

# TAAT Updates 2018

Issue 001

## TAAT celebrates 143 Interventions in 132 Sites across Africa



TAAT Approach to Combating Fall Armyworm Offers Hope to Millions of Smallholder Farmers in sub-Saharan Africa



TAAT's Business Platform approach boosts access to High Iron Beans in Zimbabwe



How TAAT's deployment of feed resources is meeting Ethiopia's livestock needs



TAAT records increased food production and income through maize technologies



# TAAT celebrates 143 Interventions in 132 Sites across Africa

Published by Technologies for African Agricultural Transformation (TAAT). Initiated by the African Development Bank (AfDB) as part of its Feed Africa Initiative, TAAT's main objective is to improve the business of agriculture across Africa by raising agricultural productivity, mitigating risks and promoting diversification and processing in 18 agricultural value chains within eight Priority Intervention Areas (PIA).

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Cover photo: Nabintou Ouattara, in her inland valley rice field, transplanting rice, Kadiolo (Sikasso District), Mali.

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# From the TAAT Program Coordinator

It is my pleasure to present to you the very first Corporate Annual Report of the Multinational Program “Technologies for African Agricultural Transformation (TAAT)”.

This Program is primarily funded by the African Development Bank (AfDB) with contributions from other donors. In this first Report, we focus on some of the key achievements that have been attained during the first year of program implementation.

This has been mainly through the engagement of our partners in the different Regional Membership Countries (RMCs) of the AfDB to decide on the program of work and linkages with ongoing activities of the different value chain compacts.

We know that there are many challenges ahead of us in implementing a complex program such as TAAT, that currently involves nine Value chain compacts (Cassava, Rice, Maize, Aquaculture, Small Livestock, Sorghum/Millet, Wheat, Orange Flesh Sweet Potato, and High Iron Beans), supported by six Enabler compacts (Water Management, Capacity Development, Policy, Enable-TAAT, Soil Fertility, and Fall Armyworm).

There are currently nine CGIAR Institutions directly involved in the implementation of the program (IITA, AfricaRice, WorldFish, ILRI, ICRISAT, ICARDA, CIAT, CIP, IMMI) and three advanced institutions (FARA, AATF, and IFDC).

TAAT is a country-focused program and is currently being implemented in 31 RMCs (Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Ghana, Madagascar, Mali, Nigeria, Senegal, Sierra Leone, Tanzania, Burundi, Chad, DR Congo, Ethiopia, Gambia, Guinea, Guinea-Bissau, Liberia, Malawi, Mozambique, Niger, Rwanda, South Sudan, Togo, Sudan, Uganda, Zambia, Kenya).

The Program Executing Agency is IITA and they are ready to take on the task of reporting at each step of the way on how far we have come, through this Annual Corporate Report.

The first year of the Program implementation has focused on a couple of target areas—putting together the implementation teams in the nine Compacts and six Enablers and establishing linkages with the various RMCs through compact and country work plan launches.

With this behind us, the compacts have now focused their attention on the full implementation of the Program activities. This began with ensuring that all essential goods and services are procured following the processes and procedures of the AfDB; recruiting all needed implementation staff to undertake the compact activities and agreeing on indicative budgets to

implement the activities of the first phase of the program.

This first edition of this Annual Report highlights some of the implementation achievements by way of selected success stories that we consider worth sharing with our audience.

Future editions of the Report shall continue to focus on more success stories of the Program that highlight the outcomes and impacts in selected compacts and locations.

The TAAT Program is giving the implementing institutions a great opportunity to start taking their proven technologies from several years of research to the people who badly need them so that Africa can finally achieve the agricultural transformation vision it has been chasing all this while.

We look forward to the outcomes of this Program in the years ahead and shall continue to update and highlight achievements in future editions of this Report.

The Program shall also continue to build on the successes and achievements of each year as it strengthens partnership with the RMCs while intensifying efforts to improve the livelihoods of all our stakeholders, especially the smallholder farmers of Africa.



Dr Chrys Akem, TAAT Program Coordinator

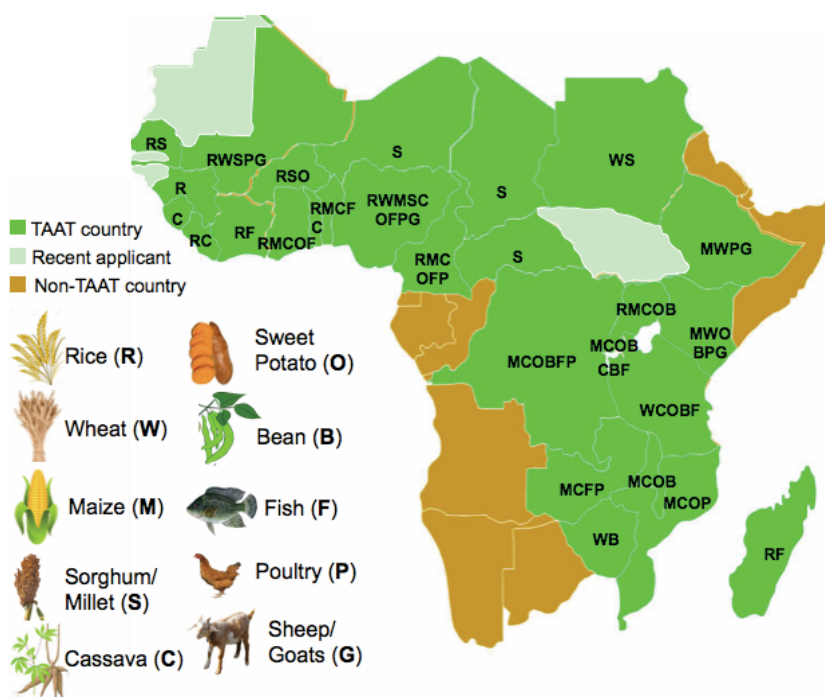
We will continue to be guided in these efforts by our commitment to sustainably improve food and nutritional security on the target value chains to ensure the transformation of African agriculture.

This we believe is the way to reduce individual poverty and increase national wealth by reducing imports on what we can grow. We will ensure that the outcomes of our efforts are freely available to all as Regional Public Goods.

I wish you all an enjoyable reading of the Report.

## 143 technology interventions in 27 countries

Gambia, Guinea Bissau, Mauritania and South Sudan have recently applied to join TAAT



# About TAAT

The Technologies for African Agricultural Transformation (TAAT) program is funded by the African Development Bank (AfDB) to increase agricultural productivity in Africa through the deployment of proven and high-performance agricultural technologies.

It originated from the need “to execute a bold plan to achieve rapid agricultural transformation across Africa through raising agricultural productivity” that was declared by participants in the Dakar High-Level Conference in October 2015 and led to the formulation by the AfDB in June 2016 of the Feed Africa: A Strategy for African Agricultural Transformation. TAAT is aligned with the objectives of the Comprehensive African Agricultural Development Program (CAADP) of the African Union Commission’s NEPAD, namely to:

- 1 Eliminate extreme poverty.
- 2 End hunger and malnutrition.
- 3 Turn Africa into a net food exporter.
- 4 Position Africa at the top of agricultural value chains where it has a competitive advantage.

The developmental objective of TAAT is to rapidly expand access of smallholder farmers to high yielding agricultural technologies that improve their food production, assure food security, and raise rural incomes. This goal is achieved by delivering regional public goods for rapidly scaling up agricultural technologies across similar agroecological zones.

This result is achieved through three principal mechanisms:

- 1 Creating an enabling environment for technology delivery to and adoption by farmers.
- 2 Facilitating effective delivery of these technologies to farmers through a structured Regional Technology Delivery Infrastructure.

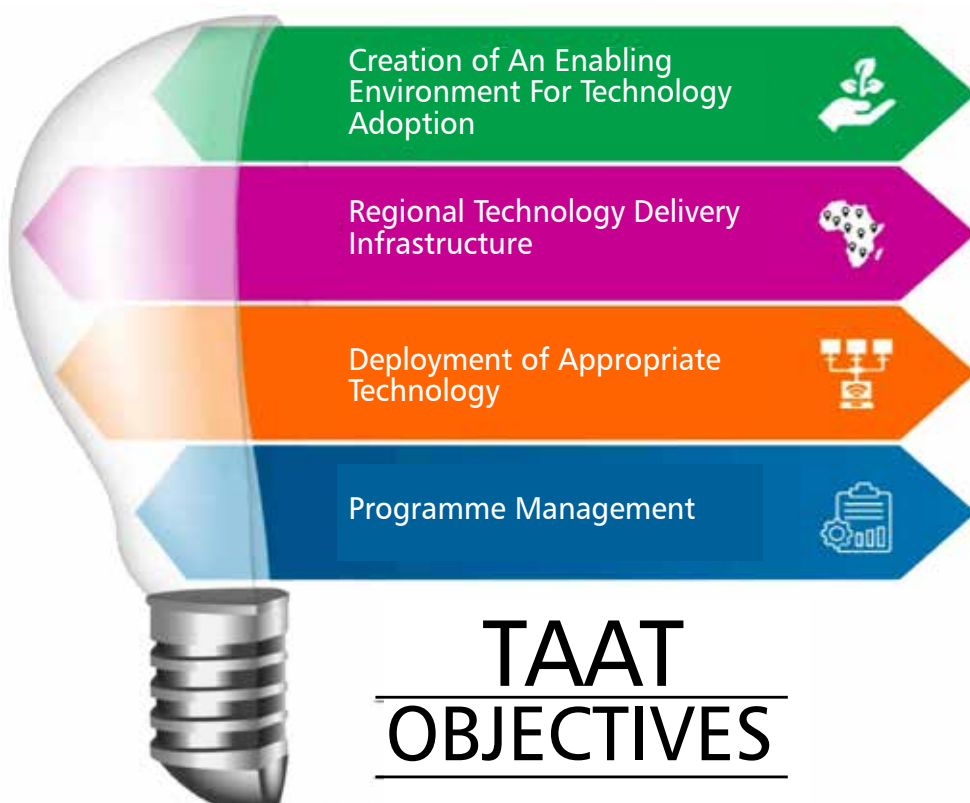
- 3 Raising agricultural production and productivity through the identification and deployment of strategic interventions that include improved crop varieties and animal breeds, accompanying good management practices, and vigorous farmer outreach campaigns at the country level.

The important roles of sound policies, empowering women and youth, strengthening and innovating extension systems, and engaging with the private sector are implicit within this strategy.

TAAT brings together research institutes (national and international), public extension services, private sector suppliers and buyers, farmers organizations and not-for-profit organizations involved in agricultural development. These institutions come together with specific objectives within selected agricultural value chains and form Commodity Technology Delivery Compacts (referred to simply as “Compacts”) for technology delivery to millions of agricultural producers.

In its first year of implementation, the TAAT program includes nine (9) Value Chain Compacts organized around rice, maize, cassava, wheat, sorghum and millet, orange-flesh sweet potato, high-iron beans, small ruminants and poultry, and aquaculture, and six (6) Enabler Compacts providing support services for soil fertility management, water management, capacity building and development, advocating supportive seed technology policy, mobilizing youth into agribusiness, and organizing a response to the fall army worm invasion.

The program has set the ambitious target of reaching 40 million farmers in the next five years (Table 1) and adding 120 million metric tons of additional foodstuffs to the African food basket (Table 2).



TAAT has started implementation in 27 countries and four more are in the process of joining the program (Fig. 1).

The overall goal of TAAT is to radically transform African agriculture into a competitive sector by deploying productivity enhancing technologies and focusing on eight Priority Intervention Areas, namely: Self-sufficiency in Rice Production; Cassava Intensification; Food and Nutrition Security in the Sahel; Transforming African Savannas into Breadbaskets; Revitalizing Tree Plantations; Expanding Horticulture; Increasing Africa's Wheat Production; and Achieving Self sufficiency in Inland Fish Production.

The TAAT Program recognizes that success in transforming African agriculture to reach the CAADP's goals will come from interventions at very large scale that require partnerships between research institutes, public institutions, farmer support organizations, and the private sector with the combined support of investors in agricultural development.

The Program has therefore been designed as a Framework Program that allows other development partners (the World Bank, AGRA, BMGF, IFAD, EU, bilateral development assistance programs, etc.) to make use of it in their investments in agricultural programs to expand country coverage, to build synergy around common objectives, and to expand the reach and impact of individual initiatives. African countries can rely on the TAAT Program as the source of technical assistance to support their agricultural transformation initiatives at the design stage and during implementation with proven and productivity-enhancing technologies.

Table 1. Numbers of farmers targeted by Commodity Technology Delivery Compacts.

	Compact	Compact Lead Institution(s)	Target Beneficiaries farmers
Commodity	Maize	AATF	4,300,000
	Rice	AfricaRice	2,260,000
	Wheat	ICARDA	850,000
	Sorghum / Millet	ICRISAT	2,350,000
	Beans	CIAT	1,220,000
	Cassava	IITA	3,380,000
	OFSP	CIP	1,250,000
	Small livestock	ILRI	1,650,000
	Aquaculture	WorldFish	1,150,000
Enablers	Policy Support	AATF/IITA/MMI	40,000,000
	Capacity Development	FARA	2,500,000
	Soil Fertility Management	IFDC	24,000
	Water Management	IWMI	650,000
	ENABLE-TAAT (Youth in Agribusiness)	IYA-IITA	850,000
	Fall Army Worm Control	IITA	15,000,000

Table 2. Additional food production targeted to be reached by 2015.

Commodity	2016 Average African productivity (Baseline) (metric tons/ha)	2016 Average productivity of lead producers (metric tons/ha)	2025 Average African productivity (metric tons/ha)	Additional food production (metric tons/ha)
Maize	2	5	4	30 million
Lowland Rice	2	5.5	4	15 million
Wheat	1.5	3.5	3	25 million
Sorghum	1	2.5	2	10 million
Millet	1	2	2	5 million
Cassava	12	24	20	20 million
Small livestock (12 month live weight)	25 kg	60 kg	50 kg	10 million
Fish (12 month live weight)	3 kg	8 kg	5 kg	5 million



# African Development Bank seeks partnerships to lift one billion people out of hunger

The African Development Bank has called on global partners to join hands to lift one billion people worldwide out of hunger and said it was leading the way by investing US\$24 billion in African agriculture over the next 10 years in the largest such effort ever.



Dr Akinwumi Adesina speaking at the 2018 Scale Up Conference at Purdue University.

“We are not winning the war against global hunger,” Bank President Akinwumi Adesina told an agriculture conference at Purdue University in Indianapolis on Tuesday, 25 September 2018.

“We must not get carried away,” he added, referring to statistics showing a decline in the global population living on less than two dollars per day. In reality, the number of hungry people in the world had increased from 777 million in 2015 to 815 million in 2016, he said citing the latest World Food Security and Nutrition data.

Adesina told the audience that included researchers, implementing organizations, business leaders, policymakers and donors that simple technical and scientific methods were already making a whole difference to farm yields and income in Africa. (Photo: Poverty in Sierra Leone’s slum community).

While such technologies to deliver Africa’s green revolution exist, they are mostly just sitting on the shelves, he said.

“The release of water efficient maize varieties now allows farmers to harvest good yields in the face of moderate drought,” he noted.

“Today, rice varieties exist that can give yields of 8 tonnes per ha. Cassava varieties exist with yields of up to 80 tonnes per ha. Heat tolerant and disease resistant livestock and technologies for ramping up aquaculture exist.”

Bank experts put current comparative yields at 1.5-2 tonnes per ha for rice and 10-15 tonnes per ha for cassava.

What was needed urgently was deployment of supportive policies to ensure technologies are cascaded down to millions of farmers. “All Africa needs to do is to harness the available technologies with the right policies and

rapidly raise agricultural productivity and incomes for farmers and assure lower food prices for consumers.”

The Bank has launched its **Technologies for African Agricultural Transformation (TAAT)**, a \$1 billion initiative to extend the use of farm technologies.

TAAT is currently engaging seed companies, public and private entities, and financial institutions in 27 countries to make technology available to a total of 40 million African farmers.

Combining targeted subsidies for farmers with a market-based system for rapidly expanding access to financing for farmers and agricultural value chains is the fastest way to get many people out of poverty to a sustained pathway for economic growth, Adesina added.

The conference on “Scaling Up Agricultural Technologies for Transformation” marked Adesina’s fond return to his alma mater.



“It was here, as a graduate student, that I began the journey of searching for ways to get technologies into the hands of millions of farmers,” he said.

Adesina was to go on to make a huge impact on the transformation of agriculture in Africa, including implementing game-changing policies in his years as Nigeria’s Minister for Agriculture and Rural Development before taking up his post at the Bank in September 2015.

Adesina said the situation in Sub-Saharan Africa needed particularly urgent intervention due to the ravages of climate change.

The International Food Policy Research Institute estimates that Africa will add 38 million to its number of hungry people by 2050 as a result of climate change.

The Institute forecasts that Africa will experience major food shortages by

2020 and beyond, while malnutrition will be on the rise over the next 20 years.

The Bank’s ongoing initiatives had the objectives of growing income for farmers, stabilizing prices for staple crops, reducing losses and stimulating multiplier effects in local economies.

With its Staple Crop Processing Zones and other initiatives, the Bank is demonstrating how this can be done.

“The African Development Bank put feeding Africa as one of its topmost priorities when it launched its Feed Africa strategy in 2015 and is investing \$ 24 billion in agriculture for Africa over 10 years – the largest ever such effort,” the Bank President said.

Across Africa, the Feed Africa Strategy is supporting the development of policies, markets, infrastructure and institutions that will ensure that agricultural value chains are well developed and that

technologies reach several millions of farmers.

Adesina called for global partnerships to establish Staple Crop Processing Zones across Africa.

“The SCPZs will provide several advantages for rural economies. They will create markets for farm produce. Raw materials will no longer be moved out of rural areas, but as finished value-added products. Post-harvest losses will be substantially reduced. Well integrated agricultural value chains will develop, with supportive logistics, especially warehousing and cold chains,” Adesina added.

The African Development Bank has already started investments to develop these SCPZs in a number of pioneering African countries, including Ethiopia, Togo, Democratic Republic of Congo and Mozambique. It expects the processing zones to be active in about 15 countries in the near-term.



Dr Adesina flanked by selected participants at the Scale Up Conference.



# How TAAT is empowering women farmers through Urea Deep Placement Technology

Kadiolo is a town in the Sikasso Region of southern Mali. The town lies 85 km south of Sikasso, 13 km north of the border with Ivory Coast and 30 km west of the border with Burkino Faso.

The town is an agrarian community with nearly everyone engaging in agriculture at the subsistence level just to make ends meet.

## Poverty drives innovation

Faced with a family to feed after the death of her husband, Nabintou Ouattara, 57-year-old

widow, and 65 other Kadiolo women came together and established what is now known as the "Dabakala Association".

This farming association exploits the Folona inland valley of 29 ha over years. These women have a unique goal: to produce rice and feed their families.

Although geared by courage, they were in a circle of poverty and food insecurity.

For example, Nabintou harvested not more than nine bags of paddy rice or 675 kg in 0.40 hectare of land over decades.

During the past 2018 cropping season, the members of Dabakala Association were brought together by the local agriculture sector of Kadiolo for training and upscaling the Urea Deep Placement (UDP) technology.

*Nabintou Ouattara, in her inland valley rice field, transplanting rice, Kadiolo (Sikasso District), Mali.*



This agricultural input-based technology, promoted by the International Fertiliser Development Centre (IFDC) under the Technologies for African Agricultural Transformation (TAAT) program, uses less fertilizer and seeds per ha for better crop harvest and income.

## Transforming African agriculture

Technologies for African Agricultural Transformation (TAAT) is a program initiated by the African Development Bank (AfDB) as part of its Feed Africa Initiative.

The program is implemented by IITA in close partnership with other CGIAR Centers and specialized technical centers like the African Agricultural Technology Foundation (AATF), International Fertilizer Development Centre (IFDC), Forum for Agricultural Research in Africa (FARA), national agricultural research and extension systems, and private sector partners.

TAAT promotes and disseminates proven high-performance food production technologies to millions of farmers in a commercially sustainable way through a network of people and institutions forming a Regional Technology Delivery Infrastructure (RTDI) within an enabling environment.

Launched in 2018, the program is already increasing agricultural productivity in Africa through the deployment of proven and high-performance agricultural technologies at scale along selected value chains such as rice, maize, cassava, wheat, sorghum and millet, orange-flesh sweet potato, high-iron beans, livestock, aquaculture.

Operating as a network of interacting “compacts” with nine devoted to specific commodity value chains, and six others serving as “enablers” that provide needed specialist services such as soil fertility, water management, capacity building, youth, policy, and Fall Armyworm control.

Just like other enabler compacts, the IFDC-led soil fertility compact works in synergy with TAAT commodity crop compacts for effectiveness in scaling up agriculture input-based technologies for accelerated productivity growth, resilience, and improved livelihoods.

The compact is targeting at least 1,783,000 farmers with technologies materials and 3,070 agro-dealers in 21 countries across Africa. Within six months, the compact was able to deploy their Urea Deep Placement (UDP) technology in Kadiolo.

## Changing lives through agricultural technology

As a volunteer through the Dabakala Association, Nabintou conducted a demonstration plot to evaluate the UDP technology.

“I used half of my field for the test. With less seed and less fertilizer, yields far exceeded the other half grown in our traditional broadcasting fertilizer practice Nowadays, from 675 kg in the past, I harvest up to 1725 kg of paddy rice in my small plot of 0.40 ha” she says.

With a smiling and proud face, Nabintou prides herself on the situation of women in Dabakala association after the adoption of the UDP.

“We never thought of selling our rice one day. But since we adopted UDP, our returns have increased so much that we are selling some of them for our cash needs. Today, many of our women are autonomous. They no longer depend entirely on their husbands. Besides, we are mostly widows,” she added.

Nabintou Ouattara and members of her Dabakala Association are grateful to the African Development Bank (AfDB)-funded TAAT program which identified their challenge with low yields and proffered the appropriate technology (UDP) that is putting smiles on their faces.

## Urea Deep Placement technology

Designed for resource-poor farmers cultivating lowland rice, urea deep placement (UDP) is a nutrient management technology that accomplishes what agriculture must do in a changing climate: increase yields and profitability and reduce pollution.

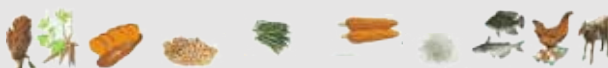
The deep point placement of urea briquettes delivers more nitrogen to the plant and reduces fertilizer use, water contamination, and greenhouse gas emissions. Additionally, farmers experience about 15–20% higher yields.

More than 2 million farmers and retailers in Bangladesh are experiencing increased production and income using the technology, and results are being replicated in several countries in sub-Saharan Africa.

Working with farmers (particularly in Bangladesh) for over 20 years, IFDC developed UDP as a more effective alternative to the traditional method of applying fertilizer by surface broadcasting (spreading, usually by hand) across a field or paddy.



*Demonstration of urea deep placement in maize cropping at a training session held in Kara, Togo. Photo by Guillaume K.S. Ezui.*



# Fertilizer Microdose Technology leads to higher yields among farmers in Mali

SAKAREL is a cosmopolitan village located at 9 km from the city of Mopti in Mali.

Mamadou Nadio, 60 years old, is one of the leaders in this village. For decades, the traditional practice of broadcasting fertilizer was a job left to the care of children.

It then took only 15 minutes for them to apply 100 kg of diammonium phosphate (DAP) fertilizer on 1 hectare of millet.

Low productivity and chronic hunger were a burden and problem to solve.

The microdose technology uses less fertilizer at the hill of millet plant. This saves fertilizer and money and significantly increases yield.

Mamadou can't stop thinking of the huge loss of fertilizer and money in past years.

"We used to give the bags of fertilizer to the children who spread it on the fly in our fields. Without knowing that in this way, a large part was lost either by evaporation or by rainwater runoff. Our millet plants received only a small portion of the fertilizer applied. But thanks to the training by the TAAT Soil Fertility compact, we finally understood that 35 kg of fertilizer could be enough for 1 ha of millet and the yield was high," Mamadou said.

He became a custodian of the microdose technology for cereal farmers in his community after the training. "After the training, I applied the microdose

in 1 ha of millet so that those who had doubts could see better and adopt the technology. Before the harvest, many people came to ask me for my secret. I told them there is no secret, I just applied the microdose. At harvest, my yield was 1500 kg; while I had never exceeded 800 kg in this field".

This success will make Mamadou the custodian of all the knowledge on the microdose technology.

But it does not stop in such a good way.

Mamadou transmits to his children the microdose technique by saying: "In my lifetime or after my death, do not give up this practice; because the microdose is probably the technology that can emerge from poverty."



Mamadou, a 60-year-old farmer and custodian of microdose technology posing with his son Allaye Nadio. Sakarel, Mali. Photo by Moussa Koumaré.



# TAAT's Business Platform approach boosts access to high iron beans in Zimbabwe

The Technologies for African Agricultural Transformation (TAAT) High Iron Bean (HIB) Project is implemented using the novel bean corridor approach, developed and fronted by CIAT's Pan-Africa Bean Research Alliance (PABRA).

The approach is operationalized through innovation platforms (IPs) with the aim of eliminating bottlenecks in the bean value chain. The target is to increase access of farmers to better seed of improved nutrient-rich bean varieties for the ultimate nutritional well-being of consumers.

The approach also helps improve the business environment, linkages between bean farmers and buyers

(off-takers), and engagement with policy makers to support investment in bean value chains and cross-border

trade, thus enhancing incomes for value chain actors.

Briefly, the corridor approach is a market-driven transformation of rural agriculture that focuses on "bean flow" activities (research, production and productivity, distribution of grain, value addition, and nutrition).

In Zimbabwe, implementation of the TAAT HIB project is a classic example of how impactful the bean corridor approach can be in enhancing bean businesses along the whole value chain.



High iron bean cultivar Cherry mixed with orange maize (cherry & orange maize samp).



Hon. Vangelis Peter Haritatos, Deputy Minister and Director, Crop Research tasting various high iron bean-based products



The TAAT HIB project in Zimbabwe aims at scaling up three HIB varieties: NUA45, Cherry, and NUA674 (released in 2018) and complementary good agricultural practices (GAPs) and value-added technologies (bean flour and canned beans).

Working through five innovation platforms within the framework of bean corridors, the TAAT HIB project

has attracted several enthusiastic partners (actors) along the HIB value chain led by private sector actors (seed companies, processors, aggregators, and agro-dealers). For example, in the North Eastern Corridor there are Nyamaropa and Mutasa IPs.

In November 2018, the IPs hosted several on-farm field days, bringing

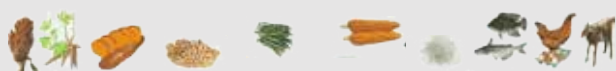
together seed companies, farm input suppliers, bean processors, NGOs, schools, and Government departments to showcase the partnerships and create awareness among farmers, school children, women, and youth groups with regards to the GAPs for productivity enhancement and nutritious HIBs and value-added HIB products.



Mr R. Chitsiko the Permanent Secretary of Ministry of Agriculture Lands and Rural Resettlement and Dr D. Kutuywayo the Director, Crops Research Division of DR&SS and others sharing light moments around processed bean products.



Hon. Vangelis Peter Haritatos appreciating some of the packaged HIB varieties on display.



# Farm to Fork: TAAT engages Ugandan youth in growing beans

Somewhere in Central Uganda, Wakiso District sits St Mary's College Kisubi (SMACK) where teachers are doing amazing work by introducing practical agricultural lessons to their students.

Most of these young students need to be guided and molded to realize that agriculture has a greater potential for their economic and nutritional well-being.

In November last year, SMACK hosted a team from the Technologies for African Agricultural Transformation (TAAT)

who explained the value of high iron beans and how to cultivate the beans. The students are keen on adopting agriculture not only as an address to food security but as a source of income once they finish college.

Through their school club known as "feed the child" where they are

adopting agricultural skills to enhance food supply in the school (especially for the students who realized the need to embrace agriculture in the school in order to feed students in the community who cannot meet the school's meal costs) to engage youth in practical agricultural skills from the lessons at school as well as engage parents, students and youth, and teachers in the fight against hunger.

According to Uganda's Demographic and Health Survey of 2016, about 2.2 million (29 percent) of Ugandan



children under the age of five are stunted, meaning they are too short for their age. About 850,000 (11 percent) of Ugandan children under the age of five are underweight and a further 300,000 (4 percent) are too thin for their height.

“If we are to do something about such ugly statistics, then we need to involve the youth in agribusiness. When we get these educated and energetic youth in the production processes, then we shall be able to increase science in production and grow food that feed our people and export the excess for higher income,” said Mr Ronald Ddungu, the Deputy Head teacher who guides the students in the agriculture program at the school. He is also a member and the contact person of the High Iron Bean (HIB) compact, TAAT platform in Uganda.

With the help from the visiting TAAT team, SMACK students were able to set up demonstration gardens of HIB and trained a few of the students who will teach the rest of the students.

Dr Stanley Nkalubo, head of Bean program at the National Crop Resources Research Institute (NACCRI) who accompanied the TAAT team to the farms at SMACK, confirmed the institution’s support in setting up bean gardens in schools and to teach the students the business of beans.

On the business side, it is approximated that an average 500 kg per acre of seed multiplied by the school’s 168,370 acres will yield 84,185 tons of beans. Each home that producers approximately 500 kg of beans is likely to earn UGX 1,250,000 for each kilo of beans sold at UGX 2,500. This paints a very great picture as the students will be able to make money out of beans as well as help feed the other students in the school from the surplus.

“This is the very reason why as teachers we need to relate what we teach to the real-world scenario and allow the students to help come up with solutions especially on food security gaps,” Mr Ddungu added.



*Students measuring the field as they prepare for bean planting.*



*Dr Stanley Nkalubo (white hat) explaining details of bean production to some of the students. Their teacher accompanies the students.*



# TAAT trains trainers on managing Innovation Platforms to amplify hotspots in local technology adoption

While the proof of concept for adoption and scaling proven innovative technologies is demonstrated in the tier one cohort of countries under TAAT, very soon, there will be a need for human resource capacity for broad scaling in these countries.

The Capacity Development and Technology Outreach (CTDO) enabler compact is already preparing local capacity to meet such demands for facilitation of technology adoption. In the last quarter of 2018, over 150 Trainers from eight countries were trained on management of Innovation Platforms to enable rapid localization and scaling of TAAT technologies.

## “The future belongs to the organized”

Technology adoption does not happen in isolation at the level of the farmer or

value chain stakeholder; instead it is more frequent within organized communities.

As mentioned by the National Small Holder Farmers of Malawi (NASFAM) during the opening remarks to the training for the Southern African region, “The future belongs to the organized”. Innovation Platforms (IPs) have been recognized within the TAAT program as the preferred mode of introducing and mentoring a community of practice or value chain to adopt proven technologies.

Thus, the Forum for Agricultural Research in Africa (FARA) has

developed training materials based on its decade-long experience with innovation platforms.

As part of TAAT, FARA, in 2018, targeted 150 experienced extension specialists as Trainers on how to establish and facilitate innovation platforms. The Trainers, a third of whom are women, cover a range of regions within the eight countries. They also have experience in a range of value chains and are well positioned to identify potential facilitators of Innovation Platforms in the local areas where the TAAT Commodity compacts are operating.

These trainers will also be able to train other trainers in their country as well as local facilitators of innovation platforms. Thus, through this approach, the CDTO enabler compact has produced a



An entire group work and plenary session chaired by women participants, leading the debate on plans to establish and manage Innovation Platforms at the Training of Trainers session in Abuja, Nigeria (Photo by Benjamin Abugri, FARA).



core pool of resource persons to help the Commodity compacts amplify the outreach of TAAT technologies in the target countries.

### Promoting local interactions between extension and Commodity Compacts

Combined with the training sessions were half-day interactions with commodity compacts operating in the host country of the workshop. Thus, presentations were made by seven commodity compacts and two enabler compacts during these training sessions. Each group of country representatives returned home with a plan on how to engage the commodity compacts already operational in their country and demonstrate the value of the compacts working with them as facilitators of innovation platforms. Paul Fatch, Focal Point of the Malawi Forum for Agricultural Advisory Services (MaFAAS) proposes that Innovation Platforms will also be useful beyond TAAT interventions in Malawi. The TAAT CDTO enabler compact has also established a Community of Practice of Innovation Platform facilitators to learn from their experiences.

### Early harvest from the Aquaculture Compact and technology adoption hotspot in Nigeria

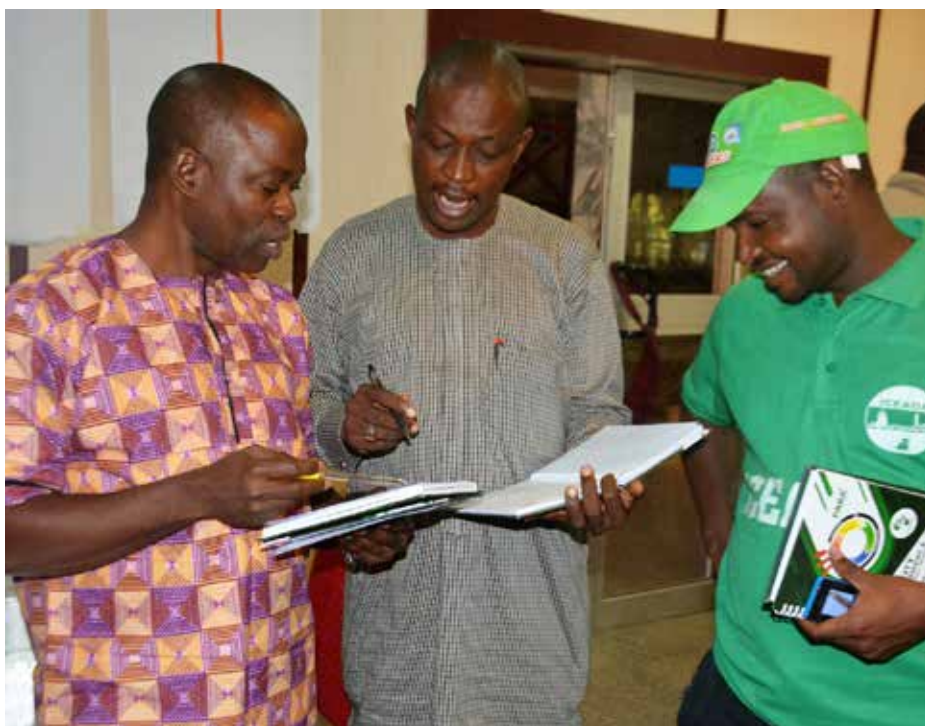
The first location for the Training of Trainers was in Nigeria, given that there is the highest concentration of TAAT compacts operational in that country. This ensured that the commodity and enabler compacts in Nigeria had early exposure to the benefits of establishing innovation platforms at community level to enhance the adoption of proven technologies by the value chains at local level.

The aquaculture compact, which had already involved extension specialists in its work, was able to send five of their representatives to the Training of Trainers (ToT) session in Abuja. Within two weeks of the ToT, Dr Isaiah Oladipo Opadokun, Head of Fisheries, Lagos State Agricultural Development Authority (LSADA) reported on the next level of step-down training with 45 staff and field officers from the LSADA.

Lagos State being a maritime State has comparative advantage in aquaculture; hence the emphasis of Agricultural IP to spread TAAT Aquaculture technologies. Having trained extensionists involved in the management of Innovation platforms builds upon their experience in facilitation of rural communities of practice and their proximity to the stakeholders involved in the locality. Moreover, they can assist in packaging and sharing of knowledge about technologies.

The francophone countries will benefit from the Training of Trainers in early 2019. As the process continues the CDTO enabler compact, working

closely with the Commodity compacts, will be targeting trainers and facilitators among the specific communities involved with TAAT. A capacity audit currently under way will help identify further capacity development needs. Furthermore, the CDTO will organize the systematic review of packaging of information and knowledge on the proven technologies, for the purpose of outreach. This will facilitate the network of extension and knowledge management specialists to doubly enhance the packaging, outreach, and facilitation of adoption of technologies within local communities grouped within innovation platforms.



Networking at one of the Train the trainers sessions. Photo by FARA.



A cross-section of participants at one of the TAAT training sessions. Photo by FARA.



# How TAAT's deployment of feed resources and sheep fattening technologies is meeting Ethiopia's livestock needs

The story of these two neighbors shows that combining soil and water conservation and fodder production may lead to rapid and significant changes at farm level, by addressing through a single innovation, the acute shortage of fodder for livestock and the severe problem of erosion in these mountainous landscapes.



In these farming systems of southern Ethiopia, animals play a vital role in land preparation and income generation from dairy products or fattening, but also as a cash reserve in case of a hard blow.

But the way to bring these changes is not that simple. There is important social work to be conducted beforehand, with several constraints that need to be tackled.

First there was the problem of open grazing that discourages any investment in fodder production. The integration of fodder resource may only work if the whole community succeeds to define and apply rules to control open grazing, and to switch to cut and carry or zero-grazing practices. To assure this, the project worked with the Iddir, a traditional community group that holds tremendous influence because it has a strong legitimacy from the community.

The Iddir, was used to galvanize the community to make and enforce a ban on open grazing in the TAAT-Inter-Aide project areas. The need to deal with the problem of erosion comprehensively, by considering the whole sub-watersheds is another challenge. This is associated with the critical issue of poor access to planting materials. To overcome the latter, the livestock compact embarked on the use of farm-based backyard nursery. This was instrumental in increasing the capacity to multiply the fodder grass species starting from a few clumps.

These changes are the precursors that paved the way to provide the solutions to two major constraints faced by the families: the issue of land fertility and the lack of diversified fodder for the livestock. The control of animal grazing made it possible gradually to diversify the fodder resources, and to introduce green manure cropping during the dry season, when parts of the land are laid bare without any cover crop. It also contributes to better utilization of wheat or other cereal straws that were hitherto left in the field to be pastured by other animals. A third benefit was the opportunity to encourage the integration of rich protein-rich, drought-tolerant fodder hedges,

such as tree Lucerne or *Sesbania sesban*, as additional fodder resources for livestock.

Ato Tesfay and his family live in the Kebele of Suticho 3 in the district (Woreda) of Doyo Gena. His 0.5 ha farm corresponds to the average surface of farms found in this area of Southern Ethiopia. It is located in a steep slope of the mountain. Ato Tesfay explains that erosion control was his main concern, as well as the depletion of feeding sources for his animals. "I have decided to intercrop the grass fodder grown on anti-erosive structures with alfalfa. This association is very interesting for animal feeding". He also developed vetch, another fodder specie, for fodder and green manure. Integrated with land conservation. The development of permanent fodder resources in the farm had a considerable impact on the economy of the family, as shown by the elements of answer provided below.

For instance, late last year, Ato Tesfay bought an ox at the price of 7000 ETB (~US\$250), for fattening. After using this ox to plough the family land, he sold it in July 2018 at the price of 13.000

ETB. He then bought another new ox in August at 9.000 ETB, also for fattening, that he sold 4 months after at the price of 13.500 ETB. This sole operation of animal fattening generated a gross profit of 10.500 ETB (~US\$380, 230 net profit) for the family.

This is equivalent to the national average of three and half month's wages of around US\$65/month, or 5 months factory workers wages at US\$45.00/month. The TAAT-Inter-Aide project is building the resilience of families like Ato Tesfay to adopt proven livestock technologies like fodder production and feed resource utilization to address the problem of feed shortage in the dry season, increase family income and protect the environment at the same time.

On her side, Ato Tesfay's wife, Wazero Abanesh, is producing and selling dairy products: she processes butter and cheese that she sells three times a week on the local market. The production varies throughout the year but on average, she is getting about



Sheep fattening, Menz, Ethiopia.



1,000 ETB/week (~US\$38), thanks to the milk by-products. In the dry season, the quantity of milk usually decreases but it is compensated by the market price increase. In the rainy season, it is the opposite. Ato Tesfaye is now extending alfalfa in his farm, mainly by cuttings.

Tesfaye's neighbor, Ato Tessema, also started to collaborate with the TAAT-Inter Aide Project. For him, the main concern was to conserve the land and preserve soil fertility. Access to fodder in the dry season was also a severe issue for the family. After having constructed 170 m of soil bunds planted with grass to stabilize the anti-erosive structures, Ato Tessema tested other solutions:

"For the last 2 years, I have been testing the use of green manure to improve the fertility of the soil". During the Belg season (dry season), part of his land is let for fallow. Farmers from highland areas have indeed no alternative than cropping Irish potatoe during the dry season. So, only part of his farm is used during this season. In 2018, the project suggested he test improved fallow by using vetch and lupin as cover crops. He decided to focus on Vetch, planted the seeds in March and chopped the biomass at the beginning of June to incorporate it in the soil before ploughing it 3 weeks later.

He observed "a very positive effect on wheat production following the green manure. I kept some seeds apart to use them for seed' production, so I can continue to use green manure the next year". He therefore allocated a small plot for this purpose. After harvesting the seed from this plot, he decided to plant "Portuguese cabbage". That was when he noted the surprising effect of mixed fodder-cabbage production. As some left seed fell on the ground, vetch germinated inside his cabbage and, in the absence of any adverse visible reaction, "I decided to let the vetch grow. Looking at the adjacent plot, with cabbage only, I felt that it is a very good association". This combination provides several benefits: soil cover and therefore decreasing weeding needs, providing additional source of fodder, up to 30% improved cabbage yields due to nitrogen fixing by the legume fodder. This amounts to double harvest according to Ato Tessema.



Ato Tesfaye (middle) and his neighbors. Photo by Inter-Aide 2018.



Female youth members receive rams Dogoyena in Ethiopia.



In 2018, thanks to his own vetch seed production, he extended the surface with green manure and also dedicated some plots for vetch whose leaves will be used for fodder. This year, he will decrease the use of urea in his wheat plot that follows vetch by 1/3rd. At ~US\$75 U/50-kg bag, Ato, will be saving nearly 2,000 ETB on urea fertilizer/ha of land planted to potato alone. He hopes to gain an additional benefit of nearly in fodder biomass harvest.

“It is providing an additional source of well-appreciated fodder!” He is now extending his hedge and is currently in the process of multiplying additional seedlings to be transplanted.



Youths Training at Addiyio Ethiopia, TAAT-ICARDA Photo by ICARDA.

### TAAT livestock feed, forages, and sheep fattening technologies: The big picture

Since inception, the TAAT Small Livestock compact has engaged partners to deliver on the TAAT Feed and Forages for access to improved feeding to support the small ruminant fattening technology.

In Mali and Ethiopia, five delivery partners have been identified to deliver different components of the feed technology. It is important to note that the forage technology does not stand in isolation; it links to the Small ruminant fattening activities.



Chicken customers receiving 20-day-old chicks.

### Achievement so far

- 1.35 million chickens distributed to 100,000 households in Oromia region, Ethiopia.
- ~US\$500,000 generated from sale of 2,000 sheep and 750 cattle fattened in Ethiopia.
- Sheep fattening youth business training on Ethiopia Regional television reach at least 2.5 million farmers. <https://youtu.be/XCWj2gq-iEgo?t=129> Awaiting English translation.
- 25 Master Trainers (12 women) from eight East African countries trained on livestock technology scaling. Some of the training slides <https://www.slideshare.net/ILRI/faoilri-niyi> , <https://www.slideshare.net/ILRI/faoilri-niyi2>
- At least 3.5 million Ugandan farmers sensitized on Livestock technology scaling via broadcast on Uganda Broadcasting corporation. FAO-TAAT Master trainers’ activities. Ongoing activities.
- 5,000 sqm nurseries and 150 fodder demonstration plots established.
- 1.5 tons of forage and dual-purpose seed distributed to farmers.
- 50,000 sq m of forages and dual-purpose legume plots established.
- 3,500 agropastoralists trained on harvesting, handling, and storing fodder feeds.
- 35 tons of dual-purpose forage biomass harvested (harvesting still in progress).
- 250 agropastoralists trained as trainers in Mali <http://u.osmfr.org/m/240976/>



# TAAT: Enabling the passion of African youth in agriculture

The ENABLE-TAAT compact is supporting the dreams and aspirations of many African youth by creating a platform that encourages them to choose a career path in agriculture.

The compact, which is one of the 'ENABLERS' under the Technologies for African Agricultural Transformation (TAAT) is targeted at guiding vibrant, energetic, young people to become owners and co-owners of independent agribusiness enterprises across all of TAAT's value chains.

Many of these young people who were unemployed graduates before their encounter with ENABLE-TAAT initially did not see themselves creating a career path along the agricultural value chains or embracing agriculture as a real business, but the compact availed them the opportunity to unveil their potentials in agriculture.

It was also gathered that many of them had a negative perception about agriculture, but the compact devised a means of changing their mindset by organizing trainings on agricultural commodities, business management, and leadership skills, and providing mentoring and facilities to explore available opportunities.

Within a short period of time, the initiative is recording successes and is fast becoming

a veritable avenue for young Africans to create jobs for themselves through the proven technologies being promoted by TAAT and linking with other compacts under the project.

Led by the Youth in Agribusiness office of the International Institute of Tropical Agriculture (IITA), the ENABLE-TAAT compact is providing Capacity Building and Technical Assistance for the establishment and expansion of youth-led agribusiness enterprises across five countries—DR Congo, Kenya, Nigeria, Tanzania, and Uganda in year 1.

The enterprises were selected after review, grading, and recommendations based on key business elements, perceived viability for sustainability, and technological impact.

One of such established agribusinesses is F-Step Cassava enterprise owned by Seun Ogidan.

After being trained through ENABLE-TAAT, F-Step acquired 15 hectares of land at Ago-Owu in Osun State, Nigeria to establish a cassava farm for root production and stem multiplication. She started the business with her savings but was supported by ENABLE-TAAT to expand her capacity for production of planting materials for farmers. The business has created direct and indirect employment for an additional ten young people.

"I will expand my farm to about 25 hectares in the next planting season because I have

lots of farmers requesting for planting materials especially the Pro Vitamin A variety. I am assisting in providing disease-free cassava stems and also making money from the sales. I will not stop until I extend the benefit to other parts of the community," she said.

Another young man that is creating economic opportunity out of the technologies promoted by TAAT is Adedamola Murtalab. He was trained on the production of Orange Fleshed Sweet Potato (OFSP) and now makes a living from the multiplication of the vines.

"The Orange Fleshed Sweet Potato is scarce here in Nigeria but I had the opportunity of being enlightened on the health and economic benefits of it by ENABLE-TAAT and decided to be one of the agents of change. I discovered that lots of people were yet to know about it, so I started making enquiries and was linked by ENABLE-TAAT with the International Potato Center (CIP) and their registered out-growers where I was trained and got the vines. I started with 4 hectares where I multiply the vines and train some farmers. I also sell the potato and the demand for it is encouraging so I will expand my business soon," he added.

The opportunity will be extended to more young people as the project expands its activities to other locations in Africa. The aim is to reach out to over 5,000 youth in the first year of implementation.

*Seun Ogidan of F-Step Cassava enterprise explaining a point at her farm.*



# Deployment of proven technologies leads to increased aquaculture productivity in Africa

Aquaculture is the world's fastest growing food production industry and currently more farmed seafood is consumed globally than captured fish. However, Africa has lagged behind the rest of the world in aquaculture development contributing only about 2% of total global production.

This is due to inadequate application of available technologies across the aquaculture value chain. Several challenges severely undermine aquaculture production, including stunted fish seed, high level of mortality and poor aquatic health management; high cost of fish feed—over 60–70% of farming costs attributed to feed costs; high level of postharvest losses and low value addition.

Although proven aquaculture technologies exist in some African countries like Egypt, which is the largest producer in Africa and third largest producer of farmed tilapia in the world, facilitating technology delivery to fish farmers, at scale still presents a challenge.

To address this challenge, the TAAT Aquaculture Compact facilitated training and demonstration of proven Aquaculture technologies to participants from 10 pilot countries across sub-Saharan Africa.

Initial activities focused on sensitization of partner countries on the available technologies in order to make them ready for early adoption. This was followed by training, attended by participants from across the 10 TAAT Aquaculture Compact countries, and conducted at the WorldFish Regional Aquaculture Training Center, Abbassa, Egypt.

Technologies disseminated to Aquaculture value chain actors in Africa included: Fast growing fingerlings of catfish and tilapia, mono-sex tilapia, quality low-cost fish feed formulated using locally available raw materials, improved rearing systems, and postharvest techniques.

The technology dissemination accompanied Better Management Practices (BMP) such as, bio-security, water quality management, feed and nutrition, fish handling techniques, amongst several others.

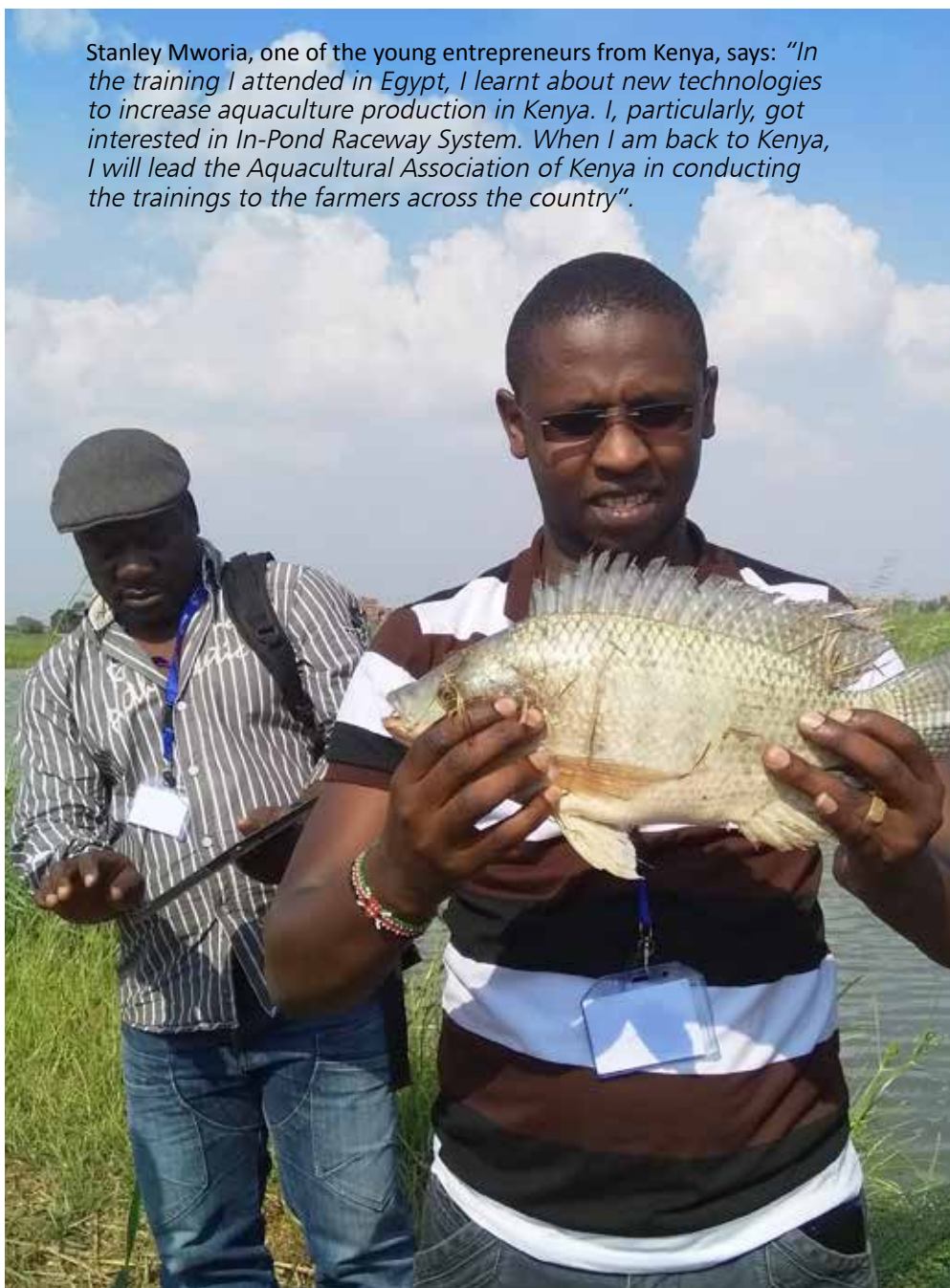
## Mass production of fast-growing fingerlings

Following exposure to proven technologies and BMP through the TAAT training at Abbassa, Zambia constructed

new tilapia mass production facilities to produce 52 million genetically improved fast-growing fingerlings per annum.

Under the AfDB-funded Zambia Aquaculture Enterprise Development Project (ZAEDP) project, which TAAT Aquaculture compact is leveraging on, over 5,000 fish farmers and other 2,000 aquaculture actors were engaged.

Stanley Mworia, one of the young entrepreneurs from Kenya, says: *"In the training I attended in Egypt, I learnt about new technologies to increase aquaculture production in Kenya. I, particularly, got interested in In-Pond Raceway System. When I am back to Kenya, I will lead the Aquacultural Association of Kenya in conducting the trainings to the farmers across the country".*



These farmers are now accessing these technologies through training undertaken by the Zambian private sector and government partners who were trained at Abbassa. This has increased the amount of fish seed for fish farmers by 41% and the supply of quality fish seed to improve aquaculture growth in Zambia and reduce the current pressure on demand for fingerlings.

Through the TAAT Aquaculture Compact, improved brood stock of catfish (*Clarias species*) have already been imported to Cameroon and the GIFT Tilapia is programmed for importation in 2019.

This has greatly improved production of fingerlings and table size fish. These systems have greatly increased larval survival (from 5% to 30–45%) and reduced cost of production of fingerlings of 3–5 g from 90 to about 25FCFA for a profit margin ranging from 11% to about 300% in Cameroon.

In Nigeria, demonstration and dissemination of fast-growing fish seed has led to the use of separation, conditioning, and eventual pairing of tilapia broodstocks at a ratio of 1:2. This has increased fish seed production by over 50% and increased growth rate of the fries by 25%. Faster growth of fish

seed at 5 weeks were 1.8 g and escapees (shooters) was 3.7 g.

This is more than a 100% result. This work was in collaboration with Tilapia Aquaculture Developers Association of Nigeria (TADAN) who participated actively in the Abbassa training bringing with them the required hormones for mono-sex production from Egypt.

TAAT has collaborated with over 50 tilapia fish hatcheries producing about 250,000,000 fingerlings of tilapia at an average of 5 million fingerlings per hatchery per year. The fingerling technology is to be deployed to about 1,000 fish hatcheries.



Genitors of fish imported to improve production of fingerlings and table fish.



Example of IPRS in WorldFish Center, Abbassa, Egypt.



Fingerlings produced will benefit 150,000 fish farmers to realize 87,500 tons of table size fish in the respective production cycle in target countries and 75,000,000 of other value chain actors in the next production cycle.

The mass production technology deployed using TAAT is now producing an average of 6,000,000 fingerlings per hatchery per annum against an average of 3.5 million fingerlings previously. As the 68 catfish hatchery operator across the 10 countries embrace this technology, it will lead to production of 119,000 tons of catfish in 2019.

This is a leading initiative for improved rural nutrition, income generation and poverty alleviation.

In collaboration with the small livestock compact, over 400 fish farmers in Nigeria were sensitized on the inclusion of cassava peel mash to produce quality, low-cost fish feed. This technology reduces the cost of fish feed by 30% and has been adopted by over 2,000 fish feed producers to benefit 200,000 table size producers.

The training has also immensely impacted fish farmers across the target countries through adoption of proven technologies.

For example, after the training, Kenya adopted the In-pond Raceway System (IPRS). This technology will enable adopting farmers in Kenya to increase their fish production 300-fold each year from the existing pond area.

Leveraging on other projects, the Aquacultural Association of Kenya is planning to up-scale this technology to over 5,000 fish farmers which will boost production to over 40,000 tons.

TAAT is also engaging the private sector as the off-taker of the technologies to disseminate to other fish farmers and operate as a business to ensure the sustainability of the technologies.



*Trainees taught how to construct a fish cage.*



# New technologies and best management practices boost aquaculture in Africa

The absence of adequately trained personnel to undertake production programs is one of the main constraints hindering the advancement of the aquaculture sector in the African continent.

Qualified employees are mainly enrolled in research or administrative work: the majority of extension services and production activities are carried out by fisheries specialists who may not have the required practical orientation in fish farming production.

Other major challenges confronting aquaculture development in Africa are stunted fish seed, high level of mortality and poor aquatic health management; high cost of fish feed with over 60–70%

of farming costs entailing fish feed; high level of postharvest losses and low value addition.

Despite these challenges, the African continent has enormous potential for aquaculture production.

Therefore, the African Development Bank through Technologies for African Agricultural Transformation (TAAT) interventions has projected to increase fish production over the next 5 years that will benefit 1,150,000 aquaculture value chain actors through improved food security and income.

The African Development Bank funded “Technologies for African Agricultural Transformation (TAAT) Aquaculture Compact” organized a technology demonstration training on proven

aquaculture technologies and best management practices for representatives of 10 African countries from National Agricultural Research and Extension Systems (NARES) and aquaculture value chain actors, to improve their skills in running aquaculture production systems back in their countries.

The training took place in WorldFish-run Abbassa Research and Training Center, Sharkia, Egypt in October 2018.

Abbassa Research and Training Center Regional Research and Training Center, also known as Regional Center of Excellence for Aquaculture provides necessary facilities for training. These include laboratories, ponds, halls, and accommodation as well as qualified trainers. Over 100 countries across the world have benefited in residential training courses in Aquaculture from the Center.



Egypt ranks first in aquaculture production among the African countries, surpassing 1.3 million metric tons per year in 2016. This is because of the country's vast experience especially in Tilapia production.

Egypt is the most appropriate country for African counterparts to learn new technologies and best management practices for adoption for sustainable fish production. The training program includes on-field demonstrations, theoretical sessions, field visits to fish farms, fish feed millers, and fish market auctions in Egypt.

Stanley Mworira, one of the young entrepreneurs from Kenya, says: "In the training I attended in Egypt, I learnt about new technologies to increase aquaculture production in Kenya. I, particularly, got interested in the In-Pond Raceway System. When I am back to Kenya, I will lead the Aquacultural Association of Kenya in conducting the trainings to the farmers across the country".

Training participants got acquainted with the IPRS that WorldFish recently introduced for the first time in Egypt and Africa. The new system improves production of farmed fish in 4 months, which is shorter than the common production system. Such new technologies will help African nations double their aquaculture production within a very short period.

Participants are disseminating the knowledge and new technologies they learned through the training to surrounding farmers, feed miller owners, and aquaculture entrepreneurs, back in their countries. The first IPRS model in East Africa is now being implemented, specifically in Kenya, in the outskirts of the capital city, Nairobi assuring an adequate nearby market for the fish. Currently, other



*Remi Ahmed, prominent fish farmer.*



*Construction of IPRS.*



less cost-efficient ponds dominate aquaculture production systems in Africa.

One of the trainees, Remi Ahmed, a prominent fish farmer from Nigeria, and president of Tilapia Developer Association of Nigeria and CEO of Choice Fisheries in Nigeria says: “I have learnt Better Management Practices and new technologies specifically the addition of probiotics in fish feed to boost fish immunity (resistance to diseases) and achieve a shorter cycle of production (fast growth rate) leading to a higher level of survival at the fingerlings stage. The technologies learnt in WorldFish will be disseminated through demonstration

and training to other fish farmers in Nigeria”.

WorldFish leads the Aquaculture Compact among 9 agricultural value chains under the Africa Development Bank (AFDB)-funded TAAT project and aims to increase fish production and self-sufficiency through sustainable intensification of existing aquaculture enterprises.

The program builds resilient small/medium enterprises and large-scale aquaculture businesses throughout ten African countries, including the Democratic Republic of Congo, Ghana,

Kenya, Nigeria, and Zambia as focal countries and the Republic of Benin, Burundi, Cameroun, Côte d’Ivoire, and Tanzania as satellite countries.

More training programs will be organized under the TAAT program to ensure actors of aquaculture production acquire required knowledge to boost fish production in African countries.

Apart from the knowledge sharing and technologies transfer, the TAAT aquaculture compact works on developing a certification scheme to ensure quality fish and feed production for domestic consumption and export.



*An integrated, multipurpose pond at a youth training site in Fouban.*



# How TAAT technologies are taking cassava to a new frontier in Africa

Cassava is a staple to about 350 million people in sub-Saharan Africa; in 2003, cassava was declared a poverty fighter by African Heads of State.

However, the crop is yet to prove its mettle as millions of growers in sub-Saharan Africa who depend on the crop for their livelihoods, still live below the poverty line.

The poor performance of cassava and indeed several other crops are due to poor productivity, low value addition, inability of farmers to access improved varieties, poor market access, and other factors. Consequently, Africa's cassava productivity per ha is less than

10 tons per ha compared to Asia where productivity is more than 20 tons per ha.

Since 2018, TAAT through the Cassava Compact has begun addressing the limiting factors to cassava transformation using a holistic and multi-stakeholder approach that brings on board researchers, extension service providers, development practitioners, input dealers, information service providers, and other partners to deliver improved and

tested technologies to the farmers, processors, and other beneficiaries across the cassava value chain.

Unlike previous dissemination efforts, Cassava Compact's strategy of technology delivery is managed by delivery and dissemination experts and backstopped by research institutions that developed the improved technologies.

Through the Bureau for Special Projects of the Togolese Presidency and the Ministère de l'Agriculture de l'Élevage et de la Pêche, a Technology Delivery Consortium (TDC) comprising more than twelve institutions has been established to undertake nationwide delivery of modern cassava technologies offered by TAAT to farmers and other value chain actors.



Similar arrangements have been made in other countries.

The Cassava Compact is targeting to produce 2.5 million stakes of high yield and disease tolerant cassava varieties in Togo through a combination of field multiplication of cassava and the new laboratory-based technology for rapid propagation of cassava, Semi-Autotrophic Hydroponics (SAH™).

Capacity building program of ten technical personnel of national institutions and the private sector from Togo (Togo Institute of Agricultural Research), the Democratic Republic of Congo, Zambia (Zambia Agriculture Research Institute), Tanzania (Tanzania Agriculture Research Institute & KilimOrgano), and Sierra Leone (Sierra Leone Agriculture Research Institute) on the use of the new technology has been completed.

New laboratories to apply the SAH technology are being established to produce sufficient planting materials for distribution to seed growers and farmers. To address the challenge of malnutrition, 40,000 stakes of three proVitamin A (pVA) cassava varieties have been transferred

from IITA Ibadan to Togo and Benin and are being multiplied to provide 200,000 cuttings that will be distributed to seed growers in the next 4 months to generate 1.0 million cuttings in the following season.

The government of Togo has provided funding for the establishment of two modern cassava processing plants to produce high quality cassava flour (HQCF) for partial replacement of imported wheat for bread and confectionary.

Cassava Compact has procured the processing equipment to be installed in the modern processing plants when completed. Private sector owners of moribund cassava processing factories have been engaged in Sierra Leone to receive technical expertise from TAAT Cassava Compact to resuscitate their operations and engage smallholder farmers on outgrower schemes.

TAAT Cassava Compact partner institutions in Togo continue to create an enabling environment for the sustainable growth of the cassava sector.

By December 2018, nearly 1,500 cassava producers and about 6,500 non-cassava farmers had been registered by MIFA and linked to financial institutions, including insurance companies.

The farmers were trained, and their farms monitored, they were guided on making market contracts with other value chain actors. A total of 11,768 farmers were supported directly or indirectly out of which nearly 5,000 were linked to insurance.

Twenty percent of these are women. An estimated 15,000 jobs have been generated or consolidated. About 10,000 tons of cassava have been traded. About 140 cooperatives with nearly 4000 members (40% women) with nearly 5,000 hectares have been structured to cultivate cassava and other crops, especially rice, maize, and soybean.

Through many fairground meetings, MIFA has reached about 6,000 people, including 44% women in nearly 120 villages. In addition, through different information dissemination channels, an estimated 450,000 farmers, processors, marketers,



Group photograph at the Togolese Presidential Office.





# TAAT: Steering Africa towards water-secure wheat production

The International Water Management Institute (IWMI) led Water Enabler Compact (TAAT-WEC) stands uniquely as a pillar for meeting water needs in crop production systems. IWMI, whose mandate is to ensure a water-secure world, has committed to making its proven irrigation and water management technologies

available on a massive scale to lift smallholder farmers across Africa out of poverty.

TAAT-WEC presently enables five value chains: Wheat, Rice, Sorghum, Maize, and Orange Fleshed Sweet Potato (OFSP). Three groups of irrigation and water management technologies are being brought to scale: engineered irrigation surfaces, efficient water lifting and application technologies, and irrigation scheduling technologies.

Crop cultivation in Africa is largely rain fed. Small-scale farmers depend on rainfall, and climate variability and change lead to reduced productivity or entire crop loss. Securing water resources for agriculture is key to increasing the resilience of African farmers. In irrigation schemes, over-irrigation leads to lower crop yields, to water scarcity and reduced crop yields elsewhere, and to environmental degradation. TAAT-WEC irrigation technologies contribute to increased water productivity. We aim to optimize the use of scarce water resources to

*Wheat demonstration site in Alkamawa, Nigeria.*



maximize crop yields. Our interventions contribute to increased production, that contributes to increased income and food security of the rural population.

Seven African countries are currently targeted: Nigeria, Burkina Faso, Mali, Ethiopia, Sudan, Tanzania, and Malawi. In Nigeria we enable the wheat, rice, and sorghum compacts. In Mali and Burkina Faso sorghum and rice farmers will benefit. In Ethiopia and Sudan, TAAT-WEC aims to increase wheat productivity and production. Finally, in Malawi and Tanzania, TAAT-WEC enables the OFSP and Maize compacts, respectively.

The TAAT-WEC activities took off during the dry season starting in 2018 Q4 and firstly focus on the wheat production systems in Sudan, Ethiopia, and Nigeria. The growing season for wheat is similar in the aforementioned countries and planting is done in November. In Mali, Burkina Faso, and Nigeria, the

compact is scaling affordable water lifting technologies for dry-season rice cultivation in 2019 Q1, using shallow ground water resources. Preparations for scaling of on-site water harvesting technologies to provide water security for sorghum farmers are being made during Q1.

New partnerships were developed with the Ethiopian Institute for Agricultural Research (EIAR), the Agricultural Research Cooperation (ARC) in Sudan, and the Institute of Agricultural Research (IAR) in Nigeria to implement the scaling of irrigation and water management technologies for wheat. The institutes are mandated for promoting irrigation development in their respective countries; they maintain strong links with water user associations, farmer associations, extension services, private sector organizations, and they contribute to national programs on agriculture and

food security. In each target country, scaling activities, including selection and equipping of demonstration sites, are implemented in consultation and collaboration with ICARDA.

Established innovation platforms (IPs) play a crucial role in the scaling trajectory in all demonstration sites. They contribute to defining challenges that value chain actors face, and for defining possible solutions. Through engagement with the IPs, the prevailing realities, water resource potential, and challenges in the production environment were established. This allowed selection of appropriate sites and matching of specific technologies to local conditions. Based on analysis of the information provided by the stakeholders and observations from the field, technologies were selected that have the potential to increase wheat crop productivity or reduce the irrigation water applied.



Wheat Demonstration field in Alkamawa, Kano, Nigeria Before Intervention Photo by IWMI WA.



## Boosting wheat production in Nigeria

TAAT-WEC demonstrates irrigation management technologies to boost wheat production in Kano State. This agricultural seasonal water use is expected to decrease by 10–15% and wheat productivity will increase by 25%. Kano State is a major wheat producer in Nigeria that was selected in consultation with the Wheat compact. After identification missions to several zones, two sites were selected: in Kadawa irrigation scheme and Alkamawa village; the latter, meaning the Wheat village when translated from the local language. Farmer participation and interest in irrigation technologies was found to be high and both are major wheat zones.

The compact has linked with two innovation platforms that are active. After discussions it was decided to scale three proven technologies in the Kadawa irrigation scheme in year 1: 1) mechanized land levelling, 2) bed furrow irrigation, and 3) weirs for accurate water management application, and three technologies in the Alkamawa area: 1) pressured water lifting, 2) check basin, and 3) border strip systems. The demonstration sites are developed and supervised by IAR.

In total 38 farmers are directly involved in the demonstration of the technologies, while approximately 200 farmers that are members of the IPs are targeted. However, the project partnered with the Water Users Association in the Kadawa Irrigation Scheme where 4,000 farmers can potentially adopt demonstrated technologies. In Alkamawa, some 2,000 farmers will be targeted. Wheat farmers will be engaged in farmer field days and receive trainings. Moreover, the project has partnered with the Kano Agricultural Development Programme to further scale the technologies within the two selected zones and beyond. Their field agents, together with lead farmers, will be trained in 2019 Q1 in the aforementioned six technologies.

## Boosting wheat production in Sudan

TAAT-WEC established two demonstration sites to increase wheat productivity in Sudan: the Gezira Scheme and. Partnerships were established with a wide range of organizations from research to private companies and include: Hudiebea Research Station, CTC (chemical and input supplier) River Nile and Gezira Farmers IPs, Hydraulic Research Center (HRC) of the Ministry of Irrigation and Water Resources (MIWR), Gezira

University, Micro-finance Foundation (NGO), WUAs, Irrigation administration of Gezira Scheme (MIWR), and the Extension and technology transfer organization of the Gezira Scheme.

Both demonstration sites are located within large irrigated schemes and TAAT-WEC scales three proven irrigation technologies: 1) mechanized land levelling, 2) weirs for accurate water application, and 3) optimized irrigation scheduling for maximizing yields. The project currently engages 120 wheat farmers. Moreover, ten extension agents from the Ministry of Agriculture were trained, ten researchers were trained, and 40 pioneer/lead farmers received training in irrigation scheduling.

Given the strong ties with a variety of organizations, it is expected that some 4,000 farmers will benefit from the irrigation technologies. ARC, the national partner, is involved in the national wheat development program and TAAT-WEC achievements will be potentially included in the national program.

## Boosting wheat production in Ethiopia

Two wheat producing states are targeted by TAAT-WEC in Ethiopia: Fentale and Amibira. EIAR is



Training and awareness raising activities in Nigeria.



coordinating the activities from its research station in Were. Challenges of farmers in wheat cultivation were identified during discussions with the innovation platforms in the two zones. Demonstration of three technologies to increase wheat productivity and production is currently implemented by TAAT-WEC: 1) mechanized land

levelling, 2) furrow irrigation, and 3) optimized irrigation application with flumes.

TAAT-WEC partnered with the national extension service and their development agents are being trained in the technologies. In total 36 farmers from three different Water User

Associations are directly involved in the participatory demonstration activities. The total number of farmers that are benefiting in year 1 exceed 2,500. Improved irrigation management should lead to an increase in wheat productivity of 25% and similar increases in income are foreseen.



*Discussions with wheat farmers on suitable irrigation technologies for boosting wheat production.*

## Major achievements

For scaling of irrigation and water management technologies, TAAT-WEC achieved the following:

- 6 wheat demonstration sites are operational in major wheat producing regions in three countries.
- 194 wheat farmers are directly involved in demonstration activities.
- 12,500 wheat farmers stand to benefit through capacity building activities, farmer field days, and technical support from extension agents.
- Wheat productivity is expected to increase by 25% and beneficiaries benefit from a similar increase in income of 25%.
- 24 new partnerships were established to facilitate scaling; these include private parties, not-for-profit organization, innovation platforms, and water user associations.

TAAT-WEC has put all administrative procedures in place and national partners are preparing for further training of lead farmers and extensions agents in irrigation technologies for wheat, organizing scaling events such as farmer field days to reach the thousands of farmers, and organize stakeholder consultation to assess the enabling environment for wheat productivity and production increase, including policy recommendations.

# Feed Africa: Stakeholders zero in on partnerships for technology delivery

Key stakeholders in Africa's agricultural sector have identified partnerships for sustainable agricultural technology delivery as a critical factor in Africa's quest to "Feed Africa".

This came out strongly at a breakfast session that heralded the presidential summit of the 2018 African Agricultural Revolution Forum (AGRF) which was held in Kigali, Rwanda's capital city.

Organized by the Clearinghouse of the Technologies for African Agricultural Transformation (TAAT), an initiative of the African Development Bank's Feed Africa Strategy that aims to achieve major agricultural transformation in Africa, the session had in attendance, African Agriculture Ministers, Scientists, representatives of multilateral development banks, donor partners, and the private sector.

Mpoko Bokanga, Head of the TAAT Clearinghouse, in his opening statements traced the program's history to the October 2015 Dakar High Level Conference on the Africa Agricultural Transformation Agenda, which led to the adoption of four goals and 18 action points to transform African agriculture.

With a focused approach on integrated development of agricultural value chains, Dr Bokanga highlighted the main objective of TAAT which is to "take proven agricultural technologies to scale in a commercially sustainable fashion through the establishment of a mechanism to facilitate partnerships."

"These partnerships will not only provide access to expertise required to design, implement, and monitor the progress of crop, animals, and aquaculture, they will also contribute to ending extreme poverty by eliminating hunger and malnutrition; and making Africa a net exporter of agricultural commodities," Dr Bokanga said.

## Innovative approach in partnerships

TAAT, according to Dr Bokanga, isn't an addition to Africa's long list of agricultural initiatives but an innovative program that serves as a clearinghouse for sustainable agricultural technology delivery.

Through its components, the program will promote an enabling environment for technology adoption; establish a regional technology delivery infrastructure to accelerate delivery; and raise Africa's agricultural productivity by deploying proven agricultural technologies at the agroecological and country levels in strengthened agricultural value chains.

The Togolese Minister for Agriculture, Livestock and Fisheries, Ouro-Koura Agadazi was full of praises for the African Development Bank (AfDB) and the International Institute for Tropical Agriculture (IITA) for this well thought-out program, which according to him, "carries the prospects of transforming Africa's agricultural landscape."

"Togo has benefited from several of IITA's path-breaking agricultural solutions and it is our hope that TAAT will not be any different," Agadazi added.

Hon Joseph Mwanamvekha, Malawian Minister of Agriculture, Irrigation and Water Development, commended the

partnership between IITA as the executing agency and the over 10 research institutes and centers driving the implementation of the TAAT program.

Also underscoring the imperatives of partnerships for sustainable agricultural technology at the breakfast session were representatives of the International Fund for Agricultural Development (IFAD), the Alliance for a Green Revolution in Africa (AGRA), and IITA.

## Technologies for Africa

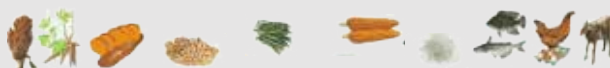
Technologies for African Agricultural Transformation (TAAT) is a knowledge and innovation-based response to the recognized need to scaling up proven technologies across Africa.

Already being implemented in 28 low-income Regional Member Countries of the AfDB, TAAT supports AfDB's Feed Africa Strategy for the continent to eliminate the current massive importation of food and transform its economies by targeting agriculture as a major source of economic diversification and wealth, as well as a powerful engine for job creation.

The initiative will implement 655 carefully considered actions that should result in almost 513 million tons of additional food production and lift nearly 250 million Africans out of poverty by 2025.



IITA DGG, Dr Kenton Dashiell with others at the breakfast meeting.



# TAAT enhances adoption of improved pearl millet and sorghum varieties in Burkina Faso

Among the constraints to adoption of crop improved varieties by farmers, seed market availability close to farmers' doors steps is on top of the list.

To address this problem for millet and sorghum in the NAYALA Province, Northwestern Burkina Faso, in 2017, under HOPE 2 project and with the technical support of Institut de l'Environnement et de Recherches Agricoles (INERA) scientists, one seed producer in the province, Mr Kombelem planted 3 ha of Kapelga (early maturing white grain sorghum variety) and 6 ha of MISARI1 (new high yielding pearl millet variety release for the Sudanese zone in Burkina Faso).

At maturity stage, a field day was organized on the seed production field. Local media (radio) and farmers from all the districts of the Province were invited. This season, Mr Kombelem harvested

6200 kg of MISARI 1 and 3500 Kg of Kapelga.

In 2018 before the rainy season, FEPA-B a farmer federation in the country organized a seed fair in the Province, where the seed produced by Mr Kombelem, a member of the organization was presented and sold.

The impact of the field day and the seed fair was positive. Mr Kombelem reported that he was able to sell in the region 95% of the seed he produced meaning that those two varieties have been adopted.

Farmers who bought the seed (MISARI 1 and Kapelga) were very satisfied and they even invited Mr Kombelem to visit their field during the growing season.



Visit during field day

Millet field in Burkina Faso.



Six other farmers who were only producing cowpea and maize seed before also started producing MISARI 1 and Kapelga certified seed.

Before 2017, these two varieties were unknown in the province of NAYALA.

With the support of the TAAT sorghum and millet compact and HOPE 2 projects, certified seed production of MISARI 1 increased in the Province from 6 ha in 2017 to 21 ha in 2018, with six new producers. For Kapelga, it increased from 3 ha to 15 ha.

Farmers of this province have been using a single improved millet variety for 33 years. With only 2 years of intervention, 2017 with HOPE 2 and 2018 with both HOPE 2 and TAAT, sorghum and millet compact, the older variety (IKMP5) was totally replaced by MISARI 1.

This was made possible because of the confidence of farmers in the new variety that they have seen in the production field.



At a Seed Fair.



Manually chopped sorghum stalk.



Farmer engagement.



Sorghum floor factory in Khartoum.



# Crop Residue trade leads to increase in farmers' income and investments in Nigeria

Crop Residues (CRs) from coarse cereals such as sorghum and pearl millet grown on the cropland as food and feed are immensely important to livestock feeding. However, animals selectively eat leafy parts of these two crops leaving thick stems in abundance that are not utilized properly; this poses challenge in feeding during the dry season.

Often, CRs are burnt which does not only cause air pollution but also a loss of biomass that could be brought back to the soil either by incorporating it in the field or through manure. In urban areas men and women farmers practice a simple method of manually cutting stover

into small pieces, which is laborious and time consuming.

While there is availability of cultivars of sorghum and pearl millet for green forage that are juicy, an absence of feed transformation technology constrains urban and peri-urban livestock keeping and increases the cost of feed.

Thus, to address the key challenges in feed cost, quantity, quality, and seasonality and inefficient utilization of crop-residues (CRs), and to stop stubble burning, a simple method of mechanized chopping technology is introduced in the form of a mobile chopper, which can cut green and coarse dry stover into small pieces leading to efficient and optimum utilization of crop residues.

ICRISAT started this work in collaboration with ILRI a few years ago under the USAID-funded project Africa ARISING project in Mali.

ICRISAT Nigeria under the TAAT program reached out to over 94 crop-livestock farmers and crop residue marketers in Kano and Jigawa states of Nigeria through a solution-based technology demonstration.

This was done during the field days jointly organized by ICRISAT Kano and IAR/ABU Zaria under the Bill & Melinda Gates Foundation (BMGF)-funded project "Harnessing Opportunities for Productivity Enhancement" (HOPE II) and TAAT projects. The field days were conducted in Bichi and Ungogo Local Government Areas (Kano State) and Garki Local Government Area (Jigawa State).

This opportunity was used by the Sorghum/Millet Nigeria TAAT in collaboration with the HOPE project to conduct training on a stover crusher.



Mr Sarki Ado (left) with Mr Sanusi Dankawu (EA).



Many farmers showed interest in adopting and acquiring the machine for their use and as service providers within their communities.

One of the beneficiaries of the trainings, Mr Sarki Ado Nauwani of Bichi was linked to the Fabricator in Kano and a service provider who can crush his stover for him for a fee. The cost of a stover chopper is about US\$1000, so Mr Sarki Ado is using the service provider.

According to him, “crushing the stover increases the price and utilization of the residues by livestock. The livestock keeper understands this, so they are willing to pay more for crushed residues. The crushed residues are also easier to transport and store as they consume less space and can be stored indoors. My profit has risen by at least 20%. I am saving money to buy my own crusher; I have also increased my livestock number”.

A 6-kg bag of crushed sorghum stalk sells for N600–1000 (US\$2–3) while a bag of crushed legume residue sells for N1500–2500 (US\$5–3) depending on the quality. The equivalent weight of unthreshed sorghum stalk sells for N200–300 (US\$0.6 to 1). According to Mr Sarki Ado, it is a win-win situation for the marketers, the livestock keepers, and emerging service providers. The marketers increase their profits, the livestock keepers increase utilization of crop residues and livestock productivity, while the service provider gets employment.



*Inefficient use of CRs (mixed with dung).*



*Training and demonstration on stover chopper.*



*Mr Sarki Ado with crushed and bagged stalk.*



*Piled sorghum stover for crushing.*



# TAAT approach to combating Fall armyworm offers hope to millions of smallholder farmers in sub-Saharan Africa

Since its advent in Africa in early 2016, the Fall armyworm (FAW), *Spodoptera frugiperda*, has become the most damaging insect pest of maize in sub-Saharan Africa and is a threat to national and regional food security particularly in regions where maize is the staple food crop.

Farmers' attempts to reduce the pest populations to non-damaging levels have not been successful owing to several factors, e.g., FAW's very wide host plant range, lack of a resting stage, migratory behavior, propensity to develop resistance to conventional chemical pesticides, and lack of a coordinated continent-wide pest response strategy.

The fact that FAW is new to Africa has not helped matters as a significant amount of research has to be done first to come up with effective management strategies.

The current approach to FAW by the TAAT Program is a culmination of initiatives, which were kick-started by FAO in early 2017.

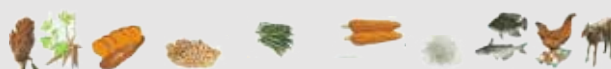
In February 2017 (14–16), FAO, in collaboration with SADC and the International Red Locust Control Organization for Central and Southern Africa (IRLCO-CSA) set the ball rolling by organizing a Southern and Eastern Africa Regional Technical Meeting in Harare, Zimbabwe, to discuss Regional Member Countries' preparedness and response actions to emerging high impact transboundary crop and livestock pests and diseases.

FAW was a key pest, which came under discussion during the meeting. This meeting was followed by a technical meeting in Nairobi in April 2017 (25–26) to discuss SADC Member States' strategic plans on FAW, research needs, and comprehensive management strategies. This meeting was organized back-to-back with the All Africa Stakeholder Consultative Meeting of FAW in Africa (April 27–28), which was convened to review the status of the invasive pest and discuss strategies for its effective management.

From these two meetings, FAO came up with a 6-component Programme of Action for Sustainable Management of FAW in Africa:

- 1 Immediate recommendations and actions for FAW containment and management.
- 2 Short-term research priorities.
- 3 Communication and training.

*IITA CIMMYT, and USAID facilitators demonstrating how to scout assess for FAW to reps from different ECOWAS Member States at IITA Cotonou Station Photo by Peter Chinwada.*





Typical fall armyworm injury symptoms in a heavily infested, late-planted maize crop (insert - partial view of a full-grown FAW larva)  
Photo by Peter Chinwada, FAW Compact Leader.

- 4 Surveillance and early warning.
- 5 Policy and regulatory support.
- 6 Coordination.

FAO started implementing its Plan of Action (PoA) by hosting a series of Training of Trainers (ToT) workshops in 2017 starting with SADC Member States (25–30 June in Pretoria, South Africa), followed by Eastern Africa (24–28 July in Addis Ababa, Ethiopia), ECOWAS (4–8 September in Abuja, Nigeria), and Central Africa (2–7 October in Yaoundé, Cameroon) in collaboration with several partners including IITA, CIMMYT, USAID, Syngenta, and Bayer.

In between the ToTs, FAO hosted a technical meeting of FAW experts from around the world from 18 to 20 July 2017 at the FAO Regional Office for Africa in Accra, Ghana.

To further support the FAO initiative, USAID in collaboration with CIMMYT

also followed up with three FAW regional ToTs: Southern Africa (Harare 30 October–1 November 2017), Eastern Africa (Addis Ababa 13–15 November 2017), and West Africa (Cotonou 13–15 February 2018). The TAAT program on FAW kick-started its activities by holding High Level Partnership Meetings firstly for Southern Africa in Lusaka, Zambia (26–27 July 2018), followed by Central Africa in Yaoundé, Cameroon (11–12 September 2018), and lastly for Eastern Africa in Nairobi, Kenya (11–12 October 2018).

While research on many management strategies/technologies are on-going, the TAAT Program’s approach to FAW management in sub-Saharan Africa aims to upscale and accelerate the deployment of effective management technologies, which are already proven or are very promising to smallholder farmers.

For effective delivery of such technologies—including those still to

come from on-going research—the FAW Compact is currently establishing a network of public and private sector partners, non-governmental organizations and regional partners to help in the upscaling and delivery of management technologies.

Key activities of the approach will include robust monitoring/surveillance of FAW at the community level, development and dissemination of mass-awareness and extension materials, training in pest identification, field scouting/assessment, and identifying and addressing country- and region-specific technical and policy constraints hindering access and scaling-up of proven and/or promising FAW management technologies.

To ensure national buy-in, the approach is aligned to ongoing national programs as well as initiatives of FAO, development partners, agro-input suppliers, and other public–private sector partners.

The TAAT Program’s immediate response strategy to FAW is anchored on three key activities:

- 1 Minimizing FAW damage to maize during its first 4 weeks of post-emergence growth through the upscaling and deployment of maize seed treated with Fortenza™ Duo:

(cyantraniliprole + thiamethoxam)

- 2 The use of integrated pest management-compatible technology toolkit combinations as Fortenza™ Duo follow-on technologies to control FAW up to physiological maturity of maize.
- 3 Building capacity of farmers, National Agricultural and Extension Systems (NARES) staff, and non-governmental extension workers in the identification of FAW (directly and indirectly through characteristic plant injury symptoms), effective monitoring and scouting of fields to guide timely and need-based application of FAW IPM-compatible pesticides.



The deployment of Fortenza Duo-treated seed has commenced in Southern Africa in the 2018/19 growing season with 164,000 ha of maize being the target area of intervention in Zambia, translating to at least 807,000 smallholder growers.

In Zimbabwe, an equal number of farmers is also targeted. Assessments for field performance of Fortenza Duo will be conducted in January 2019. Main partners in the deployment of Fortenza Duo technology comprise Syngenta, seed companies (e.g., SeedCo, MRI, Corteva Agriscience, Kelin Karoo, Kamano Seed

and Monsanto), agrochemical companies, and NARES.

Although the target beneficiaries in the TAAT Program are smallholder farmers, the major demand drivers of the technology may ultimately turn out to be large-scale commercial farmers.



Fortenza Duo-treated MRI 624 maize seed pack. [Photograph by J. Mkandla, Syngenta (Zimbabwe)].



Leaf window-paning and leaf holing, which are characteristic of stem borer infestation (maize stem borer larvae to the right). (Photograph by P. Chinwada FAW Compact Leader)

## Achievements in brief

At least 5,100 MT of maize hybrid seed (1,900 MT in Zambia and 3,200 MT in Zimbabwe) was treated with Fortenza Duo and distributed through the Farmer Input Supply Programme (Zambia), Command Agriculture (Zimbabwe), and Presidential Input Supply Programme (Zimbabwe) as well as through agro-dealers.

With each smallholder farmer getting approximately 5 kg of the treated seed, and discounting the seed which went into the demos, these figures translate to at least 380,000 and 640,000 smallholder beneficiaries of the Fortenza Duo technology in Zambia and Zimbabwe, respectively.

The FAW Compact is currently in the process of mapping out the spatial distribution of the target beneficiaries and the hectareage under the Fortenza Duo technology.

To enable standardized data collection, manual assessments as well as a Syngenta mobile app—Seedcare Assists You (SAY)—are going to be used.

Planned activities for January and February 2019 are: National Field Day at Syngenta Farm in Zambia, district Field Days, capturing farmer testimonials on camera and video, and training (farmers, agronomists, and Syngenta Field Promoters).



# TAAT records increased food production and income through maize technologies

Maize is one of the most important staple crops in Africa on which an estimated 300 million people depend. However, several challenges severely undermine maize production, including drought, diseases, and insect pests such as the Fall Armyworm (FAW).

Fortunately, many proven technologies such as climate smart maize technologies and pest and disease tolerant varieties, among others, have been developed by researchers worldwide to address some of these challenges.

Facilitating their delivery to farmers, at scale, still presents a challenge as many African farmers need to be facilitated to access agricultural credit to eliminate their capital constraints. In view of this, the TAAT Maize Compact embarked on activities to facilitate access and use of Water Efficient and other climate smart maize varieties in 14 pilot countries across sub-Saharan Africa.

In addition, the Maize Compact has also partnered with the FAW Emergency Compact to address the Fall Armyworm menace and foster innovative linkages to facilitate credit

and finance options for farmers. During the past year, remarkable traction was gained including successes highlighted below.

## Scale out of climate smart maize hybrids

The TAAT Maize compact innovatively engaged the private and public seed companies to facilitate the production and marketing of more climate smart hybrid Maize seeds compared to the previous seasons. A smart incentive system was developed, to boost the production and marketing of extra tonnages by seed companies, with technical backstopping from the TAAT Maize Compact.

The Maize Compact signed collaboration agreements with over 30 seed companies, who produced over 27,094 tons of climate smart Maize hybrid seed. It is estimated that

this seed is to be deployed to about 2.6 million farmers between July 2018 and April 2019 to plant approximately 1,083,760 ha in the respective cropping seasons in the target countries.

Further, to create more awareness and demand for these proven technologies, the TAAT Maize Compact supported seed companies to establish over 3,403 technology demonstration plots, conduct 482 field days, and distribute over 97,700 small packs for promotional purposes. The varieties, with accompanying technologies and training on good agronomic practices from the TAAT Maize team and partner seed companies are expected to lead to surplus maize production in the current season leading to food and income security of target farmers.

## Deployment of Fortenza Duo-Treated maize varieties for Fall Armyworm control in Southern Africa

Fall armyworms (FAW) are the caterpillar stage of moths, native to the Americas but recently reported in Africa where they are ravaging staple crops, particularly maize, leaving in their wake

Uganda Seed Trade Association Chairperson Nelson Masereka showcasing TAAT Maize Compact Climate Smart Hybrids in a field day in Uganda. Photo by Samuel Angwenyi, AATF.



First reported in Nigeria in 2016, the FAW has since spread to and established in all maize growing areas of sub-Saharan Africa and poses the greatest threat to security. In response to this FAW emergency, the TAAT Maize Compact in collaboration with the TAAT FAW Enabler and other partners explored deployment of Fortenza Duo, a seed treatment chemical developed by Syngenta.

This is a systemic treatment that offers protection to maize crops up to 4 weeks after germination, which is usually the most critical stage in maize growth. This technology also ensures use of chemical sprays by farmers is kept to a minimum, which translates to lower costs of production.

The TAAT Maize Compact and partners facilitated rapid deployment of Fortenza Duo seed treatment technology in Zambia and Zimbabwe where 14 seed companies were provided with over 36,000 liters of Fortenza Duo to treat 6000 MT of climate smart maize varieties.

To date, these seed companies have managed to use over 17,440 liters of the chemical to treat about 3,007 MT of seed that have all been deployed to farmers through National Programs (Farmer Input Support Programme - FISP in Zambia and the Command Agriculture/Presidential Schemes in Zimbabwe) and Agro dealers and Direct marketing in the two countries. This effort has deployed Fortenza Duo treated seeds to over 300,000 farmers in Zimbabwe and Zambia covering about 120,280 ha of farmland. Plans are underway to treat other seed in the first season of 2019, to target farmers in Eastern and Western Africa.

Very encouraging feedback was reported during recent follow-up missions in Zambia and Zimbabwe where farmers expressed extreme excitement having witnessed clear differences between Fortenza Duo and non-Fortenza duo treated seed.

One particular farmer in Masaiti District, Zambia who had planted both farmer-saved seed and Fortenza Duo treated seed from MRI Company said that, "Our problems are solved! I hope these seeds will be available in subsequent seasons so that we won't plant our local varieties anymore".

## Harnessing finance services and credit access

One of the serious bottlenecks curtailing the access of improved technologies in Africa is limited access to agricultural credit. To solve this, financial and credit service providers have been engaged with the aim of enhancing farmers' links with input suppliers.

Notably in Nigeria, 40,000 farmers have been registered to access the Central Bank

of Nigeria (CBN) Anchor Finance Program. A total of 12 elite climate smart maize varieties were identified and about 2,000 tons of seed distributed to cultivate about 100,000 ha of farmland by the 40,000 registered farmers across 19 states of Nigeria.

The TAAT Maize team is learning from the innovative Anchor Borrower in Nigeria, aimed at adapting and replicating the same in the other target countries in collaboration with the identified credit/finance institutions in 2019.



Maize.



Farmers paying Attention to a TAAT Maize Field Officer training on installing FAW pheromone traps in a recently planted farmer's maize field in Zambia. [Photo by Samuel Angwenyi, AATF].



# TAAT supports harmonization of regulations for variety release and registration of quality seed in Eastern and Southern Africa

## Poor access to quality seed remains one of the major causes for low agricultural productivity in Africa.

This results mainly from inefficient seed systems and lengthy crop variety testing, registration, and release procedures.

Policy and regulatory systems for seed were developed with a focus on national boundaries instead of transnational agroecological zones and thus have not facilitated timely release and registration of improved varieties and breeds within a country or across a region.

Clearly, access to seed technology can be made easier if seed policies can be harmonized at regional level. This will ensure that seed varieties from one

country can be easily accessed by farmers in other countries which share similar agroecological zones.

This challenge drove the TAAT policy enabler to convene a high-level consultative meeting on harmonization of seed regulations within countries in the Common Markets for Eastern and Southern Africa (COMESA) region—the largest regional economic block on the continent inhabited by 510 million people, the majority of whom are farmers.

The meeting, which took place in Nairobi, Kenya in early December 2018, was attended by over 70 seed industry delegates from the 21 COMESA member states.

The meeting opened on a high note with a call for urgency regarding implementation

of harmonized regulations and protocols for hastened variety release and registration. Indeed, nothing captured the significance of seed policy harmonization more than the words of Nnenna Nwabufo, the Deputy Director General, AfDB - East African Regional Hub who said that ... **“Just imagine that it takes an average of 2 years to release a maize variety in one country. And this variety has to go through similar variety release process in other countries. It will take us at least 20 years to reach the tenth country. Africa cannot wait that long ...”**.

The meeting took cognizance of the winding road taken by COMESA towards developing regionally harmonized seed regulations that have so far not yet been fully domesticated for implementation by member states.



Key AfDB, AATF, and COMESA Officials join COMESA delegates during the High Level Consultative workshop on Seed Policy Harmonization.



The meeting prioritized development of country-specific action plans for redressing outstanding seed policy implementation bottlenecks with a view to facilitating a projected 5 million farmers in COMESA member states to access quality seed faster in the near term.

TAAT Policy Enabler Compact targets to catalyze implementation of the action plans in the coming months that is expected to enhance inspection capacity of 200 seed certification and phytosanitary officials, accelerate the release and registration of hundreds of seed varieties, and facilitate the acquisition of over 5 million COMESA seed labels and 2,500 certificates for use by seed companies in the region.

This effort is expected to increase the number of varieties uploaded on the COMESA catalog from 57 to 100 within one year and “push” over 10 COMESA member states to fully align their national seed policies and regulations with the COMESA harmonized seed regulations.



*AATF Executive Director, Dr. Denis Kyetere (Left) handing over Seed Policy Action Plan and Communique.*

Leveraging on support from AGRA, TAAT has, during the past one year, been involved in the assessment of the seed sub-sector in six African countries (Kenya, Uganda, Tanzania, Malawi, Ethiopia, and Ghana).

Through these efforts, TAAT has identified key seed policy implementation challenges and facilitated seed industry players in these countries to develop costed action plans that will form the basis for advocacy for government buy-in and ownership.



*Processing and storage facility for Job seed company, one of the largest seed companies in DRC, based in Goma, North Kivu Province. The company’s management is actively involved in implementing seed sector reforms.*



# Democratic Republic of Congo: Implementing reforms for seed sector development

In 2017, the TASAI team conducted a comprehensive assessment of the seed sector in DRC.

The initial work was funded by ELAN-RDC, and, thanks to additional funding under TAAT, the reach of TASAI's work was extended.

The initial assessment revealed multiple gaps in the seed sector, such as no national seed law, a lack of capacity in the National Seed Service (SENASEM) at national and provincial levels, the high prevalence of counterfeit seed, the lack of quality basic seed for seed producers, weak seed producer associations, and no clear procedures for seed importation.

To respond to gaps, in early 2018, the TASAI team worked in collaboration with ELAN-RDC and local stakeholders to draft a strategy document on how to implement

the recommendations of the assessment. The strategy was discussed and validated during three seed sector meetings in Goma, Kinshasa, and Lubumbashi.

Under the TAAT Policy Enabler Compact, the TASAI team is building on this work by providing technical support to local seed sector players who are implementing some of the recommendations.

The local stakeholders decided to focus first on updating the DRC National Variety Catalogue.

In a meeting convened by TASAI on 28–29 November 2018, 16 seed experts from SENASEM, National Agricultural Research Institute (INERA), CGIAR centers (IITA and CIAT/Harvest Plus), the University of

Lubumbashi, and key agencies under the Ministry of Agriculture formed a committee to collect information on varieties in the country under the categories of cereals, legumes, and roots and tubers/fruits.

The Committee also drafted a decree (L'Arrete) to legalize the updated catalog, which will be submitted to the Ministry of Agriculture for signing.

Other planned activities include linking seed producers directly to regional suppliers of basic seed (e.g., CGIAR institutions like CIMMYT), strengthening seed associations by providing technical support to their leadership and providing technical support to draft the decree (L'Arrete) establishing provincial seed sector councils (COPROSEM) in North Kivu, South Kivu, and Haut-Katanga provinces.



*The Permanent Secretary, State Department of Agricultural Research, Republic of Kenya, Prof. Hamadi Iddi Boga gracing the Official Opening of the COMESA High Level Consultative meeting.*



# Sierra Leone: Stakeholder engagement for seed sector reform

TASAI began the comprehensive review of Sierra Leone's seed industry in September 2018, following the methodology outlined above. As the first step of the process, the TASAI team convened thirty seed sector stakeholders for the TASAI kick-off meeting on 14 September 2018.

The meeting was officially opened by the AfDB Country Manager and the Deputy Minister of Agriculture. In addition, the team met with the Director of Sierra Leone Seed Certification Agency (SLeSCA), the Director General and Deputy Director General of the Sierra Leone Agricultural Research Institute (SLARI), the Deputy Minister of Agriculture, the Director

General of Agriculture in the Ministry of Agriculture, and the Country Manager of the African Development Bank.

Based on the information obtained from local stakeholders, the inception phase confirmed that Sierra Leone's seed industry is in its infancy. As such, one key contribution of the TASAI research is to provide a detailed picture of Sierra Leone's seed industry, thus creating a baseline for future measurements.

Further, the inception phase highlighted some of the accompanying challenges of this early stage of development. One is that the national research institution SLARI lacks adequate funding, which in turn leads to under-supply of basic seed.

Although the Sierra Leone Seed Certification Agency (SLeSCA) Act was passed in 2017, it is yet to be implemented fully, and as such,

currently operates with only three seed inspectors. Another challenge identified is that not all the seed producers are registered and/or monitored by the agency, leading to low-quality certified seed on the market.

The Sierra Leone TASAI study is currently in the data collection phase.

The goal is for the TASAI study to present a detailed picture of the country's seed industry and to present accurate information and data to inform responses to the challenges and questions identified—or yet to be identified—by local stakeholders and to outline the contours of comprehensive seed sector reform in the country.

This dissemination meeting is scheduled for March 2019. The TASAI team (under the Policy Enabler compact) will provide technical support to the local efforts in Sierra Leone.



Seeds. Photo by Shutterstock.



# TAAT transforms Sudanese wheat seed sector with proven technologies

Wheat is one of the most important agricultural commodities in Sudan for food security in terms of quantity and calories consumed.

Currently, wheat in Sudan is grown on approximately 201,000 ha under irrigation with an average productivity of 2.5 t/ha. The annual wheat production stands at 513,000 tons, representing about 22% of the total national requirement of 2 million tons.

Consequently, the ever-widening gap between local production and consumption has created a huge shortfall that is primarily met by imports, which drains the Sudanese economy of over 500 million dollars per year in foreign exchange.

On the other hand, the Sudanese national agricultural research system in collaboration with international partners (such as ICARDA, CIMMYT) has developed and released a number of high-yielding, heat-tolerant wheat varieties with a production potential of 5–8 t/ha.

Recent experiences to promote these heat-tolerant wheat varieties in Sudan through the AfDB funded SARD-SC (wheat) project revealed that technology-adopting wheat farmers at project intervention sites increased their wheat productivity to 4–7 t/ha, while farmers with their traditional varieties rarely exceed 2.5 t/ha.

Despite this potential, the lack of improved wheat seed in sufficient quantity and quality at an affordable price is widely regarded as a driving factor significantly contributing to the poor adoption and weak performance of this crop in Sudan.

Within the framework of the AfDB-funded TAAT Program, Sudan is one of the target countries implementing the TAAT wheat compact with the objective to scale up proven wheat technologies for achieving a widespread and transformative impact in terms of enhancing productivity, farmers' income, job creation, and value addition; all leading towards attaining higher levels of wheat self-sufficiency.

For the realization of this ambitious objective in Sudan, the TAAT wheat compact has identified the lack of improved wheat seed in sufficient quantity and quality at an affordable price as a major constraint challenging its technology scaling up and dissemination activities.

## Approaches for transforming the wheat seed sector

Building on the previous SARD-SC wheat experience, the TAAT wheat compact initiated its intervention in Sudan in 2018 with a bold plan to transform the wheat seed sector in collaboration with all concerned national partners involved in wheat seed production and delivery.

Accordingly, the TAAT Wheat compact organized a National Wheat Seed Sector Stakeholders Consultation and Joint Planning Workshop that was held on 28–30 June 2018 in Khartoum, Sudan.

*Wheat in Sudan.*



The workshop was attended by a total of 52 invited stakeholders drawn from all partner organizations involved in the wheat seed sector including NARS, public and private seed companies, and senior policy and decision makers of the Ministry of Agriculture and Forests (MoAF).

The meeting was officially opened by the State Minister of Agriculture, where he expressed the country's commitment to implement the TAAT wheat scaling up activities and transform domestic production for achieving wheat self-sufficiency within 3–5 years.

Based on the discussion and outcomes of the joint planning workshop, the stakeholders unanimously agreed on the 2018 work plan developed, which emphasized the following priority TAAT wheat interventions that are critical to transform the wheat seed sector in Sudan.

These included:

1 The 2018 accelerated plan for the production and delivery of different classes of wheat seed (breeder, basic, and certified seed of newly released and demand-driven wheat varieties) and capacity building,

2 Analysis of the country wheat seed sector for developing a national wheat seed roadmap aligned with the country strategy that will provide targets for seed production to achieve wheat self-sufficiency by 2025.

3 A participatory monitoring and evaluation system for implementing the planned activities and achieving the anticipated targets. This workshop was extremely successful in terms of creating a common vision on the TAAT wheat objectives and expected targets, and for building consensus and buy-in on the roles and contribution of each of the partners during project implementation.

The TAAT wheat compact in Sudan has worked in two directions to diversify the seed sector within the concept of integrated seed sector development embracing both formal (public and private seed companies) and informal (farmer-based) seed systems. In this regard, particular attention has been given to train, capacitate, and engage youth and women in commercial seed production and marketing.



*Wheat in Sudan.*

## Accelerated seed multiplication and delivery

Following the successful implementation of the planned TAAT wheat seed activities in Sudan, the private seed enterprises in the country (such as ASSCO, NileSun Enterprise, Makeen Seed Company, MS inputs & Services, Rajhi Investment Co.) have grown over 850 tons of basic seed of five popular wheat varieties (Imam, Goumria, Zakia, Elnielain, and Bohaine) on more than 11,000 ha at different locations.

As a result, more than 26,000 tons of certified seed is expected to be produced that can be distributed to benefit more than 260,000 wheat farmers in the coming season.

The certified seed produced will account for more than 80% of the total seed required to cover the targeted wheat area in 2019/20. In addition, 180 tons of pre-basic seed of the most recently released heat-tolerant wheat varieties have been cultivated on 2100 ha involving a number of public and private seed enterprises (such as Makeen Seed Company, Social Security Investment Authority, Authority of Merowi Dam Area for Agricultural

Development, New Halfa Agric Corporation) with an expected harvest exceeding 4200 tons of basic seed at the end of the season.

This in turn, could be partly grown on more than 25,000 ha in 2019/20 to produce over 55,000 tons of certified seed, which is enough to cultivate a wheat area exceeding 500,000 ha in 2020/21.

As part of the effort made by the TAAT wheat compact to strengthen the informal seed sector through providing technical support and field backstopping, 14 tons of seed of six demand-driven wheat varieties have been cultivated on 140 ha by a number of organized pioneer farmer groups engaged in the informal, community-based seed production system.

More than 300 tons of quality declared seed are expected to be produced for distribution to benefit more than 6000 smallholder wheat farmers in 2019/20.

This intervention is particularly beneficial to wheat farmers who are remotely located with poor infrastructure and limited access to improved seed produced by the formal seed sector.



Capacity strengthening of seed sector stakeholders through a tailor-made training course on the various aspects of improved seed production and management techniques was conducted targeting seed specialists drawn from the formal sector (seven private and three public seed enterprises) during 18–24 October 2018 at Wad Medani, Sudan.

Accordingly, the theoretical know-how and practical skill of 58 (42% youth and women) seed production technicians and specialists were strengthened.

Furthermore, direct field technical backstopping was provided to different wheat seed companies engaged in commercial seed production. Similarly, 38 (40% youth) farmers involved in the informal, community-based seed production system have been capacitated through providing hands-on training at

farmers' field schools and a follow-up field technical backstopping on different aspects of seed production techniques.

This capacity building activity was extremely productive and should continue in subsequent years to ensure the production and supply of high-quality wheat seed sustainably and towards transforming the wheat seed system in Sudan.

### Development of national wheat seed road map

The TAAT wheat compact carried out an analysis of the national wheat seed system with the objective to strengthen the wheat seed system and formulate a wheat seed roadmap that are aligned with the country strategy to meet the goals and objectives of wheat sector transformation for achieving the anticipated wheat self-

sufficiency in Sudan within the coming 3–5 years.

The development of the national wheat seed road map was carried out with active involvement of all concerned stakeholders including policy makers, concerned government agencies associated with wheat seed and grain production, and key stakeholders from the private sector engaged in wheat seed production and marketing.

Based on the findings of the review, there are three key issues that need to converge to meet the anticipated goals of achieving wheat self-sufficiency in 2025:

- i Projected changes in domestic demand for wheat during the period.
- ii Technical changes in raising the productivity levels to reach the target production.



Wheat farm in El Gezira, Sudan supported by TAAT Wheat Compact.

Table 1. Category of wheat seed produced by different seed sector stakeholders in Sudan in 2018/19.

Heat tolerant wheat varieties	Category of seed	Bread wheat seed produced (tons)	Number of beneficiary farmers	
			2019 / 20	2020 / 21
Imam, Goumria, Zakia, Elnielain and Bohaine	Breeder	20		
“	Pre-basic / Basic	4200		840,000
“	Certified	26,000	260,000	
“	QDS	300	6000	
	Total	30,000	266,000	840,000



iii The availability of land for expansion to meet the target area. The wheat seed roadmap was developed based on the country strategy and defines the critical investments that are needed for each key component of the seed value chain that enable production of a sufficient quantity of seed of the desired quality and supplies to farmers at the right place, time, and price making use of the diversity of the national seed sector.

Moreover, the seed roadmap provides targets for production of different classes of seed, taking into account area expansion and desired level of seed replacement rate. For any given year, a four-year production cycle (breeder, pre-basic, basic, and certified seed) is required to achieve the amount of certified seed.

Accordingly, for the certified seed production planned in 2022, the breeder, pre-basic and basic seed should be produced in 2018, 2019 and 2020, respectively.

Based on this assumption, the wheat seed road map was developed for Sudan until 2025.

Finally, as part of the outcomes of the National Wheat Seed Sector Stakeholders Consultation and Joint Planning Workshop, the following key recommendations were outlined by participants to strengthen the national wheat seed system in Sudan:

- 1 Establishment of a national forum (platform) for planning, production, and marketing of wheat seed involving all concerned stakeholders such as NARS, public and private seed producers and suppliers, the Ministry of Agriculture, development partners, and commercial farms.
- 2 The need for stable and sustained enabling policies that enhance the competitiveness of domestic wheat production and encourage the private sector to be enrolled in wheat seed and grain production, processing, and marketing.
- 3 The importance of introducing innovative and supportive financial

and insurance policies for agricultural production that would support wheat farmers to access improved seed and other inputs needed to fast-track technology uptake.

It is obvious that with the current ongoing and successfully implemented TAAT wheat intervention, Sudan will come out from the

bottleneck of seed shortage in 2019/20 which will bring the opportunity to massively scale up and disseminate proven wheat technologies reaching all small-scale wheat farmers with a widespread impact in transforming the productivity and competitiveness of domestic production for achieving wheat self-sufficiency within 3–5 years.

Table 2. Wheat area and certified seed requirement in Sudan for achieving self-sufficiency by 2024/25 seasons.

Items	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025
Area in ha (thousands)	305	382	420	462	485	535
<b>Seed production (t)</b>						
Certified seed	30,500	38,200	42,000	46,000	48,500	53,500
Basic seed	1525	1910	2100	2310	2425	2675
Pre-basic seed	77	95.5	105	115	121.25	133.75
Breeder seed	3.8	4.775	5.25	5.75	6.0625	6.6875
<b>Total</b>	<b>32,106</b>	<b>40,210</b>	<b>44,210</b>	<b>48,421</b>	<b>51,052</b>	<b>56,315</b>



Wheat farmers in Sudan.



# Rwandan youth finds self-employment processing orange-fleshed sweet potato

After completing her secondary level of education, the 28-year old Dusabe Noeline did not get enough tuition to join university for further studies.

For two years, she stayed home until 2012 when she started a small business selling fried sweet potato and African tea, commonly known as “Icyayi” in Kayonza district, eastern province of Rwanda.

“It had been a long time of sitting home, so I lost hope of going back to school. The only way I was going to build my future was to be self-employed. So I had to think and come up with something to do to earn a living,” she said.

However, getting any capital for a young lady who could not raise school fees for her studies proved to be a Herculean task. She then thought that she could start with locally available and cheap raw material. She came up with the idea of frying sweet potato and making tea in the local market.

This business requires less capital than most businesses.

Noeline would wake up daily go to the garden and harvest sweet potato roots. She peeled and washed them thoroughly before frying them for sale. She then prepared the local African tea. She introduced these two products to motorists and school children who take it as breakfast.

These two groups of people became her main customers at the start of her business.

She did not find any difficulties in doing this work and she started saving quite some good money. Selling a piece of sweet potato at Rwf 50 (\$0.056)

and a cup of tea at Rwf 100 (\$ 0.11), determined Dusabe managed to save about Rwf 200,000 within 6 months.

Soon she became a common figure in town because of her business.

The TAAT OFSP project sponsored her further trainings on its sweet potato program with emphasis on how to improve her product. The program also supported Dusabe’s business by sponsoring her to participate in several exhibitions.

She participated in AGRA AGRF2018 in Kigali as a Participant in the youth network and displayed her products. TAAT has supported her to participate in three other exhibitions.

She has expanded her products to include doughnuts commonly known as “mandazi” that have become very popular in the local markets. In addition to fried sweet potato, mandazi and tea, she has added fried groundnut.

Dusabe always dreamt of becoming a prominent business woman.

She has always been inspired by a successful agri-entrepreneur, Sina Gerald of Urwibutso enterprises who makes Akarabo Orange-Fleshed Sweet potato biscuits. She hopes that one day she would be as famous as this man through the production of products from sweet potato.



Through an entrepreneur visit exchange visit at SINA Gerard factory she learnt how to make OFSP biscuits. The method does not require much capital. One requires only local equipment to make puree. Then using the same equipment, she had already, she was able to start a biscuit line.

“On leaving this place, the urge to grow my business increased. I knew it was time for me to push myself higher in this game. This is when I immediately planned to search for knowledge and skills on how I can make these products myself,” she narrated.

Through the TAAT OFSP mentoring, Dusabe has been able to register her business with the Rwanda Development Board (RDB). She is the current Chief Executive Officer (CEO) of Dusabe Group Company Limited.

Then she shifted her business from the rural town to the local district center Nyagatare. She also decided to move to a nearby town in Nyagatare where she believed she would have more customers.

She started incorporating 50% of orange-fleshed sweet potato and 50% of other ingredients to make all of her baked products. For constant supply of the sweet potato, Dusabe has contracted one root producer who is supplying the roots.

Incorporating OFSP roots in the production process has reduced the cost of production per product by at least 12 percent. Orange-fleshed sweet potato contains natural sugar

hence she uses less sugar. The puree baking properties also reduce the use of milk and eggs in the products.

From the savings of proceeds, she has built a factory worth RwF 23 million (US\$25,871) in a plot of land she had bought earlier in Nyagatare district.

The business is one of the current Technologies for African Agricultural Transformation (TAAT) beneficiaries in Rwanda.

The programme is providing technical support to increase OFSP root production and improve product quality and will provide some basic processing equipment. Through the project she has been linked to five new commercial farmers who constantly supply her with roots. These farmers have received OFSP planting material through the project and technical support to produce high quality roots.

TAAT also supports Dusabe in marketing the products through appearing in various exhibitions in the country. The program is assisting her to develop new products as well as improve the packaging. She has been selected as one of processors to receive some processing equipment through the TAAT OFSP project on leveraging to improve her production efficiency and quality.

Dusabe is able to sell her products to many supermarkets in Nyagatare town, shops, and restaurants as well as making cakes for occasions like weddings and birthdays.

In her words, “Many people love my products. However, I fail to meet the demand due to lack of equipment.” The factory requires a bigger electrical oven and a mixer to reduce the cost of manual labor. With new, more efficient equipment she will sell her products in more cities in the eastern province of Rwanda.

TAAT is a leveraging programme and since the processor is well advanced, the programme will assist in removing some of the machinery constraint.

Dusabe employs a total of 10 permanent employees. She also buys milk daily from the local farmers.

She is guaranteed a profit of Rwf 300,000 (US\$337) every month. However, with exhibitions she is able to make much more.

She is slowly attaining her dream of becoming a successful youth entrepreneur. She is a member of the Rwanda Youth in Agribusiness Forum (RYAF) where through telling her story, she has encouraged many youth to engage in agribusiness.

She has become the hope of her family paying school fees for three of her siblings in secondary school.

Dusabe believes that after building a strong business that can stand with enough employees, she will go back to school and continue her studies in Business Management and Administration.



*Some of the biscuits Dusabe makes for sale.*



# How TAAT is rewriting the African Rice story

With established partnerships in 16 countries, mostly in West Africa where massive importation of rice occurs, the TAAT Rice Compact is already laying the foundation for Africa's self-sufficiency in rice.

The rice technology toolkits based upon the dissemination of three varietal lines: New Rice for Africa (NERICA), Advanced Rice Varieties for Africa (ARICA), and ORYLUX (aromatic) varieties; with over 68 varieties released to date.

## Breeder seed production

Ten tons (t) of breeder seed of improved rice varieties (NERICA 4, ORYLUX 6, NERICA L19, WAB 638-1) were produced in the M'be research station in Bouaké, Côte d'Ivoire using 10 ha. The 10 t of breeder seed represents 16.7% of the expected target of 60 t to be produced on-station.

Currently, TAAT has 10 ha of NERICA 4, ORYLUX 6, NERICA L19, and WAB 638-1 planted and an additional 5 ha is being prepared through collaboration with Office Cherifien des Phosphates (OCP) support. The output of these improved and climate-smart varieties will be shared with seed enterprises to produce foundation seed.

The target production of 60 t of breeder seed will be distributed to seed enterprises to produce foundation seed based on their capacity. At a sowing rate of 50 kg/ha, this will sow 1200 ha of foundation seed. The expected certified seed of 3600 t to be produced from the foundation seed will cover 72,000 ha at the rate of 50 kg/ha. This should reach about 288,000 farmers in target countries.

## Quality parboiled rice

At the request of a private rice processing company (RINA SARL, Daoukro, Côte d'Ivoire) and the Bouaké Innovation Platform (Marche de Gros, Bouaké), two GEM rice parboiling systems were fabricated and installed in Daoukro and Bouaké.

The systems have a monthly capacity of 14 and 6.4 t paddy (9.8 and 4.4 t of milled rice), respectively. The GEM parboiling system installed at these two sites uses only rice husk as parboiling fuel, thus recording 100% saving on wood cost because the systems

are installed close to the rice milling facilities that are producing rice husk as rice milling by-products.

GEM users collect the rice husk and use it in their parboiling stoves to get clean (environment friendly) parboiling fuel.

The rice husk biochar produced was collected to serve as soil replenishment by rice farmers who are also members of the IP (Bouaké) or part of the out-grower scheme managed by RINA SARL. Millers in Bouaké wholesale market who do not have the GEM parboiling facility have to pay CFA 300,000 for transporting rice husk six times a month from the milling facility to garbage dumping sites.

Before installation of the GEM, a private sector partner—RINA SARL—produced only white milled rice. However, with the installation of the GEM system, RINA SARL is now supplying both white and parboiled milled rice to the market under the trademark RIZ IVOIRE.

Mme Aichatou Camara and members of her women rice processors' association. Photo by AfricaRice.



The production of the GEM parboiled rice increased the production capacity of RINA SARL by 9.8 t of high-quality milled rice per month. This translates to:

**1680** consumers having access to high-quality parboiled rice after 6 months given a per capita consumption of 35 kg.

**\$11,760** added profit after 6 months given that GEM parboiling added \$170 per t compared to traditional parboiled rice.

**\$600** saving on wood after 6 months given that about \$8 per t is spent on wood to parboil using the traditional method.

**84 t** of paddy sourced from 48 farmers with an average yield of 2 t of paddy.

### Job creation

RINA SARL has employed 10 women processors who provide parboiling services using the GEM system. Furthermore, RINA SARL has a network of parboiled rice marketers (500 women) in Abidjan and environs who are involved in retailing parboiled rice.

Before GEM installation in the Bouaké IP, it produced and marketed only paddy. However, with the installation of the GEM system, the Bouaké IP is now supplying 4.4 t parboiled milled rice to the market per month. It is estimated that the Bouaké IP GEM parboiled rice reaches 25 consumers accessing high-quality parboiled rice after 1 month; \$748 added profit after 1 month given that GEM parboiling added \$170/t compared to traditional parboiled rice; \$50 saving on wood after 1 month taking into consideration that about \$8/t is spent on wood to parboil using the traditional method; and 6.4 t of paddy sourced from six farmers with an average production of 1 t of paddy.

### Job creation

Bouaké IP has employed 10 women processors who provide parboiling services using the GEM system. Furthermore, Bouaké IP has a network of 100 rice marketers involved in retailing parboiled rice.

In collaboration with the NGO CECI-PAFER and an artisan equipment fabricator (TCMS) both in Benin, the NGO CECI-PAFER contracted TCMS-Benin to manufacture and install six mini GEM rice parboilers costing CFA 19.5 million in communities in the Glazoué rice hub in Benin.



Within this context, the skills of the proprietor of TCMS-Benin, Mr Lucien Hounhoui was further enhanced at the AfricaRice research station in M'be, Bouaké to produce and install enhanced models of the GEM in Benin for the NGO CECI-PAFER. TCMS is an active AfricaRice partner through the Africa-wide rice processing and value addition taskforce.

The Africa-wide rice processing and value addition task force is one of the technical arms of the rice technology delivery infrastructure (riceTDI), framed around the RTDI.

From April to December 2018, 893 t of paddy was processed by the IPs using the GEM parboiling system. This resulted in 625 t of parboiled milled rice. About 27,500 actors—rice producers, parboilers, marketers, and consumers, benefited in eight sites in Glazoué, Malanville (both in Benin), Bouaké, Daoukro, Gagnoa, and Man (Côte d'Ivoire), Nasarawa (Nigeria), and Tara (Niger).

There was a reduction in or complete substitution of firewood by rice husk as fuel for the GEM parboiling system, resulting in about \$17,600 savings in the cost of wood across the IPs in the eight sites.

Over 13,389 rice farmers received RiceAdvice guidelines in Burkina Faso, Mali, and Nigeria on fertilizer use efficiency in irrigated rice.

### e-registration of rice value chain stakeholders

e-registration of rice value chain stakeholders was completed in one of the two planned rice hubs in Côte d'Ivoire in the Bandama Valley region—Gkêkê and Hambol.

A total of 4,713 rice value chain actors were documented with 2,061 actors in the Gkêkê region and 2,652 actors in the Hambol region. Some 89.45% (4,213) of actors are male and 10.55% (497) are female, 96.92% (4,568) are rice producers (paddy), 0.04% (2) are producers of foundation seed, 11.56% (545) are producers of certified seed, 2.89% (136) are traders, and 0.53% (25) are millers.

Most rice producers cultivate on rainfed lowland (63.48%) and they grow WITA and BOUAKE varieties. Stakeholders in the rice value chain are mapped and georeferenced.







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