tanzania is the most infested country in East Africa with more than 600,000 hectares in 11 regions under the weed causing cereal yield losses estimated at 1.7 million tonnes valued at approximately USD 356 million.

By controlling *Striga* weed infestation, the Project hopes to increase maize grain yields as a contribution to food security among rural farm households. To accomplish this, the Project is facilitating access to and delivery of IR maize technology, which is also referred to by its trade name, StrigAway® maize.

The technology comprises use of herbicide-resistant maize seed and innovative seed coating with Imazapyr herbicide. Imazapyr-coated maize seed imbibe the Imazapyr herbicide upon germination. When the *Striga* seedling attaches to the maize roots, it takes in water, nutrients and the herbicide, which is fatal to the parasitic weed and not the crop.

The Project has been active in Tanzania since 2008 and has made progress under Tanseed International, the lead partner for the Project in the country. Tanseed

40 million
*hectares of land infested with Striga
in Sub-Saharan Africa*

20 years
*amount of time Striga seeds remain
dormant and viable in the soil*

20–80 percent
*proportion range of yield losses on
maize caused by Striga*



Isaka Mashauri, the Managing Director of Tanseed International, Tanzania, explains how to identify the Striga weed and how it works to destroy a maize plant during a farmers' field day in Muheza, Tanga in August 2012

focused on the production of certified IR maize seed and on promotion of the technology in the country. The Project produced 0.84 tonnes of breeder seed against a target of 0.5 tonnes and 2.6 tonnes of foundation seed during 2012.

Kenya and Uganda continued to make significant progress towards the deployment of the IR maize seed to smallholder farmers.

In Uganda, the Africa 2000 Network and partners promoted the IR maize Longe 7H variety which was evaluated under the recommended farmer management conditions on smallholder farms of Eastern Uganda, one of the areas in the country that is heavily infested with the weed. This activity also served as an avenue of creating awareness on the StrigaAway® maize technology among smallholder farmers, community based organisations, seed producers, researchers and policy makers.

The team in Uganda also carried out farmer identification, installation of over 1,000 trials, data collection, outreach programmes and documentation of farmer experiences. The outreach saw 30 sensitisation meetings on *Striga* management conducted at the sub-county level reaching over 20,000 farmers and 950 groups.

The above activities were carried out alongside those of getting the IR herbicide and the IR Longe 7H maize variety registered in the country. The Longe 7H hybrid has been successfully converted into an IR-maize hybrid and has been incorporated in the demonstration pack in Uganda.



Richard Obbo at his IR maize demonstration farm in Tororo, Uganda where farmers are evaluating the IR Longe 7H variety as they await the registration of the IR herbicide that will allow for the commercialisation of the variety

In Kenya, the partners coordinated by Maseno University concentrated on scaling up the commercialisation and adoption of Western Seed 303 (WS 303) StrigAway® maize variety. This involved engaging more agro-dealers to stock the variety and increasing the adoption of other *Striga* control and soil health improvement technologies in an effort to reduce the *Striga* weed threat and increase food productivity. In addition, the Project engaged in building the capacity of NGOs, farmers and agro-dealers on *Striga* control, soil health and data collection. Trained agro-dealers are seen as real change agents capable of hosting on-farm learning sites that can be used to create more awareness through on-farm demonstrations and during field days.

During 2012, over 27 tonnes of IR maize seed was produced and distributed to 24 agro-dealers out of which over 23 tonnes was sold to farmers and another 4.8 tonnes used to set up demonstrations for promotion of the technology. In the process, the Project trained 73 agro-dealers on how to stock IR maize seed and advice farmers.

The Kenya team also trained 30 District Crop Officers and 347 Divisional Agricultural Extension staff on *Striga* and soil health. In addition, 119 farmers were trained on *Striga* biology, soil health and value chain in agriculture. Outreach activities reached about 30,000 farmers.

In the area of project management, the IR Maize Project Steering Committee for Kenya, Uganda and Tanzania, held one meeting in August 2012 to guide and follow-up on *Striga* control activities in the region. The committee also continued to work with the Integrated *Striga* Management in Africa (ISMA) Project in Kenya through which four roundtable meetings were held to review and plan *Striga* work in the country. ISMA is a partnership coordinated by the International Institute of Tropical Agriculture (IITA) and brings together AATF, BASF, the International Maize and Wheat Improvement Center, the International Center for Insect Physiology and Ecology, and the Tropical Soil Biology and Fertility of the International Center for Tropical Agriculture. AATF's role in the Project is to support IR maize technology delivery and stewardship of seed dissemination.

'As the Project progresses into 2013, the focus will be to follow up on the registration of the IR herbicide in Uganda and to also support enhanced strategic demonstration work in all the countries to upscale adoption of the technology that is bound to make food security an achievable dream,' says Dr Gospel Omanyia, the Seed Systems Manager at AATF.



Killion Otieno Ouko

I am an agro-dealer in Kiboswa market in Nyahera, Kisumu County of Kenya. I sell a variety of agricultural inputs to farmers. These include various types of seeds for common crops grown in this area including maize.

In addition to being an agro-dealer, I am also a farmer and one of the crops I grow is maize. This area is heavily infested with the *Striga* weed that adversely affects maize production. As an agro-dealer, I am always looking for new seed varieties that can help farmers and also boost my business. I got to know about the Imazapyr Resistant (IR) maize seed that is effective in controlling *Striga* in 2009. The variety is known as WS 303 and is produced by Western Seed Company. It was introduced to me by William Bodo from the Nyanza Center for Destitute, a community based organisation that promotes the technology among farmers.

I tried out the IR maize on my farm first to see if it works before stocking it in my shop. I planted the seed on one acre and harvested eight bags of maize. Previously, the best harvest I got from the same acre of land was one and a half bags of maize. Compared to other seeds, I confirmed that the IR maize variety is effective in controlling *Striga*.

I have attended various field days and seminars on the use of IR maize seed that has helped me to educate farmers when they come to purchase seed. Some of the important aspects I have learnt include how the herbicide that coats the seed works to kill the *Striga* seed that is in the soil, the different physiological changes the plant undergoes as the Imazapyr herbicide works, and the need to handle the seed separately during storage and planting. This knowledge is important because if farmers are not aware and they don't adhere to the handling requirements their seed will not germinate and they will think that the technology does not work. I have known farmers who in ignorance have uprooted their maize plants when the leaves yellowed not knowing that it is normal and is an indication that the herbicide is working.

Agro-dealers being the first point of contact with farmers need the above information to be able to advise farmers on the effective use of the technology. Trainings and attendance of field days and seminars like the ones I have undergone are thus very important.

Successful *Bt* cowpea trials pave way for multi-locational testing in Nigeria as Ghana receives approval for first confined field trial

The Project made significant progress with CFTs in Nigeria and Burkina Faso recording consistent results with previous trials that confirmed the efficacy of the tested events against the *Maruca* pod borer. Ghana also achieved a major milestone with the grant of the approval to conduct CFTs.

Dr Prince Addae, Cowpea Project Manager, AATF



Women dance at a festival in Mepe, Ghana

During 2012, Nigeria and Burkina Faso successfully conducted confined field trials (CFTs) for the *Maruca*-Resistant Cowpea Project whose results confirmed the efficacy of two events against the *Maruca* pod-borer. These findings were consistent with results from previous trials conducted in 2011 in the two countries that indicated that lines 709A and 252D were resistant to *Maruca*. These results paved way for multi-locational trials to be conducted in Nigeria in 2013. The Project also achieved a significant milestone following the approval granted by Ghana's National Biosafety Committee (NBC) in November 2012 to the Council for Scientific and Industrial Research - Savannah Agricultural Research Institute (CSIR-SARI) to conduct CFTs in 2013. This makes Ghana the third country in Africa to conduct CFTs for *Bt* cowpea.

Apart from efficacy trials, the Project also compared and evaluated the performance of the transgenic versus the non-transgenic lines against the *Maruca* pod-borer. This was carried out through the installation of both infested and non-infested trials in Nigeria. The un-infested trial was conducted to demonstrate whether the transgenic lines perform comparably to the non-transgenic parent line in the absence of insect damage and

whether there is any yield drag associated with the transgene. The results did not show any yield drag by the transgene after the data was analysed.

Following the grant of the three-year permit to CSIR-SARI to conduct CFTs, the Ghana team led by the Principal Investigator and an entomologist visited the Institute of Agricultural Research (IAR), Nigeria to familiarise themselves with the operations of implementing CFTs and managing *Maruca* rearing. Six lines including the two promising lines from the Nigeria and Burkina Faso trials will be tested under high insect pressure in Ghana in 2013. Plans are underway to establish a *Maruca*-rearing facility for artificial infestation of these lines to determine efficacy in controlling *Maruca* in Ghana.

12.5 million
*hectares of land on which
cowpea is grown in Africa*

200 million
*average number of people in
Africa who consume cowpea*

The multi-locational testing planned for 2013 in Nigeria will be conducted in three IAR sites located in Zamfara, Kano and Kaduna states. The sites have been inspected by the country's NBC and have been approved. Lines that will be tested in these locations include seed obtained by incorporating the *Bt* gene from the donor parent into farmer-preferred varieties through breeding.



Denis T Kyetere (left) from AATF and Jean Baptiste De la Salle Tignegere, the Principal Investigator for the Cowpea Project in Burkina Faso, at the Bt cowpea confined field trial in Farako Ba, Burkina Faso in October 2012



Stakeholders at the Cowpea Project progress update meeting held in Zaria, Nigeria in November 2012

Screening and backcrossing

In Burkina Faso, seed of the first cross (F1) between the donor parents and farmer preferred varieties was harvested in 2012. Seed of other backcrosses will be produced in 2013 and 2014 before they are tested for yield performance and efficacy in multi-locational testing. In Nigeria, seed from backcrosses of donor parent and farmer preferred varieties were planted in a glasshouse in Zaria, Nigeria. The process will fix the trait in the seed for the 2013 multi-location testing.

Cowpea is considered the most important food grain legume in the dry savannas of Sub-Saharan Africa. It is rich in quality protein and has energy content almost equivalent to that of cereal grains and it is a good source of quality fodder for livestock and provides cash income. Many biotic and abiotic factors greatly reduce cowpea productivity in Africa. Among these constraints is the pod borer, *Maruca vitrata*, which perennially damages cowpea pods on farmers' fields. The Project is developing improved varieties of cowpea that can withstand attack from the pod-borer and enhance farmers' grain and fodder production. It is expected that farmers will have access to the improved cowpea varieties by 2017 subject to approvals from regulatory agencies in the three project countries.

CFT compliance management training

A two-day regional CFT compliance management training course was organised and conducted by AATF in Ghana in July 2012 to refresh the Cowpea Project staff in all the three project countries on the theory and practice of CFT management. The training aimed at ensuring that

personnel responsible for CFT activities are familiar with regulatory compliance requirements throughout the duration of the CFT including post trial monitoring and removal of volunteers. The trainees were also encouraged to hold similar training to share the knowledge on CFT compliance with all the site staff and conduct periodic audits to prevent any cases of non-compliance.

As the Project progresses into 2013 and as partners conduct multi-locational field testing of the *Maruca*-resistant trait in two farmer preferred varieties in Nigeria, the regulatory compliance team will commission a suit of studies to compile food and environmental safety data on the *Bt* cowpea for commercialisation.

Stakeholder engagement

The communication and outreach team continued with awareness creation and engagement activities during the year. A one-day media training was organised in December 2012 aimed at strengthening journalists' understanding of biotechnology. The training focused on plant breeding and agriculture, gene modification, and the role of media in biotechnology communication. The highlight of the training was the interaction between scientists and journalists on prevailing issues around biotechnology.

The Project also held a stakeholder sensitisation workshop in November 2012 at the IAR, Nigeria. The workshop updated stakeholders on progress made in research and development of the *Maruca*-resistant cowpea varieties to enhance their understanding of the technology being used in the Project, and get their support and goodwill. The workshop was attended by over 200 participants who included academicians, research scientists, legislators, students, farmer cooperatives, agro-allied companies and non-governmental and community based organisations, and the media.

'The Project made significant progress with CFTs in Nigeria and Burkina Faso recording consistent results with previous trials that confirmed the efficacy of the tested events against the *Maruca* pod borer. Ghana also achieved a major milestone with the grant of the approval to conduct CFTs. This has paved way for multi-locational trials in Nigeria and a CFT in Ghana that will accelerate the Project's development phase and enable the timely deployment of the improved varieties to our smallholder cowpea farmers,' said Dr Prince Addae, the Cowpea Project Manager at AATF.

Jerry Asalma Nboyine

I am an entomologist based at the Council for Scientific and Industrial Research – Savannah Agricultural Research Institute (CSIR-SARI) in Tamale, Ghana. I am a field entomologist for the *Maruca*-resistant Cowpea Project. Ghana will begin conducting confined field trials (CFTs) for the Project in 2013. In preparation to conduct these trials, I underwent a *Maruca*-rearing training in 2012 at the Institute of Agricultural Research in Zaria, Nigeria that was organised by AATF and facilitated by Prof Stephen Misari, the entomologist in charge of the Cowpea Project in Nigeria and his staff. The objective of the training was to teach the Ghana team how to rear *Maruca* in sufficient quantities in readiness for the trials and manage their colonies.



The training introduced me to the basic components of a *Maruca vitrata* rearing laboratory. These include the kitchen where the diet for the insect is prepared; the micro or laminar flow table where the prepared diet and other materials are sterilised; the infestation room for storing the oviposition cups for use in field infestation; and the larval holding room where the hatched eggs are held until they complete the five larval development stages. The oviposition room is used for the rearing cages containing adult *Maruca* while the harvesting room is for holding and disinfecting the field insect collections and any other materials before they are taken to the laboratory.

Another important aspect of the training was the session on the Standard Operating Procedures (SOPs) to observe in the rearing laboratory. These include keeping the rearing lab aseptic, not entering the facility after visiting the field and keeping the windows shut at all times in addition to keeping proper records. Not observing these procedures could compromise the rearing of the *Maruca* which would in turn affect the infestation in the field.

The training afforded me the opportunity to go through all the practical aspects of rearing wholesome, high quality *Maruca* in readiness for smooth take-off of the Cowpea Project in Ghana in 2013. I have been able to transfer these skills to the other technical staff who will be involved in the Project.

As a result of this training my capacity to manage the rearing lab and carry out screening of the lines for resistance to *Maruca* has been built. I am certain that the cowpea CFTs will commence without any hitches in Ghana come 2013.



A woman dances in Nampula,
Mozambique

Banana cultivar lines with resistance to bacterial wilt disease developed in Uganda

Several transgenic lines of the *Gonja manjaya* cultivar will be developed and evaluated for resistance to BXW in glasshouse by IITA at the Biosciences East and Central Africa hub in Kenya. Another CFT at Kawanda, Uganda is expected to start in mid-2013 and the first one for Kenya in 2014.

Dr Leena Tripathi, Principal Investigator, BXW Project

Scientists working on the Bacterial Wilt (BXW) Resistant Banana Project in 2012 reported that they had selected 12 lines out of 65 lines of the banana cultivar *Sukali ndiizi* popularly known as *apple banana* that have shown resistance to the banana bacterial wilt disease. Sixty-five (65) lines were tested in confined field trials (CFTs) at Uganda's National Agricultural Research Organisation's (NARO) Kawanda research station. Results from the trials demonstrated that constitutive expression of the sweet pepper *Hrap* or *Pflp* gene in banana resulted in enhanced resistance to *Xanthomonas* wilt.

Product development progress

The 12 lines were singled out of 65 transgenic plants and non-transgenic mother plants that the Project evaluated for BXW resistance and assessed for disease symptom development in the first CFT in Uganda. All transgenic lines tested showed a significantly higher resistance in comparison to control non-transgenic plants. The bunch weight and size of the transgenic lines were found to be similar to non-transgenic plants. The best 10 lines will be tested further with more replicates in a second

trial through the support of the United States Agency for International Development's Agricultural Biotechnology Support Programme (USAID-ABSPII) in 2013 once approval to conduct the second trial is granted by the National Biosafety Committee of Uganda. In addition, work started in Kenya to generate transgenic events for banana varieties important for the Kenyan market. These will be tested in a CFT in 2014.

Bananas are among the most important food crops after maize, rice, wheat and cassava. East Africa produces and consumes the most bananas in Africa, with Uganda being the world's second largest producer after India. Banana farmers especially in Uganda are currently battling with the anguish of watching their fruit ripen prematurely, seeing their leaves wilt and then witness the inevitable death of the entire plant. The BXW caused by the pathogen *Xanthomonas campestris* pv. *musacearum* (Xcm), costs banana farmers millions of dollars in damages every year across East and Central Africa. The pathogen infects all varieties, including East African Highland Banana (EAHB) and the exotic types. The rapid spread of the disease has endangered the livelihoods of millions of farmers who rely on banana for staple food and cash.

Farmers are currently trying to control the disease by cutting down and disposing infected

16.4 million tonnes
average bananas produced annually
in East Africa – about 20 percent of
world output

50 million
number of smallholder farmers in
East Africa who depend on banana for
food and income



Project partners visit the Bacterial Wilt-Resistant banana confined field trial in Kawanda, Uganda in July 2012



Some of the partners during the CFT compliance management training in November 2012 in Uganda

plants, de-budding the male flower and disinfecting cutting tools. These methods have been useful in confining the spread of the disease and the on-going work to develop disease resistant material will enhance what has been achieved so far.

Transgenic technologies that facilitate the transfer of useful genes across species have been shown to offer numerous

advantages to avoid the natural delays and problems in breeding bananas through conventional breeding given the sterile nature and long gestation period of the crop. These technologies provide a cost-effective method to develop varieties resistant to BXW.

The novel green pepper proteins that give crops enhanced resistance against deadly pathogens can also provide effective control against other bacterial diseases of banana in other parts of the world. The Project is using the plant ferredoxin-like protein (*Pflp*) gene and the hypersensitivity response assisting protein (*Hrap*) gene isolated from sweet pepper by Dr Teng-Yung Feng of Academia Sinica in Taiwan which has been identified as a possible solution for developing a transgenic banana resistant to BXW. The mechanism of this resistance rapidly kills plant cells at the region of attempted invasion by the pathogen and forms a physical barrier to prevent further infection. In addition, it activates the defences of surrounding and even distant uninfected parts of banana plants leading to a systemic acquired resistance.

AATF brokered access to the *Pflp* and *Hrap* genes from Academia Sinica and is working with partners – the International Institute of Tropical Agriculture (IITA) and NARO in Uganda – to develop a *Xanthomonas* wilt-resistant banana from East African preferred germplasm. It is expected that smallholder farmers in Sub-Saharan Africa will have access to adapted high yielding bananas from east African highland germplasm with resistance to BXW by around 2020.

Confined field trial compliance

As the CFT continued in Uganda, compliance audit missions were carried out and reports indicated no incidences of compliance infraction. In

addition, a compliance management training for CFT site staff was carried out in November 2012 in Uganda.

Micro-propagation

The Project recognises tissue culture as a means of fast multiplication of banana cultivars and in ensuring the availability of clean planting material. The process also reduces cost and the time required for production. In view of this, a capacity building training workshop for improved production and commercialisation of clean banana plantlets through the use of micro-propagation was held in November 2012 in Kigali, Rwanda. The workshop was organised by AATF and hosted by the Rwanda Agricultural Board and brought together 25 participants from Kenya, Uganda, Tanzania, Rwanda, Burundi and the Democratic Republic of Congo. Key recommendations were made from the training highlighting issues that will significantly improve the efficiency and effectiveness of banana tissue culture processes in the Great Lakes region of Africa.

As the Project progresses into 2013, the various activities towards providing smallholder farmers with BXW resistant varieties will continue. More lines will be generated for additional cultivars with vector *Hrap*, *Pflp* and *Hrap/Pflp* in Kenya and Uganda.

'In addition, several transgenic lines of the *Gonja manjaya* cultivar will be developed and evaluated for resistance to BXW in glasshouse by IITA at the Biosciences East and Central Africa hub in Kenya. Transgenic lines will be developed with additional cultivars, including preferred EAHBs and dessert bananas in East and Central Africa. Another CFT at Kawanda, Uganda is expected to start in mid-2013 and the first one for Kenya in 2014,' says Dr Leena Tripathi, the Project's Principal Investigator.



Participants to the banana tissue culture and micro-propagation workshop held in Kigali, Rwanda in November 2012 during a lab session



Wilfred Mushobozi

I run the Crop Bioscience Solutions (CBS) Ltd in Arusha, Tanzania. CBS is a commercial crop biotech company that was established in 2011 with a mandate to improve farmers' livelihoods and nutrition status through the transfer of agricultural technology. The company has a laboratory that is involved in the production of disease free tissue culture (TC) planting materials for crops such as banana, sweet potato, cassava, pineapple and potato. We also provide plant disease diagnostic expertise. Under banana we are specifically involved in mass production of TC banana plantlets, hardening and distribution. We also establish banana mother gardens for our clients in a professional manner.

Banana happens to be an important crop in Tanzania that has the potential to contribute to food security and income for many rural farmers. However, the crop is facing serious challenges occasioned by diseases and pests such as fusarium wilt, bacterial wilt and nematodes among many others. These challenges are compounded by the farming practices that farmers engage in. Most farmers replant their farms with banana suckers from existing mother plants which simply transfers the pests and diseases to the new sites. This results in high losses of the banana produce which also contributes to food insecurity. Production and distribution of TC banana addresses the above mentioned constraint.

I was privileged to attend a banana tissue culture training workshop for improved production of clean banana plantlets through the use of micro-propagation organised by AATF in Kigali, Rwanda from 26–29 November 2012.

Apart from the theory aspects, the training also involved a practical lab session on banana culture initiation process. I found the training very useful. I learnt new skills in commercial mass multiplication of TC banana especially how to reduce TC production costs. I have introduced some of the TC production aspects I learnt at the CBS lab. We have already established an efficient way of delivering and establishing farmers' nurseries without any loss of semi-hardened TC plantlets. This has contributed to efficiency and cost effectiveness in the way we do our work.

WEMA prepares to deploy conventional hybrids and receives permits for *Bt* maize trials in Kenya and Uganda

Following the successful end of Phase I and the significant progress made in product development especially for the WEMA conventional products, the partners are looking forward to deploying the first drought-tolerant maize hybrid in 2013.

Dr Sylvester Oikeh, WEMA Project Manager



A man dances during a festival in Mepe, Ghana

The Water Efficient Maize for Africa (WEMA) Project ended the year on a high note with its first conventional drought-tolerant (DT) maize hybrids nearing commercialisation in 2013. Two promising conventional DT hybrids developed by the International Maize and Wheat Improvement Center (CIMMYT) through the Drought Tolerant Maize for Africa (DTMA) Project were submitted for the second year into the national performance trials (NPTs) in Kenya.

In addition, a new set of 38 WEMA hybrids were entered into the first NPT in Kenya and Uganda, and five hybrids for distinctness, uniformity and stability (DUS) observations in Tanzania in 2012. A total of 21 of these hybrids will be advanced into the second NPT in Kenya and Uganda, and five into the first NPT for Tanzania in 2013. Another set of about 50 new hybrids were identified for NPT1, DUS observations or advanced yield trials in 2013. To further enhance the deployment of the products coming out of the Project, AATF signed a memorandum of understanding with African Seed Trade Association in February 2012.

The Project made significant progress in conventional breeding with more than 600 three-way doubled haploids (DH) intermediate-maturing and early-maturing hybrids being evaluated across optimum-moisture,



WEMA Project Product Development team members during a field trip to evaluate various maize trials in Potchefstroom, South Africa in April 2012

managed-drought stress, and random-drought stress in Kenya and Zimbabwe in 2012. Some of the hybrids had yield advantage of 10–26 percent compared with the best check under optimum-moisture and 10–36 percent under managed-drought stress. The WEMA-Monsanto breeding pipeline also showed another set of 10 DH trials with the best single-cross hybrids ranging from 31–64 percent higher yield than the best commercial check.

In 2012, the WEMA testing network was fully up and running with more than 120,000 two-row and 120,000 single-row breeding plots established by Monsanto, CIMMYT and the five partner countries. Through this network, hybrid trial sets comprising medium-maturing and early-maturing kits were evaluated across the participating countries under optimum-moisture, managed-drought stress, and random-drought stress conditions. All these showed 8–64 percent higher grain yield than the mean of the best commercial checks. These promising hybrids formed more than 60 percent of the list of hybrids selected for nominations into the 2013 NPTs in Kenya and Uganda, and for DUS observations in Tanzania.

300 million
*number of people who
 depend on maize as a main
 food source in Africa*

Disease screening

To ensure that WEMA hybrids are suitable for the target environments, the breeding lines and hybrids were consistently screened for resistance to major diseases including

leaf blight, maize streak virus and gray leaf spot as well as for resistance to post-harvest pests. In 2012, WEMA partners in Kenya, the Kenya Agricultural Research Institute, Monsanto and CIMMYT took proactive action towards testing the WEMA elite germplasm against Maize Lethal Necrosis Disease (MLND) that has emerged in Kenya and is wiping out the crop. The results of these MLND screening will be available in 2013.

Insect-pest protection trials

The Project began preparations towards installation of *Bt* maize confined field trials (CFTs) in Kenya and Uganda following the decision to include insect-pest protection into the DT maize varieties in 2011. Kenya and Uganda submitted CFT applications to test insect-pest resistance maize and both countries received approval to install the trials, which will be planted in early 2013.

Similar to drought, insects – particularly stem borers – present a challenge to smallholder farmers in Sub-Saharan Africa, and this can have a negative impact on yields, particularly during times of drought. The WEMA Project identified the problem of insect pressure as a threat to the anticipated benefits of drought-tolerant maize varieties. It is to overcome this challenge that the Project decided to add insect-pest protection to the



Stephen Mugo, the WEMA-CIMMYT Product Development team leader discusses some of the Project's conventional trials with Bob Shuma of the Tanzania Seed Traders Association during a field trip to Kiboko, Kenya in September 2012

varieties. With this added protection, farmers will be able to secure a better maize crop through healthier plants that are able to use available water and nutrients more efficiently, which is critical during times of stress.

Drought-testing continued in Kenya, Uganda and South Africa, following receipt of regulatory approvals. The third round of CFTs in Kenya and Uganda and the fourth for South Africa were installed and completed.

The Project also went through a successful end of Phase I external review and submission of a proposal for implementation of Phase II. The review report indicated that the Project had successfully met Phase I objectives. The focus for Phase I was on the product development of drought-tolerant maize varieties while Phase II will focus on their deployment to smallholder farmers.

Capacity strengthening

During the reporting period, the Project continued to enhance the capacity of partners in regulatory compliance involving conducting CFTs through stepwise (harvest and post-harvest) compliance training workshops in Kenya, Uganda and South Africa. In addition, quarterly regulatory compliance audits at WEMA CFT sites in the three countries were carried out.

Stakeholder engagement

In 2012, the Project continued with stakeholder engagement efforts to expand the understanding of the Project and appreciation of progress made. The second WEMA Regional Stakeholders meeting was held in Nairobi, Kenya in September 2012. It aimed at updating the stakeholders about the second phase of the Project, proposed deployment plans and the upcoming conventional drought-tolerant maize hybrids. The meeting was attended by about 90 participants drawn from the five WEMA countries, representing various stakeholders including government officials, National Biosafety Committee representatives, the media, farmer association leaders or representatives, and seed associations and companies. The meeting participants also had an opportunity to see the impressive WEMA conventional trials in Kiboko, Kenya.

‘Following the successful end of Phase I and the significant progress made in product development especially for the WEMA conventional products, the partners are looking forward to deploying the first drought-tolerant maize hybrid in 2013,’ says Dr Sylvester Oikeh, the WEMA Project Manager.



Joel Muema Nyamai

I am the Confined Field Trial (CFT) site manager for the Water Efficient Maize for Africa (WEMA) Project in Kiboko, Kenya. The site is under the Kenya Agricultural Research Institute (KARI), one of the project partners.

I participated in a 'Stem borer insect mass rearing training' at the KARI Katumani Insectary in March 2012. The training's aim was to train the CFT managers and stem borers' insectary technicians from the five project countries on how to conduct the *Bt* insect protection CFTs that will be conducted from 2013. This follows the Project's decision to add insect protection into the WEMA drought-tolerant (DT) maize varieties. Insect pressure – especially maize stem borers are a major threat to the anticipated benefits of the DT maize varieties that the Project is developing. The training was organised by AATF, KARI and the International Maize and Wheat Improvement Centre (CIMMYT). It was facilitated by entomologists from CIMMYT and KARI.

The training was very useful as my exposure to any aspect of stem borers prior to the training was very limited. I learnt how to rear stem borers, how to infest the maize with them during field trials and data recording. I also got to understand how the different but inter-related units of the stem borer mass rearing function. Prior to the workshop, I was unaware of the challenges faced in stem borer mass rearing. I appreciated the great care that needs to be accorded to the neonates once they are delivered to the field. In addition, I appreciated the seriousness of stem borer infestation on maize production in Kenya. This will influence the commitment with which I will manage the CFTs come 2013 as I want to make a contribution in providing maize farmers with varieties that can help them control stem borer infestation on their farms which will enhance food security for them and their families.

The training was both theoretical and practical. The practical sessions involved diet preparation such as weighing of ingredients and how to mix them proportionately. The other aspect was infestation using sterilised plastic rods and larvae placement jars, larvae/pupae management including checking the larvae against contaminants like fungi, insects or mites; harvesting the pupae, oviposition of moths, egg collection and packaging the stem borers for field infestation.

I believe the training received will come in handy during the evaluation of the various maize genotypes with the *Bt* trait for resistance against stem borers as from 2013.



A woman dances in Tubman, Liberia

Ghana and Uganda prepare to conduct rice trials as project generates transgenic lines for testing

“ The go-ahead from the NBCs to install CFTs in Ghana and Uganda is a significant milestone for the Project that will see the prospect of deploying improved rice varieties that will address the constraints of nitrogen deficiency, drought and salinity in rice production to smallholder farmers realised sooner. ”

Dr Jacob Mignouna, Project Coordinator, AATF

Ghana and Uganda, the two initial pilot countries for the Nitrogen-Use Efficient (NUE), Water-Use Efficient (WUE) and Salt Tolerant (ST) Rice (NEWEST) Rice Project, are set to conduct the first confined field trials (CFTs) for the Project in 2013 following significant progress made by all project partners during 2012. Arcadia Biosciences, the product development partner generated and characterised 12 transgenic lines in readiness for the testing. These lines will be shipped to the two countries for testing in CFTs in 2013. The two countries completed the CFT site development and sought approval from the national biosafety committees (NBCs) to conduct CFTs.

Significant progress was achieved in developing transgenic events carrying the NUE, and the triple gene stacked NUE-WUE-ST traits for testing in CFTs in Uganda and Ghana. The transformation involved three pipelines and include: pipeline 1 consisting of six New Rice for Africa (Nerica)-4 NUE lines which will be tested in the field at the National Agricultural Research Organisation (NARO), Uganda and at the Crops Research Institute (CRI), Ghana. Pipeline 2 has 7 NUE lines which are phenotypically the same as pipeline 1. Seeds of pipeline 2 will be tested

in Ghana and Uganda. Pipeline 3 is expected to generate six marker-free lines and nine marker-bearing lines in early 2013.

Trials also continued at the International Centre of Tropical Agriculture (CIAT) during the year. Six transgenic lines together with the wild type Nerica-4 were characterised for agronomic and physiological traits under different nitrogen applications. These traits revealed that there was considerable difference between the transgenic lines and the wild type at different nitrogen applications. The transgenic lines produced higher grain yields at 50 and 100 percent nitrogen more than the other lines including the wild type. Seeds produced from these trials will be tested in a CFT in Ghana.

The NEWEST Rice Project was launched in 2008 to develop and deploy farmer preferred and locally adapted genetically improved African rice varieties with enhanced agronomic traits, specifically NUE, WUE and ST. Rice production in Africa has been characterised by low yields. The average grain yield is as low as 2.2mt/ha, compared to a potential yield of 7mt/ha. This

21 million tonnes
Africa's annual rice consumption

14.5 million tonnes
annual rice production in Sub-Saharan Africa

USD\$ 1.7 billion
value of rice imported annually in Africa



The NEWEST Rice Project team members at the CFT site in Namulonge, Uganda during a regulatory compliance training held in November 2012

low yield has been attributed to several abiotic factors. Drought and nitrogen deficiency have been cited as leading constraints to upland rice production. About 80 percent of African rice farms traditionally depend on rainfall as farmers are resource constrained, and cannot afford to install irrigation systems or buy much fertiliser. High salinity is increasingly becoming a major problem in many rice growing areas of Africa. The NEWEST Rice Project offers a window of opportunity to addressing these constraints. The initiative strives to genetically transform some varieties of NERICA using plant transformation technologies to improve their productivity in nitrogen-deficient soils, drought prone regions and in soils with high salinity. The goal is to provide smallholder rice farmers with higher yielding varieties that are well adapted to marginal agricultural production conditions that characterise many areas in Africa.

The project partners include AATF, who is coordinating the Project, Arcadia Biosciences is donating the trait technologies, producing transgenic plants and providing technical support and Public Intellectual Property Resource for Agriculture (PIPRA) is donating the enabling technologies for plant transformation; while NARO, CRI and CIAT are involved in field testing for trait gain.

Technology access and agreements

During the year under review, the Project was granted a technology license agreement for use of *Agrobacterium*-mediated plant transformation technology known as 'PureIntro' by Japan Tobacco in March 2012. This was

after a series of negotiations between Japan Tobacco and AATF. This technology will improve the efficiency in generating transgenic lines and thus save time in product development. PureIntro® is an agrobacterium-mediated plant transformation technology that is recognised worldwide as the standard transformation system. The technology reduces development costs and time. PureIntro® has been licensed by Japan Tobacco



The Ghana NEWEST Rice Project CFT site planted with maize to deplete nitrogen in readiness for trials in 2013

to around 50 private and public entities worldwide for numerous crops including maize, rice, wheat, barley, sorghum, banana, sugarcane, switchgrass, miscanthus and turf. The Project also has access to transformation vectors from Arcadia Biosciences. These include the gene conferring nitrogen-use efficiency and the one which carries the triple gene stack – NUE-WUE-ST. Others include DNA constructs from The Regents of the University of California, Davis which include binary transformation vectors. These licensed materials have been very useful in the transformation process in the Project.



The developed NEWEST Rice Project CFT site laid with drip irrigation pipes at NARO, Uganda

CFT site development in Uganda and Ghana

Ghana and Uganda took steps to ensure readiness to receive and test the lines. They each carried out site preparation, nitrogen depletion with maize and soils analysis, including seeking regulatory approvals for trials. In Uganda, the CFT site construction was concluded and inspection carried out by the NBC. The final decision document to conduct the CFT was issued by the NBC and the plant import permit application submitted.

In Ghana, following the approval to conduct the CFT in November 2012, a CFT compliance management training workshop was held for project staff to refresh on the theory and practice of regulatory compliance for GM crops in readiness for importation of seed and planting of the trial. The NARO team also participated in a similar training during the same month in Kampala.

‘The go-ahead from the NBCs to install CFTs in Ghana and Uganda is a significant milestone for the Project that will see the prospect of deploying improved rice varieties that will address the constraints of nitrogen deficiency, drought and salinity in rice production to smallholder farmers realised sooner,’ says Dr Jacob Mignouna, the Project Coordinator at AATF.



Jimmy Lamo

I am a rice breeder at the National Crops Resources Institute, Namulonge, a division of Uganda's National Agricultural Research Organisation (NARO). In November 2012, I attended a 'Regional Inter-Project Confined Field Trial Compliance training workshop' in Kampala. Participants were drawn from Uganda, Kenya and South Africa. I attended the training in

my capacity as the Principal Investigator for the Nitrogen-Use Efficient, Water-Use Efficient and Salt Tolerant (NEWEST) Rice Project for Uganda. The Project is set to conduct the first confined field trial (CFT) in Uganda in 2013.

The training was facilitated by staff from AATF and NARO and focused on how to manage CFTs to test genetically modified crops in accordance with regulatory requirements. Failure to comply could lead to a CFT being cancelled and the regulatory permit being withdrawn. This can be a serious setback to any project conducting CFTs as it could mean a waste of resources, time and undue delay in deploying a technology to farmers who are waiting to access it to improve their agricultural production and enhance food security for their families.

The objective of the training was to enhance the capacity of personnel involved in managing CFTs on the theory and practice of confinement. The areas covered included among others how to conduct CFTs for GM crops, how to transport and store transgenic plant materials, how to manage CFT sites and how to carry out the planting, growth monitoring, harvest and post-harvest.

The training has really helped my team and I to prepare for the forthcoming NEWEST CFTs to be conducted in 2013. We have prepared the CFT site in accordance with the National Biosafety Committee requirements which has resulted in the necessary approvals being granted to the Project to conduct the trials next year. We have also been able to develop a good documentation system.

I believe the conduct of the NEWEST rice CFTs without any compliance infraction will give farmers confidence in the technology and the above training will have contributed to that. I would like to request AATF to consider other trainings related to CFTs and biotechnology to beef up what we have learnt. Training in science communication would come in handy as it would enable us to address stakeholder concerns on the technology as we conduct the trials. Exchange visits with countries already conducting similar trials would also help us.

Aflatoxin Control Project receives approval for on-farm testing in Kenya as demand for bio-control technology rises in Nigeria

“ The Project will continue working closely with regulatory agencies in order to successfully complete evaluation of aflasafeKE01 in farmers’ fields, including evaluation of samples from second season trials, in order to nudge closer towards product registration. ”

Dr Ranajit Bandyopadhyay, Project Coordinator at IITA



Zingili dancers group perform in South Africa

Following successful on-station trials carried out in Kenya between 2010 and 2011 for the Aflatoxin Bio-control Project, approval was given by the Kenya Standing Technical Committee on Imports and Exports (KSTCIE) in April 2012 to move the trials to the next stage of on-farm testing. Work in Nigeria continued to grow during the year with the extension of aflasafe bio-control technology to more farmers. This saw the demand for the product grow with farmers requiring about 60 tonnes of the product.

Results from the aflasafe bio-control on-station trials carried out by the Kenya Agricultural Research Institute (KARI) and National Irrigation Board (NIB) in Kenya identified four candidate strains from the 13 that were originally tested. The isolates belonging to 11 vegetative compatibility groups and applied as three strain mixtures were found to be effective in displacing toxigenic isolates of *A. flavus*, *S* strain and *A. parasiticus*, and consequently reducing aflatoxin levels. Of these, four strains were found most suitable to constitute a bio-control product.

Approval to conduct on-farm efficacy trials enabled the Project to apply for an import permit and ship 2.5 tonnes of the inoculum comprising

of the four strains from the International Institute of Tropical Agriculture (IITA) for use in the on-farm trials in Kenya. The first season trials on farmers' fields were carried out during the long rains in April 2012 while the second season trials were initiated during the short rains season (October-November).

In preparation for the first season on-farm trials, 402 farmers spread across 12 districts in upper and lower eastern parts of Kenya and in Bura district were selected to participate. Soil sampling and inoculation, and maize sampling at harvest was carried out between June and August 2012 in all the 402 fields. Of these, 201 were taken as controls while the other 201 fields were treated with either 10kg/ha or 20kg/ha of inoculum. All samples collected were further dried and packed at KARI and taken to the Kenya Plant Health Inspectorate Service for inspection and acquisition of a phytosanitary certificate, after which they were shipped to the United States Department of Agriculture-Agricultural Research Services (USDA-ARS) laboratory in Arizona for further analyses. A second season trial was set up during the short rains of October and sampling of both soils and maize took place as carried out in the first season.

4.5 billion
*number of people in
developing countries
exposed to aflatoxins*



Field staff harvest the Aflatoxin bio-control Project trials in Kitui, Kenya



A farmer broadcasts the aflasafe bio-control product in Homabay, Kenya

The on-farm trials were carried out under the guidance of the Pest Control Products Board (PCPB) as the data from the trials will be used to facilitate the registration of the aflasafeKE01 and pave way for commercialisation.

The Project also completed the renovation of a mycotoxin research facility at KARI Katumani. This will reduce the time and monetary burden of taking samples to USDA-ARS facilities for analysis. Plans are underway to equip the facility with the necessary aflatoxin analysis equipment.

Activities in Nigeria and Senegal

IITA continued working in Nigeria and Senegal during the year. A total of 8.6 tonnes of aflasafe was prepared and distributed to the Commercial Agriculture Development Project in Kaduna, Nigeria for wide scale on-farm trials. The aflasafe was given to 246 maize farmers in the region and was used on 860 hectares. The demand for aflasafe in the country is growing with farmers demanding about 60 tonnes of the product which the current lab-scale manufacturing process is not able to meet. In an effort to create more awareness on the problem of aflatoxin contamination and the use of aflasafe, an awareness campaign was carried out through meetings and radio, where up to 1,700 farmers were reached.

In Senegal, work continued with the planting and harvesting of the efficacy trials of aflasafe SN01 during the year. Data from these trials was taken for analysis for use in the registration of the technology in the country.

Regulatory compliance

The Project is working on a registration dossier for aflasafe registration in Kenya. Compilation of data on the product chemistry of the four strains that constitute the Kenyan product that will go into the dossier was completed. The Project also identified four good laboratory practice approved laboratories to collate the necessary eco-toxicological and toxicological data for inclusion in the registration dossier as required by PCPB in the registration of any pesticide. The dossier will be submitted to the PCPB in Kenya in 2013.

Farmer engagement

Sensitisation meetings with 500 farmers in upper and lower eastern and Bura and Hola, in Kenya were carried out between April and October 2012. In addition, two workshops were held in Bura and Hola for agricultural extension staff on the management of aflatoxin through bio-control.

According to Dr Ranajit Bandyopadhyay, the Project Coordinator at IITA, the Project will continue working closely with regulatory agencies in order to successfully complete evaluation of aflasafeKE01 in farmers' fields, including evaluation of samples from second season trials, in order to nudge closer towards product registration.

'Nigeria will also continue to test the efficacy of aflasafe™ in farmers' fields as full registration of the product is awaited. Inclusion of aflasafe

as one of the pilot projects for the newly announced AgResults initiative of the G20 countries managed by the World Bank will provide further support to the widespread adoption of aflasafe in 2013. To meet the rising demand for aflasafe in Nigeria, a demonstration-scale manufacturing plant in Ibadan will be constructed to assist in the production of sufficient quantities of the product for distribution to farmers,' Dr Ranajit Bandyopadhyay.



Dr Charity Mutegi, the Kenya Country Coordinator for the Aflasafe Project (right) with a farmer in Embu, Kenya during the on-farm trials



Joseph Kituku Missi

F I am the Divisional Agricultural Extension Officer for Kaiti Division of Makueni County in Kenya. I work with farmers where I advise them on various farming technologies in addition to testing some of them on their farms. In 2012, I was involved in a project that was testing the efficacy of an aflatoxin bio-control product on maize known as aflasafe. The project is a partnership between AATF, IITA and KARI.

Under this project, I was involved in conducting on-farm testing of aflasafe with 60 farmers for two planting seasons, the 2012 long and short rains. The exercise included identifying and selecting farmers to participate in the trials, demarcating an acre per farmer and getting their consent, sensitising them on the problem of aflatoxin contamination and on the use of aflasafe bio-control product.

The trial process involved two separate fields – a treatment and a control. Soil samples were collected from both fields before the application of the aflasafe and after harvest of the maize. These activities were done together with farmers and documented. Farmers were guided on how to care for the maize fields by keeping them weed free before the application of the treatment which was done after the crop had tussled and to ensure that chicken don't pick the aflasafe grains, and not to harvest the maize before alerting project staff to enable them collect data. Cobs were harvested randomly from both fields and labelled appropriately before being taken to KARI for drying and shelling. The next step will involve going back to the farmers with the results as they are eager to see the performance of aflasafe.

I was able to assist the Aflatoxin Control Project carry out the on-farm trials as a result of training workshops I attended in 2012 prior to the commencement of the trials. Causes of aflatoxin contamination and methods of control were covered. This information was useful during farmer sensitisation. Information on aflasafe bio-control product and how it works enabled me to handle and apply it appropriately for effective results. We also learnt how to conduct soil sampling and how to inoculate the farms with aflasafe. The training also included demonstrations.

Farmers are eagerly looking forward to the registration and commercialisation of the aflasafe as the problem of aflatoxin contamination in this area is very high and maize happens to be a key crop both for food and trade.



A woman performs a traditional dance in Dar es Salaam, Tanzania

Cassava Mechanisation and Agro-processing Project kicks-off in Zambia and Nigeria

As the Project progresses into 2013, the acreage under CAMAP will be up scaled to cover 200 hectares in Zambia and 300 hectares in Nigeria for the 2013/2014 planting season.

Mr George Marechera, Business Development Manager, AATF

Cassava farmers in Sub-Saharan Africa (SSA) are set to benefit from access to labour-saving production technologies with the kick-off of the Cassava Mechanisation and Agro-processing Project (CAMAP) whose implementation began in August 2012 with Zambia and Nigeria as the pilot countries.

Mechanisation of cassava production and processing has been identified by the New Partnership for Africa's Development as the most important constraint to the development of the cassava sector in Africa. This has resulted in the launch of the Pan-African Cassava Initiative. Several countries, such as Nigeria and Ghana, have also started national initiatives to promote the use of cassava in industries. The Nigerian government requires that 10 percent cassava flour be incorporated in wheat flour for bread making. Meeting this demand requires a large number of small-scale cassava processing units and provides a market opportunity for farmers. However, the existing capacity for manufacturing of cassava processing equipment is limited and unless it is upgraded, Africa's farmers and entrepreneurs are unlikely to benefit from the new market opportunities. The Project, therefore, aims to stimulate cassava mechanisation along the product value chain to ensure increased production and value addition and on the other hand reduce post-harvest losses.

CAMAP aims at developing competitive cassava commodity chains for a reliable supply of processed products for food and non-food industrial use by upgrading and expanding traditional planting, harvesting and processing techniques in selected African countries.

The Project will target 3.5 million smallholder farmers including agro-processors, service providers and fabricators in Nigeria, Ghana, Mozambique, Zambia, Uganda, Tanzania and the Democratic Republic of Congo (DRC) covering approximately 7.5 million hectares for farmers who need labour saving cassava production and processing technologies. This will lead to increased incomes and better livelihoods for millions of cassava farmers and thousands of small-scale entrepreneurs through the use of cassava as a raw material for manufacturing of a number of products in African countries.

It is expected that the development of appropriate prototypes of cassava production and processing units

55 percent
*Africa's contribution to world
cassava production*

10 tonnes
*average cassava yield per
hectare in Africa compared to
26 tonnes in India*



CAMAP partners preparing cassava stems for planting in Zambia

coupled with capacity building on production, processing and enterprise development will lead to higher revenues and better working conditions for the labour force involved, which is largely composed of women (over 80 percent). AATF is therefore working with partners to improve cassava productivity through approaches that optimise labour requirements during field and processing operations. It is expected that these interventions will guarantee a stable and large-scale transition of smallholder farmers from subsistence into commercial production as well as small-scale processing enterprises from partial-market orientation to full integration in industrialised cassava supply chains.

AATF has so far negotiated and accessed cassava mechanisation technologies from Brazil. The Project procured five cassava planters and five harvesters as initial equipment for demonstration in Zambia and Nigeria. A tractor and a plough were also procured for use in Zambia in December 2012.

AATF will partner with government agencies responsible for cassava development in the respective countries as well as the private sector players in the industry in order to build strong public-private partnerships which will ensure Project sustainability. In addition, AATF will build the capacity for local fabricators, backstop enterprise development, steward the technologies, facilitate deployment and create market linkages. AATF will also link farmers to service providers and identify innovative financing for both the farmers and the processors for the Project to run on a commercial basis and ensure sustainability.



A cassava planter at work in Nigeria

Activities in Zambia

Pilot Project areas in Zambia were identified in Kaoma district, Eastern province and Mansa and Samfya districts in Luapula province where an initial 50 farmers with one hectare each were selected based on the suitability of their land for mechanisation and their commitment to participate. Planting in the three districts began in December 2012. Prior to

this, the Project supported the farmers in land preparation, and provided inputs such as cassava cuttings, fertiliser, as well as technical knowhow of planting and crop management.

To support the success of the Project partnership, baseline information on participating farmers was collected and a preliminary assessment of the current cassava production technologies and marketing initiatives in the country carried out. Sources of cassava planting materials and other inputs were also identified.

A memorandum of understanding (MOU) and a contract with the Zambia Agricultural Research Institute who will assist AATF in the coordination of the Project in the country was signed in September 2012.

Activities in Nigeria

In Nigeria, the Project identified 100 farmers each with one hectare (100ha) in Kwara and Osun States to participate in the pilot phase. AATF signed an MOU with the National Root Crop Research Institute, the National Centre for Agricultural Mechanisation, and the Kwara and Osun State ministries of agriculture to enable the Project kick-off. Planting in the two states is expected to begin in April 2013.

Africa is the world's largest cassava producing region, accounting for nearly 55 percent of the world's output despite the fact that yields on the continent are the lowest in the world (10 tonnes per hectare compared to 26 tonnes per hectare in India). In addition, market opportunities for cassava in Africa are limited compared to other cassava-producing regions. This has resulted in farmers not adopting technologies which enhance productivity for lack of access to markets for excess produce. CAMAP will work to address these constraints in an effort to make cassava farming a viable business.

'As the Project progresses into 2013, the acreage under CAMAP will be upscaled to cover 200 hectares in Zambia and 300 hectares in Nigeria for the 2013/2014 planting season,' says Mr George Marechera, the Business Development Manager at AATF who is also in-charge of the Project.

'The Project is set to positively impact the cassava industry and also present market opportunities for farmers given the recent government directive to incorporate 20 percent cassava flour in each package of 20kg mealie meal and the possibility of setting up a brewing factory to produce beer from cassava in Zambia and the mandated incorporation of cassava flour in bread making in Nigeria,' adds Mr Marechera.



A Ndebele dancer in South Africa

Demand for OFAB grows as a sixth chapter is launched in Burkina Faso

OFAB will continue to outscale its activities in 2013 to reach more audiences in a targeted manner. This will include exploring the possibilities of establishing a chapter in southern Africa and an additional one in eastern Africa in the coming year.

Mr Daniel Otunge, OFAB Coordinator, AATF

The Open Forum on Agricultural Biotechnology in Africa (OFAB) launched its sixth chapter in Burkina Faso during the year as it continued to expand throughout Africa. The Burkina Faso chapter is the first in the Francophone countries. This expansion follows interest shown by other countries including Ethiopia, Malawi and Zimbabwe. The Burkina Faso chapter is a collaboration between AATF and the Institut de l'Environnement et de Recherches Agricoles (INERA). The launch of the chapter received overwhelming support from the media, regional organisations, heads of agriculture-related research institutions and the country's Minister for Scientific Research and Innovation, Prof Gnise Konate. While presiding over the launch, the Minister reiterated the government's support for biotech, saying that the country would continue to invest in such technologies to improve the standards of living of Burkinabes.

The year under review also saw the existing chapters (Kenya, Uganda, Nigeria, Tanzania and Ghana) adopting innovative ways to create awareness on biotechnology and increase the participation of diverse

audiences in the biotech debate. Chapters like Nigeria, Kenya and Ghana, started using social media during the year that saw many people take a keen interest in biotechnology. Other communication channels that were used to target both local and international audiences include exhibitions, mass media, training and conferences.

All the six chapters successfully held over 50 monthly meetings where various topics on biotechnology and biosafety were discussed. Chapter representatives also made topical presentations in five agricultural and scientific workshops and participated in four scientific exhibitions and supported two targeted media trainings. OFAB also partnered with Biosciences for Farming in Africa to conduct media fellowships in Tanzania, Uganda, Ghana and Nigeria, where up to 160 journalists were trained on effective agriculture reporting.

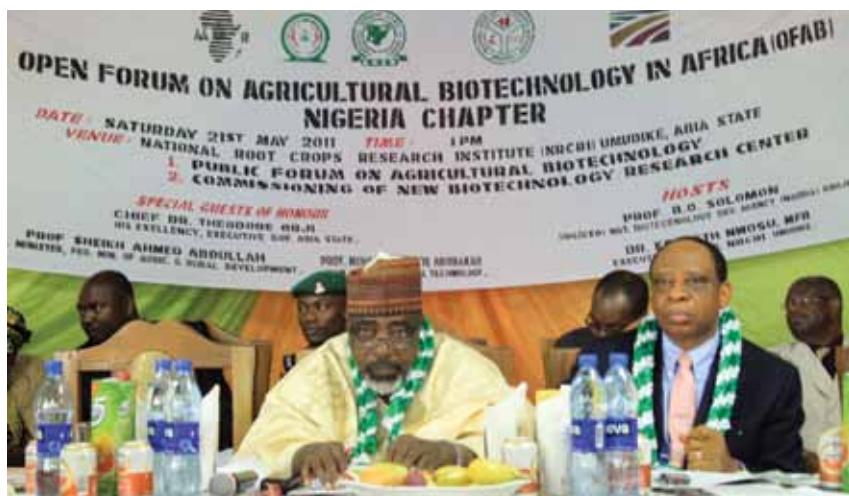
The recruitment of coordinators at the national and global level significantly improved

6***number of OFAB
country chapters*****50*****number of OFAB
monthly meetings
held in 2012***

Participants to the OFAB-Burkina Faso launch in Ougadougou in October 2012

OFAB's activity implementation and coordination during the year. The Forum also kicked off a netmapping exercise in Ghana, Kenya and Uganda. The exercise identified key audiences and their biotech information needs and yielded useful data that will be used by the chapters to strengthen their biotechnology outreach strategies at the country level. Each of the other chapters will hold a similar exercise in 2013.

OFAB Kenya focused its discussions on continued efforts in enhancing the understanding of biotechnology in general and providing a forum for discussions on adverse developments affecting the biotech uptake in the country, with a view of having them reviewed. The chapter, for example, hosted Dr Willy Tonui, the National Biosafety Authority's Chief Executive Officer and Mrs Paloma Fernandes, the Cereal Millers Association's Executive Officer, to discuss the implications of the stringent GMO labelling regulation that was gazetted by the government in August 2012 and provide for appropriate remedial measures. The chapter also hosted a session to discuss the Seralini report that linked GMOs with cancer. This report contributed significantly to the ban on the importation of GMO grains into the country by the Cabinet in November 2012. The chapter also provided members of parliament with factual information on the safety of biotechnology products, which was effectively used by one of the MPs to seek clarification from the Minister of Public Health on the ban. During the same period, the chapter produced a policy brief on the safety of GMOs that was disseminated to policy makers and legislators.



Participants at an OFAB meeting held in Abia state, Nigeria in 2012



Sherry Ayithey, Ghana's Minister for Environment, Science and Technology and Denis T Kyetere, Executive Director, AATF unveil the OFAB logo during the Forum's fifth anniversary celebrations held in Accra, Ghana in May 2012

OFAB Uganda recorded a marked improvement in raising awareness on the potential benefits of biotechnology in the country. In partnership with the Uganda National Council for Science and Technology (UNCST), the chapter established a biotech resource centre based at the Council that is open to the public. This has enhanced access to credible biotech information. The chapter also provided the cabinet with up to date information and data on the status of biotech in Uganda and also globally which contributed to approval of the biosafety bill for gazettment and eventual debate in parliament. At the same time, the chapter partnered with UNCST and the National Agricultural Research Organisation to take members of parliament on a seeing-is-believing tour of biotech research facilities and fields in Uganda.

OFAB Nigeria provided the President's office with information on safety and benefits of biotechnology products and processes upon request. To widen biotech awareness creation and knowledge sharing, the chapter held seven monthly meetings in various states and developed a curriculum for primary schools to help educate pupils on biotechnology. One of the chapter's highlights was the endorsement of biotech by renowned Nollywood celebrities such as Bob-Manuel Udokwu, some of whom accompanied the chapter members on a seeing-is-believing tour of USA biotech fields and facilities during the year.

OFAB Ghana hosted discussions focussing on farmers' perceptions towards biotechnology that were attended by diverse participants, including farmers, researchers, scientists, university lecturers, policy

makers and journalists. The highlight for the year was the successful hosting of the second OFAB Review and Annual Meeting and the fifth anniversary celebrations in Accra in May 2012. During the period under review, media coverage of OFAB activities in the country improved markedly. However, there were pockets of negative reporting by the media. This was attributed to lack of understanding of the technology by the journalists. In future, the chapter will conduct targeted media training aimed at improving their capacity to report on biotechnology factually and objectively.

OFAB Tanzania played a key role in enhancing awareness on biotechnology in the country. The chapter participated in an agricultural exhibition at the parliamentary grounds in Dodoma, where it engaged with members of parliament and cabinet ministers through biotechnology messages. This led to marked improvement in the support of biotechnology by policy makers. Top policy makers, including the President, Vice President, the Prime Minister and the Minister for Agriculture, called for a review of the strict liability biosafety law by the Ministry of Environment to make it more facilitative to biotech research and deployment that will support the country to achieve its objectives under the *Kilimo Kwanza* initiative that aims to make Tanzania food secure. The Prime Minister requested the Tanzania Commission for Science and Technology (COSTECH) and OFAB to organise biotech sensitisation workshops for parliamentarians, the cabinet and heads of relevant agriculture sector departments. Consequently, the chapter produced and shared with the same groups a policy brief on the status of biosafety and biotechnology in Tanzania. In addition, in October 2012, the chapter, together with COSTECH and African Biosafety Network of Experts organised a 'seeing-is-believing' field visit to *Bt* cotton fields in Burkina Faso for members of parliament, journalists and ministers to acquaint themselves with the benefits of biotechnology.

'OFAB will continue to outscale its activities in 2013 to reach more audiences in a targeted manner. This will be informed by the netmapping exercise that was carried out in each of the countries that will see evidence-based strategic activities undertaken in each country. We will also explore the possibilities of establishing a chapter in southern Africa and an additional one in eastern Africa in the coming year,' says Mr Daniel Otunge, the OFAB Coordinator at AATF.

Financial Report



These audited financial statements cover the period from January 2012 through December 2012 and provide comparative data for the previous accounting period, 2011.

Funding overview

AATF investors for the year 2012 were:

- Bill & Melinda Gates Foundation
- Howard G. Buffett Foundation
- PepsiCo
- Rockefeller Foundation
- United Kingdom's Department for International Development
- United States Agency for International Development

Sub-grants were received from:

- International Maize and Wheat Improvement Center (CIMMYT)
- International Institute of Tropical Agriculture (IITA)

The funds from CIMMYT and IITA are from the Bill & Melinda Gates Foundation grants for the Integrated *Striga* Management for Africa, the Aflatoxin Control in Maize and Peanuts and the Commercial Products II projects to execute project specific tasks. A grant was also received from PepsiCo, the first private company to financially support AATF.

AATF is grateful to all its investors for their continued support that is ensuring that its commitment towards assisting resource-constrained farmers' access affordable agricultural technologies to improve their lives is achieved.

Statement of financial position

As at 31 December 2012 (US\$)

	2012	2011
ASSETS		
Non-current assets		
Equipment and motor vehicles	174,021	71,028
Intangible assets	4,383	9,273
	178,404	80,301
Current assets		
Grants receivable	729,801	115,655
Other receivables	457,502	204,489
Bank deposits	14,268,012	4,246,018
Bank and cash balances	1,241,944	1,627,153
	16,697,259	6,193,315
Total assets	16,875,663	6,273,616
EQUITY AND LIABILITIES		
Current liabilities		
Unexpended grant payable	11,760,374	2,617,178
Deferred income	11,979	21,211
Payables and accruals	604,776	418,405
	12,377,129	3,056,794
Fund balances	4,498,534	3,216,822
Total liabilities and fund balances	16,875,663	6,273,616

3. Statement of comprehensive income (abridged version in US\$)

For the year ended 31 December 2012

	2012	2011
INCOME		
Grant income *	17,937,102	17,378,542
Other income	289,085	92,338
TOTAL INCOME	18,226,187	17,470,880
EXPENDITURE		
Project related expenses	15,518,990	15,019,092
Management and general expenses	1,425,485	1,164,215
TOTAL EXPENDITURE	16,944,475	16,183,307
SURPLUS FOR THE PERIOD	1,281,712	1,287,573
Percentage of management and general expenses to the total operating expenses	8.41%	7.19%
Percentage of project related expenses to the total operating expenses	91.59%	92.81%
	100%	100%

Financial status

The funding received/available income as at 31 December 2012 was adequate for the Foundation's needs for the year as all expenditures were fully catered for. The Foundation's finance is healthy both in terms of expenditures/income and project expenditures/general operating expenses ratio.

The independent auditors' opinion was that the financial statements present fairly, in all material aspects, the financial position of the Foundation as at 31 December 2012 and its financial performance and cash flows for the year then ended in accordance with International Financial Reporting Standards and the requirements of the Kenya's Companies Act.

Board of Trustees 2012



1



2



3



4



5



6



7

1. Idah Sithole-Niang (Board Chair), Professor, Department of Biochemistry, University of Zimbabwe
2. Stanford Blade (Vice Board Chair), Chief Executive Officer, Alberta Innovates Bio Solutions Corporation, Canada
3. Rory Radding, Partner, Edwards Wildman's Intellectual Property Group, New York, USA
4. Jikun Huang, Director, Center for Chinese Agricultural Policy, Beijing, China
5. Josephine Okot, Managing Director, Victoria Seeds Ltd, Kampala, Uganda
6. Kevin Nachtrab, Senior Patent Counsel, Johnson & Johnson, Brussels, Belgium
7. Michio Oishi, Director, Kazusa DNA Research Institute, Kazusa-Kamatari, Kisarazu, Chiba, Japan



8



9



10



11



12



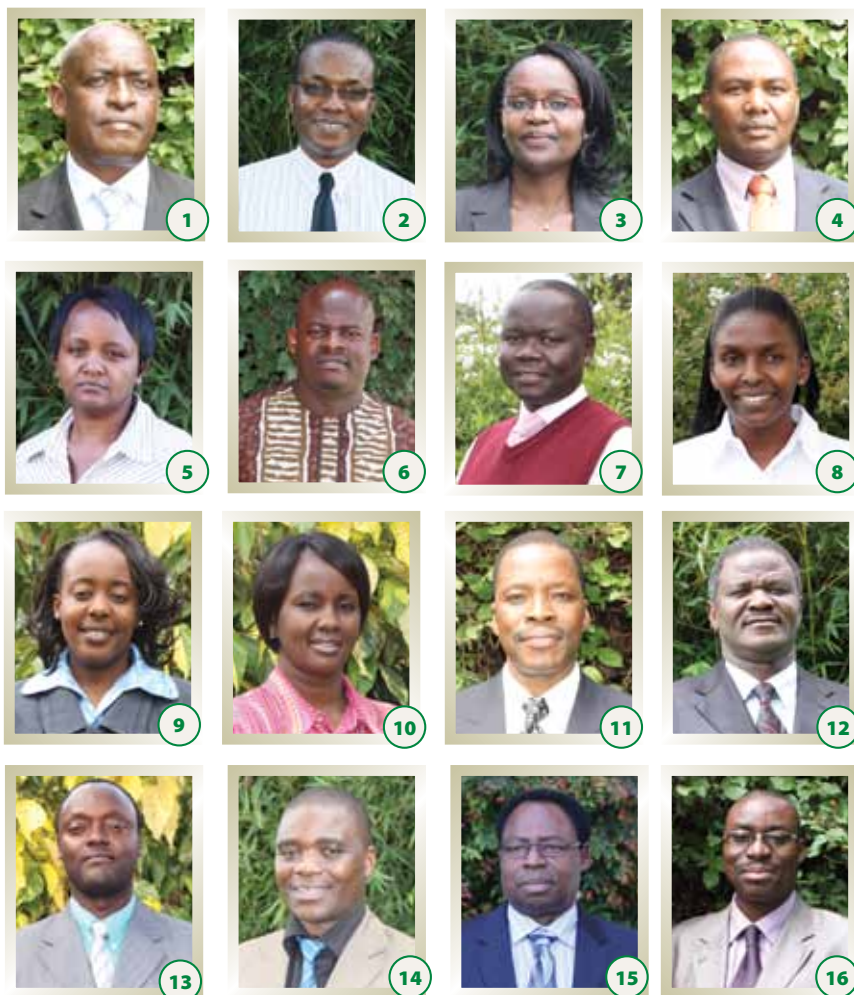
13



14

8. Gordon Conway, Professor of International Development, Centre for Environmental Policy, Imperial College, London, UK
9. Mariame Maiga, Rural Development Sociologist, Development Policy and Project Analyst, Gender Specialist
10. Wilson Songa, Agriculture Secretary, Ministry of Agriculture, Nairobi, Kenya
11. Adrienne Massey, Principal, A Massey & Associates, Chapel Hill, North Carolina, USA
12. Kwame Akuffo-Akoto, Deputy Director General, Corporate Services, International Institute of Tropical Agriculture, Ibadan, Nigeria
13. Denis T Kyetere, Executive Director, African Agricultural Technology Foundation, Nairobi, Kenya
14. Jennifer Anne Thomson, Board Chair Emeritus, University of Cape Town, South Africa

AATF Staff 2012

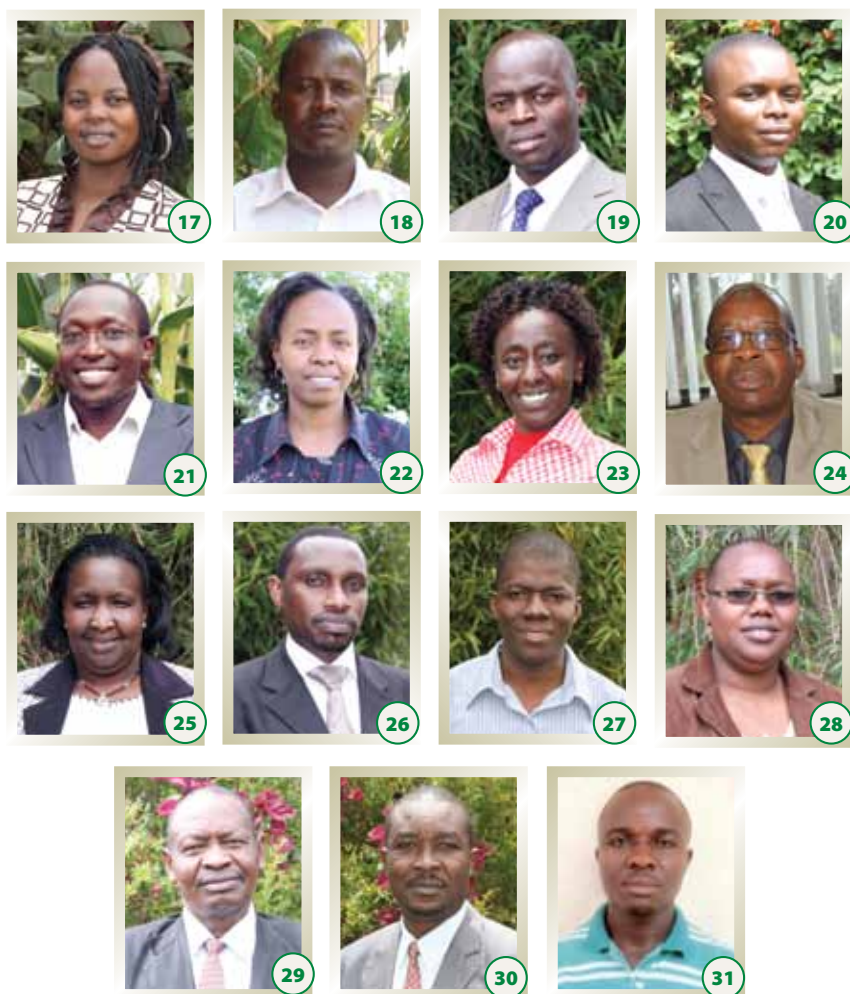


Executive Director's Office

1. **Denis Tumwesigye Kyetere**, Executive Director
2. **Alhaji Tejan-Cole**, Legal Counsel
3. **Nancy Muchiri**, Communications and Partnerships Manager
4. **Peter Werehire**, Documentation and Websites Officer
5. **Grace Wachoro**, Corporate Communications Officer
6. **Abu Joseph Umaru**, Administration & Communications Officer, Abuja-Nigeria
7. **Daniel Otunge**, OFAB Regional Coordinator
8. **Rosemary Nzuki**, Project Communications Officer, WEMA
9. **Jane Achando**, Associate Legal Officer
10. **Jacquine Kinyua**, Executive Assistant to the Executive Director

Technical Operations Department

11. **Jacob Mignouna**, Director, Technical Operations
12. **Francis Nang'ayo**, Regulatory Affairs Manager
13. **Gospel Omanyia**, Seed Systems Manager
14. **George Marechera**, Business Development Manager
15. **Prince Addae**, Project Manager, Cowpea
16. **Sylvester Oikeh**, Project Manager, WEMA



- 17. Stella Simiyu-Wafukho**, Programme Officer
18. Peter Musyoka, Programme Officer, Seed Systems
19. Joseph Ndwigwa, Programme Officer, Agribusiness
20. Francis Onyekachi Nwankwo, Programme Officer, West Africa
21. David Tarus, Programme Assistant
22. Pauline Mundia, Programme Assistant
23. Caroline Thande, Administrative Assistant

Administration & Finance Department

- 24. Moussa Elhadj Adam**, Director, Finance & Administration
25. Nancy Okita, Administration/Human Resource Associate
26. Amos Kimebur, Accounting Officer
27. Maurice Ojow, Project Accountant
28. Fatuma Wario, Administrative Assistant/Events Coordinator
29. George Njogu, Driver
30. Gordon Ogutu, Protocol/Liaison Assistant
31. Simeon Eze, Driver, Abuja Office



AFRICAN AGRICULTURAL TECHNOLOGY FOUNDATION
FONDATION AFRICAINE POUR LES TECHNOLOGIES AGRICOLES

African Agricultural Technology Foundation

P O Box 30709 - 00100, Nairobi, Kenya

Tel: +254 – (0) 20-4223700

Fax: +254 – (0) 20-4223701

Email: aatf@aatf-africa.org

Website: www.aatf-africa.org