AATF
PROSPERITY THROUGH TECHNOLOGY

Stories from the field
An impact booklet

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Introduction

In 2003, AATF set out on ambitious journey, marked with renewed determination and optimism to empower smallholder farmers across Sub-Saharan Africa with a wide choice of agricultural innovations to help them generate wealth and health for their families and communities. The journey so far has been fulfilling while challenging at the same time.

This booklet presents voices of farmers with testimonies on how our work, supported by various partners and collaborators, across the regions where we operate is improving the livelihoods of farmers. It is a compilation of stories from the field on different projects that captures achievements and project milestones as experienced every day by the farmers, and their interaction with the gradual, transformative agricultural initiatives.

We are pleased to share with you these stories believing the voices will serve to justify the trust that our partners and investors have placed in us to help transform the livelihoods of farmers in Africa.

Productivity and stress management

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

Ann Aloo, a smallholder farmer in Kisumu County, Kenya who is the beneficiary of DroughtTEGO maize

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

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

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

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

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

Paul Wabomba, a farmer in Bungoma County Western Kenya, says that even though they received the inputs late and planted a little past the desired time, the DroughtTEGO varieties matured faster with high yields compared to other varieties planted within the same agro-ecological zone.

"The DroughtTEGO maize varieties were near harvesting while the other varieties had not matured yet for harvest despite having been planted earlier," says Wabomba.

About 95 demonstration plots were established in the region to showcase TAAT Maize technology package which included improved climate-smart hybrids, blended NPK planting fertilizer with added micronutrients, optimal planting density, and Fall armyworm (FAW) management practices.

To boost productivity and incomes and sustain the livelihoods of farmers like Aloo and Wamukhuna, adoption of good farming practices and facilitation of access to and uptake of new high-yielding, drought- and disease-resistant varieties are essential.

While 1, 935 farmers received and planted the climate-smart seeds on their demonstration plots, the COVID-19 outbreak caused a big upset at the onset of the planned activities due to travel and other restrictions that affected movement and gatherings.

The outbreak-related restrictions denied farmers timely access to farm inputs while agro-dealers saw a decline in supplies from seed companies. Although the Kenyan government stepped in and developed protocols for agricultural value chains to continue with business to avoid a food crisis, the confusion had already impacted the planting season.

The AATF TAAT team that needed to carry out monitoring and evaluation of the project progress in the field was not spared the loss of time due to the restrictions on the receipt of travel authorization from the AATF Risk Management Committee to conduct a limited evaluation of the project.

In August, the team went ahead to distribute complementary inputs such as appropriate fertilizer blends and FAW control technologies which ensured farmers got optimal maize yields.

To save time, the team worked closely with the farmer group leaders to oversee seed distribution, field selection, and establishment of demonstration plots among other activities. In addition, farmers who interacted with the TAAT team stated that the Striga and FAW are still issues of concern to their maize productivity in many parts of Western Kenya.

Despite the challenges brought about by the pandemic, AATF ensured farmers received seed inputs during the COVID-19 period.

Feedback from farmers was that the DroughTEGO seeds that are usually delivered in 50kg bags, be repackaged into smaller bags as it is hectic and expensive to farmer groups to repackage into 3kg bags.

Further, the farmers requested AATF to link them with seed companies

and agro-dealers that produce these varieties to ensure they are distributed within the localities.

The objective of the TAAT Maize Compact is to disseminate and facilitate the rapid adoption of water-efficient and climate-smart maize technologies such as the Water Efficient Maize Varieties from the WEMA project across 14 target countries in Africa. The project aims at reaching more than 2,000,000 farmers across 14 African countries.

https://www.aatf-africa.org/aatf_fieldstories/farmers-embrace-high-yielding-fast-maturing-drought-tego-maize/

Training on MLN management brings hope to farmers after years of losses

When Maureen Kiptum, a farmer in Perkerra Irrigation Scheme in Kenya's Rift Valley region, first noticed yellow spots on her maize plants in 2013, she feared for the worst.

An outbreak of the notorious maize lethal necrosis diseases (MLN) had just begun and Kiptum and her rank of farmers in Marigat area had no idea of the disease so they simply called it 'yellow'.

From her assessment, as a bloc leader in charge of 60 women out-growers contracted by Kenya Seed Company, almost all members of the 94-acre irrigated bloc were affected, with production falling by half.

"Most of us thought we had sprayed the wrong chemical while others said something had happened to the soil here," says Maureen.

With no information on the disease, the agricultural extension officers in the region advised them to uproot and burn the plants.

Determined to know more about the mysterious disease, the 43-year-old mother of three, Maureen began attending the field-days organized by Kenya Seed Company and other partners where she was educated on how to contain the disease on her farm.

In her participation in field days, she learnt the importance of early planting during the long rains and switching to other crops such as New Rice for Africa (NERICA) rice and beans in the short rains season as one of the cost-effective ways of preventing the disease.

George Njihia, operations manager at Faida Seeds based in Njoro, Nakuru County, recalls attending an MLN workshop in 2013, where he was informed that a trial of over 100 commercial maize varieties found all the seeds to be susceptible to MLN. Faida Seeds has since applied for MLN-tolerant maize varieties from CIMMYT, a partner in the MLN project, and began seed production in 2020.

"Maize is susceptible to MLN disease at all stages of crop development. If a maize field is infected early in the cropping cycle, complete yield loss may occur, so we cannot take chances. The training has also helped us with prevention approaches," says Njihia

He mentions the application of insecticides to seeds prior to planting as crucial in early-stage protection against potential MLN vectors.

The MLN project is also helping seed companies like Western Seed reduce losses from the devastating MLN disease. The Kitale-based company destroyed up to 18 acres of maize in 2012 following an MLN attack.

Daniel Shiundu, the Farms and Research Manager at Western Seed, explains that the only option then was to destroy the entire crop in their field according to information available at the time.

In 2016, Western Seed staff members were introduced to the MLN project training that included internal quality control systems such as MLN disease scouting, sampling, and testing.

Daniel says the seed company and its out-growers discussed each of the 14 Standard Operating Procedures (SOP) on MLN disease management and how to adapt them to local conditions.

"We have 20 staff members trained on the 14 SOPs in MLN management and we are confident not just about our own systems producing MLN-free seed but about solving the problem to avoid such big losses in future," he said.

"Today all our contracted farmers are observing a maize-free period of each year as a company policy. We are also enforcing timely planting at the onset of the long rainy season, which we now know helps to reduce disease incidence and pressure," added Daniel.

An additional component of the project was the supply of Rapid Diagnostic Kits (RDKs) to allow easy detection and confirmation of the disease to avoid extra costs that seed companies incur due to seed rejection by the regulators.

According to Daniel, training and monitoring of seed companies operating in MLN affected zones should continue to ensure the production of MLN-free commercial seed – to protect farmers in affected zones and prevent introduction of MLN to non-affected areas.

Furthermore, visits to individual seed companies, out-growers and breeders at the national agricultural research stations in the five countries helped to generate important feedback on the MLN management checklists.

Increasing awareness on the disease

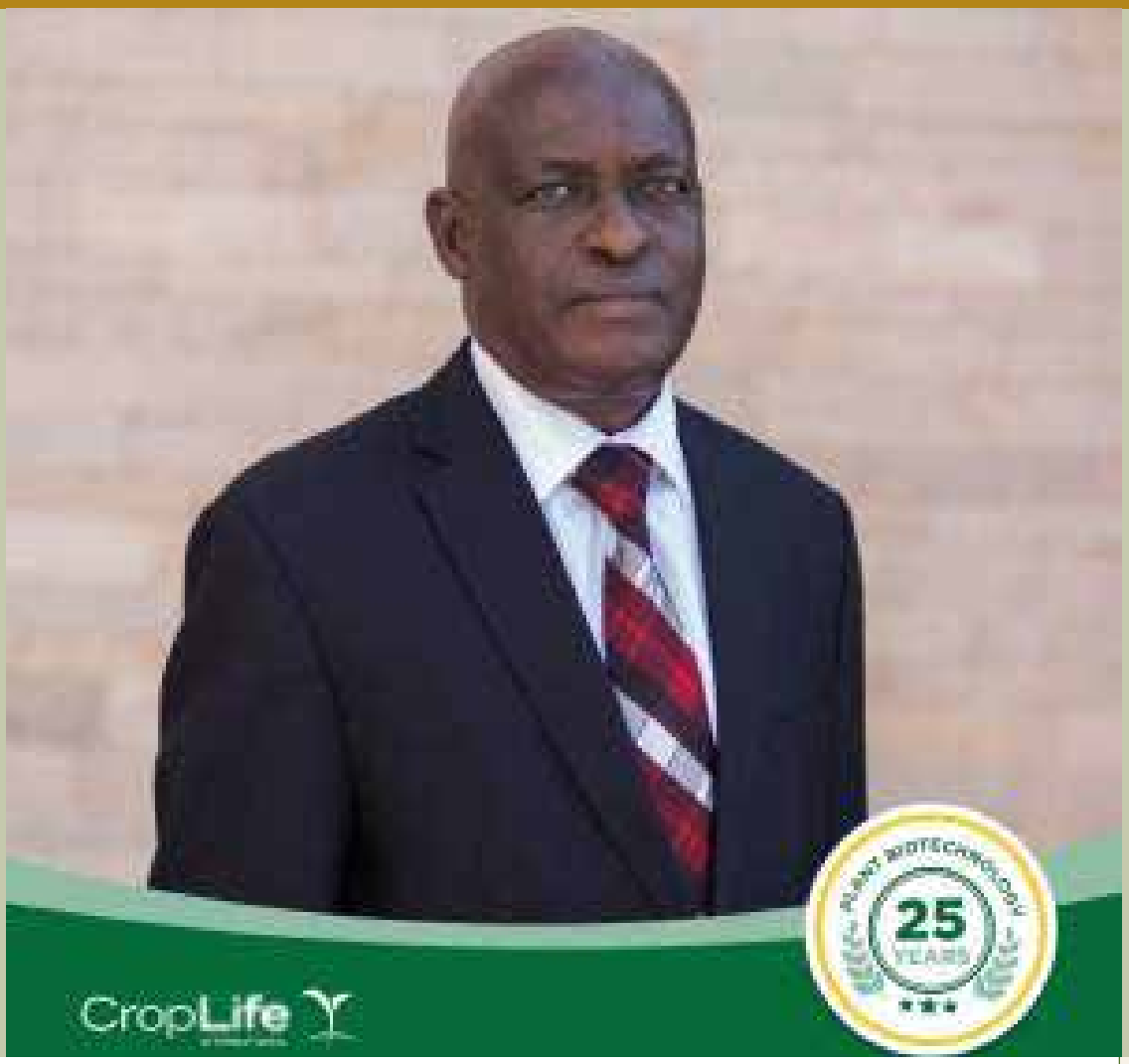
Information Education and Communication materials (IECs) were translated into Swahili and Amharic to increase awareness for users in Tanzania and Ethiopia.

About 75 per cent of the eight seed companies visited in Kenya in 2018 did not experience MLN in their seed production fields thanks to adherence to the SOPs and existing quality management systems to ensure continuous adherence.

The five programme target countries have reported reduced MLN incidences since partners began optimizing management protocols. Surveys among seed companies and farmers identified crop rotation, use of certified and MLN-tolerant seeds and insecticide application as some of the procedures that reduce the spread of the disease

https://www.aatf-africa.org/aatf_fieldstories/training-on-mln-management-brings-hope-to-farmers-after-years-of-losses/

Biotech #Foodheroes: Denis Kyetere



Denis Kyetere measures success on a humanitarian scale

As the director of the African Agricultural Technology Foundation (AATF), Kyetere knows that rural communities thrive when smallholder farmers prosper.

To that end, he and AATF are helping farmers in sub-Saharan Africa access practical technology solutions that have increased yields 100-300% across several crops.

"This has contributed to their increased income and improved their well-being," explains Kyetere, whose passion for agriculture is rooted in a childhood spent tending livestock and crops on his family's homestead.

"We have demonstrated how progress is possible when companies, governments, NGOs, researchers and farmers work together to develop

technologies that address specific production challenges."

Under Kyetere's leadership, AATF and its partners are collaborating on the Water Efficient Maize for Africa (WEMA) project. They're developing maize (corn) varieties that can withstand the double impacts of drought and pests, including attacks by the destructive Fall Armyworm, which can ruin an entire field in just a few days.

Kyetere is especially interested in maize because it's an essential food and cash crop for Africa's smallholder farmers. His PhD research identified and mapped the first gene that confers tolerance to the devastating maize streak virus disease (MSVD). He sees real value in using technology to improve staple crops.

"Biotechnology is an approach that can complement conventional crop improvement methods, address huge food deficits and reduce poverty in Africa. Biotechnology is one tool in the toolbox that contributes to food production with precision and speed," Kyetere says. "I am proud that AATF is contributing to wealth creation and the health of smallholder farmers."

https://croplife.org/industry-profile/biotech-foodheroes-denis-kyetere/

Drought-tolerant beans helping improve the livelihoods of smallholder farmers in Eastern and Northern Uganda

43-year-old Afua Munya from Mataba village in Kayunga district grows beans as a source of income

She uses earnings from beans to pay school fees for her children and keeps some for domestic use. According to Munya, every mother should have beans in-store from season to season to sustain the family. Munya who pays school fees for her eight children using proceeds from beans is faced with challenges of climate change such as prolonged drought affecting the production of beans, other encounters due to pests and diseases and fluctuating prices. She explains that drought sets in usually when the beans are at the flowering stage. "When that happens, all flowers on the bean plant fall off preventing pod formation, if lucky, some beans tend to flower as soon as the rains set in but the harvest is not usually good," she says. Despite the challenges, Munya is determined to continue growing beans because of its many benefits.

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eight children using proceeds from beans is faced with challenges of climate change such as prolonged drought affecting the production of beans, other encounters due to pests and diseases and fluctuating prices.

She explains that drought sets in usually when the beans are at the flowering stage. "When that happens, all flowers on the bean plant fall off preventing pod formation, if lucky, some beans tend to flower as soon as the rains set in but the harvest is not usually good," she says. Despite the challenges, Munya is determined to continue growing beans because of its many benefits.

He however believes that in the other three acres, he will harvest more, but only hopes AATF and PASTTA project can help him secure market for especially the new red beans.

"They have been buying Nambaale from us at shs2500 sometimes shs3000 but some places, a kilo of the same beans goes for between sh4000 to sh5000," said Kirabira. Kirabira who joined farming eight years ago has been into papaws, pineapples, tomatoes and less attention to beans.

"But after observing Munya for sometimes, how she grows beans every season and keeps earning, I was encouraged and since Arnold Mbowa (PASTTA project officer) conducted a demo garden in our village, I now know that from beans, one can still earn just like any other crop," explains Kirabira.

Why interested in the red beans?

The two are among the many farmers in Central, Eastern and Northern Uganda who have accessed drought-tolerant red and black beans. The beans were bred by researchers from NARO's National Crop Research Resources Institute (NaCRRI) with support from AATF, Bio-diversity international, CIAT, PABBRA, AVISA, USAID.

These are being promoted through the PASTTA, which aims at taking improved technologies to farmers to increase adoption.

According to Arnold Mbowa, the PASTTA project officer at AATF, the beans are promoted among women and youth for various reasons.

For the women, the beans are a good source of food while youth prefer projects that have quicker returns in terms of cash.

"Women first think of the family, so they grow crops that will first cater for family needs before considering markets while the youth want an investment that has quick returns and beans mature within two and half months, so more youth are getting on board," he said.

According to the head of the bean research program at the National Agriculture Research Organization (NARO), Dr Stanley Nkalubo, the beans include NARO bean 6 which is red in color, drought-tolerant and small-seeded and can yield up to 3800 kg per hectare.

At the flowering stage, they present white flowers. They are also rich in minerals such as iron, measuring 72 parts per million (ppm) and zinc measuring 34parts per million (ppm).

It matures within 68-72 days and can be grown in almost all parts of the country. In addition, the red beans are tolerant to anthracnose, BCMV, ALS, Rust and most of the other diseases.

NAROBEAN7 are small-seeded but black in color and drought tolerant. At the flowering stage, these usually have purple flowers. The potential yield is 3500kgs per hectare, and maturity is between 68-73 days.

In terms of the nutrient content, they too have an iron at 76 parts per million (pmm) and zinc at 35 parts per million (ppm). Just like the red beans, these too can grow well in low-mid altitude areas but are more on-demand in the Northern parts of the country.

They are also tolerant of anthracnose, BCMV, Rust ALS, and most of the other diseases.

To further spread out the beans in times of the changing climate, researchers are now working with individual farmers, farmer groups, youths to appreciate the technologies, multiply them and later become suppliers to other farmers within their localities, added researchers.

https://www.newvision.co.ug/news/1530160/eastern-northern-farmers-drought-tolerant-beans

Farmers laud IAR's *maruca* resistance cowpea variety in Kano

Enduring the cultivation of conventional cowpea with limited yielding capacity, farmers in Kano expressed joys with the new improved cowpea variety (sampea-20T) modified to resist the persistence attack of pod borer insect (Maruca vitrata), a deadly threat growers had to contend with over the years.

Sharing their success stories at a brownfield day organized by the Institute of Agricultural Research, (IAR), Ahmadu Bello University, Zaria, in Tudun Wada Dankade village, Tudun Wada local government of Kano, the farmers said the successful performance of the new technology 70 days after the plot demonstration of cowpea-20T in their community has justified their choice to embrace the first biotechnology product.

Mallam Mu'azu Abba, a cowpea farmer in Tudun Wada Dankade, who narrated how cowpea-20T changed years of unprofitable harvest, contended the introduction of maruca resistance cowpea is a life-changing intervention. Mu'azu explained that after embracing the improved variety, he had harvested 20 bags of 100kg of cowpea per hectare as against the traditional eight bags of 100kg per hectare.

Against the usual practice, Mallam Mu'azu told journalists how the cultivation of the improved variety reduces cost and risk of applying chemicals spray to crops to eliminate the constant threat of pod borer and other insects.

"I was introduced to the new improved cowpea some years back by

the Institute for Agricultural Research (IAR) during a one day workshop. After that, we were shown how to cultivate the new seed and apply all the methods by the expert. Now, we know how to overcome the threat of *maruca* on our cowpea. We now understand that within 70 days with the right method farmers can have high yield on their cowpea". Mu'azu narrated.

Another farmer, Abubakar Illiasu who expressed delight on the introduction of the Genetically Modified cowpea (sampea-20T) developed by IAR, mentioned successes recorded on his plot during the field trial. Abubakar explained that the new variety has shown evidence to resist any form of attack six months after harvest without applying preservatives.

"Let me thank the IAR for this wonderful opportunity to assist us end the problem of *maruca* on our cowpea. Before now, farmers growing the conventional cowpea had suffered huge loss due to low yield. The economic loss is because of an insect that would damage more than half of the crops. With the successful outcome of this demonstration, we are convinced the GMO is safe and reliable to grow.

"We cannot spray twice instead of five times and this will reduce the danger of too much chemical on the crop and the effect on we farmers spraying it. The scientists have proved to us that we can now grow cowpea in any season and it can only take 70 days within which the new seed germinates and is ready for harvest," Abubakar noted.

On his part, a 70-year-old cowpea farmer at the field day equally revealed Alhaji Yahaya Umaru applauded the IAR for easing the years of farmers suffering owing to prolonged delimitation of outputs. Alhaji Yahaya expressed satisfaction that the new down will bring to an end long deprivation of maximum yield capacity henceforth.

"We can now see for ourselves that this new variety is for real and it can change what we are used to in terms of low yield because of attack and damage of insects. We now know that with this new variety produced by IAR, we can have three to five multiplication of what we are used to with the ordinary conventional cowpea. We are fully aware and accept the GMO product of cowpea because we are satisfied it is safe for consumption and environment," Yahaya stressed.

Sampea-20T is the latest improved cowpea variety developed by the Institute for Agricultural Research, (IAR) with support from African Agricultural Technology Foundation (AATF) to elicit new paradigm shifts in cultivation and harvest of cowpea, targeted at improving food security in Nigeria.

The new variety which is the first Genetically Modified Organism (GMO) cowpea produced by IAR have shown sufficient evidence to resist *Maruca*, after a series of field demonstrations on the efficacy on the environment, consumption safety and non-target organism.

IAR trial manager on the sampea-20 project, Dr. Mohammad Lawan Umar explained that IAR embarked on the confined trial of sampea-20 with support from AATF to produce a widely acceptable biotechnology solution after similar efforts adopted in Ghana and Burkina-Faso yielded no significant result.

Explaining the scientific efficacy of the biotechnology globally as exemplified on sampea-20T, Dr Mohammad emphasized that Genetically Modified Organism (GMO) which involves organisms whose genome has been engineered through laboratory trial to withstand pod borer on field. He added that IAR had recorded tremendous success and evidence-based account on cowpea-20T, having after its demonstration

Dr. Mohammad reassured farmers of the availability of the improved seed for commercial and other value chains and disclosed IAT is presently reaching an agreement with reputable seed companies on multiply production of the seed.

A representative of AATF, Dr. Ijeoma Akaogu reaffirmed the commitment of the foundation to sustain support and transformation of small scale farmers' livelihood with appropriate agricultural technologies that will deliver farmers productivity and profitability.

Dr. Akaogu said "AATF is grateful for the transformative impacts that have been generated through the outcome of the partnership with IAR and the release of the PBR cowpea variety (sampea 20T) which is resistant to legume pod borer, early maturity within a season, produces white medium size seeds and enhances yield by up to 20 per cent.

"This means that this improved cowpea variety brings true joy to farmers and enables them to make more money which they can use to expand their farms, pay for the children's education, buy other basic needs and pay for healthcare services," Dr. Akaogu said.

Nigeria is the largest producer of cowpea in Africa. But its production and productivity are largely limited by several constraints, prominent among the predicament is, the threat of *maruca* attack, a major cause of farmers loss, amounting to almost 80 per cent yield loss.

The introduction of the new variety will not only change the farmer's narrative but also improve the country's food security.\

https://guardian.ng/news/farmers-laud-iars-maruca-resistance-cowpea-variety-in-kano/

Growing fortunes of transgenic cowpea variety

Last year, the Federal Government approved the registration and release of a new Pod Borer Resistant (PBR) cowpea (beans) variety for commercialisation. The cowpea variety, SAMPEA 20-T, developed by scientists at the Institute for Agricultural Research (IAR), Ahmadu Bello University, Zaria, in collaboration with various partners under the coordination of the African Agricultural Technology Foundation (AATF), is doing well, Juliana Agbo reports.

The cowpea variety, SAMPEA 20-T, was developed by scientists at the Institute for Agricultural Research (IAR), Ahmadu Bello University, Zaria, in collaboration with various partners under the coordination of the African Agricultural Technology Foundation (AATF).

Speaking after the release last year, the Principal Investigator for the project and Executive Director, IAR, Mohammed Ishiyaku, said the on-station and on-farm trials demonstrated the superiority of SAMPEA 20-T relative to local, recently released cowpea varieties and improved breeding lines tested.

"SAMPEA 20-T is high yielding, early maturing and resistant to Striga and Alectra, which are a major constraint to cowpea production in most producing areas in Nigeria and other dry savanna regions," said Ishiyaku who is also a professor in a statement.

"The protein and nutrients content of variety SAMPEA 20-T is the same

as that of other conventional varieties meaning that the Bt gene that was introduced into the variety has no negative influence on the nutritional composition of both grain and folder," Ishiyaku further said.

He added that the newly released variety does not differ in any way from already existing cowpeas other than the improvements made.

The National Biosafety Management Agency (NBMA) had in January last year approved the release of the PBR cowpea. The approval by the biosafety agency paved the way for submission to the National Variety Release Committee for consideration and registration of the first variety containing the PBR Cowpea trait as a commercial crop in Nigeria. One outstanding feature about SAMPEA 20-T is that it is highly resistant to Maruca vitrata, an insect pest that causes up to 90 percent yield loss in severe infestation cases.

It is also resistant to Striga and Alectra, two notorious parasitic weeds.

So far, Cowpea farmers said the new beans variety Pod Borer Resistant (PBR) Cowpea (SAMPEA 20-T) has reduced cost of production compared to what was spent on the conventional variety.

Comparing the cost of production of the genetically modified(GM) crop and the conventional cowpea, a farmer in Tudun Wada Kano, Khalid Salihu said in a hectare of beans farm, he saves over N20,000 he spends buying chemicals to control Pod Borer insect because the GM beans resists the insect.

A Cowpea (beans) farmer, Khalid Salihu, has said that he spends less planting Pod Borer Resistant (PBR) Cowpea compared to planting the local variety. Salihu who said he sprays just three times on the PBR Cowpea in order to control other pests attacking the crop, said he needs to spray up to nine times on the conventional beans variety in order to control both the Maruca Vitrata and other insects.

While noting that a farmer would spend about N26,000 to purchase chemical and labour in cultivating one hectare of conventional variety of cowpea, he said a farmer would use one and half litres of chemical which cost about N6,000 for PBR cowpea.

On maturity circle, he said the PBR Cowpea needs about 70 days to mature for harvest while the conventional one takes about 85 days. PBR Cowpea, he added, produces a slightly bigger seed compared to the conventional variety, but both produce the same pod.

Corroborating Salihu, a farmer Aliyu Mohammed who noted that the PBR cowpea reduced the burden of buying chemicals, said farmers won't have to spend much on preserving beans after harvest.

He however, said the new variety which requires only two sprays within a season has given cowpea farmers up to 20 percent yield. The Trial Manager of PBR Cowpea, Mohammed Umar, from the Institute for Agricultural Research (IAR) Zaria, explained that "PBR Cowpea was developed using modern technology, the scientists tried to find out the resistance to Pod Borer insect, but they couldn't because there is no way you can develop such variety using conventional means, so that is why we go into using modern technology."The gene that confers the resistance to this crop was identified from a soil bacterium

called Bacillus thuringiensis which is harmless".

He further said the GM cowpea is safe for consumption and environment. Speaking further on the GM cowpea, PBR cowpea Programme Manager, Dr Issoufou Kollo commended the farmers making use of the new variety by applying good agronomic practices.

Dr Kollo, who was represented by the Program Officer Dr. Ijeoma Akaogu, urged farmers to encourage others on the improved cowpea variety so that they can also enjoy the great benefits it provides.

"This improved cowpea variety brings true joy to cowpea farmers and enables them to make more money which they can use to expand their farms, pay for the children's education, buy other basic needs and pay for healthcare services".

https://thenationonlineng.net/growing-fortunes-of-transgenic-cowpea-variety/

Policy environment and public participation

How can *Bt* Cotton Help Nigeria

Nigeria's varieties of cotton seeds are said to have low productivity, and at best farmers can only get loss than half a ton per hectare, wile their counterparts from other parts of the world are experiencing bumper harvests. Nigeria's cotton farmers are not only discouraged from farming the crop but gain nothing after months of investments and suffering. The country recently approved the commercialization of Bt cotton in a bid to revive its textile industry. The adoption of Bt cotton is expected to help revive Nigeria's comatose textile industry, which has dramatically declined from its heyday of employing over 450,000 in more than 180 mills and contributing some 20 percent of the nation's gross domestic product. OFAB Nigeria explains in the video link below how Bt Cotton will boost Nigerian economy.

https://www.facebook.com/watch/?v=560876491500006

Analysis: How Nigeria's Bt Cowpea will Combat Food insecurities due to the COVID 19 Pandemic

One of the major concerns across the globe is the impact of the Covid-19 pandemic on food security, as the United Nations World Food Program UNWFP warned that the number of people facing food insecurity may double by the end of the pandemic. It was feared the pandemic may delay the rollout of pest resistant Bt cowpea, Nigeria's first genetically modified food crop. Travel restrictions imposed to stop the spread of the coronavirus made it difficult to get the improved seeds out to farmers. OFAB Nigeria explains how Nigeria's Bt Cowpea will combat food insecurities due to the COVID 19 Pandemic

https://www.facebook.com/watch/?v=744210492782431

Market systems for commercialization

Seed companies exude confidence, ready to commercialise TELA maize

For Peter Mutisya, the Managing Director of PealAgro Services Enterprises Ltd, meeting future food demand will require quick growth in the agriculture sector by embracing modern technologies that have been proven to boost farm productivity.

"Any genuine business must adapt to advances of modern-day technologies in the world, and agricultural biotechnology is one such technologies," he quips.

Agricultural biotechnology continues to change the lives of farmers across Africa by delivering to them a wide range of innovations that have been proven to improve agricultural productivity.

Mutisya is optimistic that biotech research currently underway in the country will deliver better performing varieties that will add value to farmers.

As one of the entrepreneurs in the seed sector in the country, he is looking forward to the approval of the TELA Bt maize for registration and commercial release for use by farmers.

"Seed companies want a product that will give farmers better results," he says.

Just like Mutisya, Peter Ndungu, research and development manager at Gicheha Farm in Nairobi, is looking forward to the results from the National Performance Trials (NPT) for Bt maize to allow seed players move ahead and get the product to farmers.

"I am convinced on the science. What we are interested in is better performing products than what is currently available

in the market that will help improve the livelihood of farmers," says Ndungu.

He adds that as a player in the seed industry, his seed company is ready to embrace the new variety and develop their own capacity to produce the seeds for farmers if there is sense of business in it.

"Although it primarily targets the stemborer pest, TELA® Maize has shown partial but significant resistance to the devastating Fall Armyworm, and this is a plus for the seed industry," he points out.

Mutisya and Ndungu are among participants from seed companies who visited the Bt maize NPT site in Kisumu that was set up by the Kenya Plant Health Inspectorate Service (KEPHIS) to validate the performance of the varieties.

The seeing is believing site visit was organised by AATF, Kenya Agricultural and Livestock Research Organisation (KALRO) and other partners in the TELA project to allow seed companies to assess the performance of the TELA Bt maize against other conventional and commercial crop varieties.

The visit also provided opportunity for the seed players to identify suitable varieties that will be availed to farmers affected by stemborers and Fall Armyworm.

The TELA Maize Project is working towards delivering drought-tolerant and insect-protected maize varieties to enhance maize production among smallholder farmers in the region.

This means that after successful NPT process, the TELA® Bt maize will be available for planting by farmers to mitigate effects of climate change especially moderate drought and losses to insects such as stemborers and Fall Armyworm.

Caleb Obunyali, TELA Programme Officer at AATF with other representatives from seed companies at the TELA NPT maize field

So far, TELA Maize has shown partial control of Fall Armyworm compared to maize varieties that most farmers currently grow.

According to Dr. James Karanja, the principle investigator of the project, stemborers are known to reduce maize production in several countries in Africa.

"In Kenya, stemborers can reduce maize production by an average of 13 per cent or 400,000 tonnes of maize, equivalent to the normal yearly amount of maize imported by Kenya," he says, adding that this damage is valued at more than $90 million.

Dr. Karanja says six sites spread across the country are currently undergoing NPT for Bt. maize to evaluate performance in different agroecological zones.

He said after the trials are complete, the next phase shall be obtaining clearance from KEPHIS to allow seed companies to produce seeds for farmers.

"All TELA maize varieties will be made available to smallholder farmers through local seed companies and the companies will not be required to pay royalties for the maize varieties, thus making them more affordable for farmers," he explained.

Now, it is just a matter of time before Mutisya, Ndungu and other seed companies in Kenya can receive license rights, to produce and commercialize the new TELA maize under their private brand.

Licensed seed companies will access the technology royalty-free for them to produce and sell the seed under their brands to farmers. The better yield performance of TELA hybrids, together with improved seed quality will deliver more value to farmers and create more demand and profit potential for the seed brand.

https://www.aatf-africa.org/aatf_fieldstories/seed-companies-exude-confidence-ready-to-commercialise-tela-maize/

Good news for seed companies and farmers in Africa: QBS offers a sustainable supply of foundation seed

Photo: Credit/ProAgri

The seed industry in Africa is one of the pillars upon which improved agricultural productivity for the continent must rest in order for farmers to increase production. However, smallholder farmers across Sub-Saharan Africa (SSA) suffer low crop yields and sometimes crop failure due to the use of poor-quality seed or the unavailability of better performing seed.

Poor seed quality is a major bottleneck facing seed companies and farmers in the SSA region. This is often caused by mishaps during the seed production process, leading to difficulties with production and maintenance of quality foundation seed for some independent seed companies that service Africa's smallholder markets, resulting in a low and inconsistent supply.

To alleviate this problem and to help address challenges associated with production of foundation seed, QualiBasic Seed Company (QBS) was formed to offer a commercially sustainable foundation seed supply solution to seed companies and farmers in Africa.

QBS supports seed companies in SSA to ensure the quality of certified seed by operating a centralised system that manages foundation seed production, quality control and storage, in a highly effective and efficient way.

According to the QBS Managing Director Andy Watt, QBS works with different seed companies to plan production and ensure delivery of high-quality foundation seed to satisfy the

needs of their certified seed production. "As a company specialising in production of foundation seed for independent seed companies, we work with seed companies to help them realise their goal of producing quality certified seed by taking the burden of foundation seed production from them."

He points out that QBS works to fill the foundation seed production gap by supplying high quality foundation seed with high genetic integrity, phytosanitary security and industry-leading seed quality standards to seed companies, including providing technical support to help seed companies with production and marketing of their certified seed.

One such seed company is Uganda's BRAC Social Business Enterprises, a social venture launched in 2006 to contribute to poverty reduction and to support women and the youth by creating sustainable value chains for farmers.

According to the Head of BRAC Social Business Enterprises, Dr Ziaur Rahman, they have been working with QBS to produce high-quality hybrid seed to ensure maximum yield for Ugandan farmers.

He notes that the fundamental requirement of a growth-oriented hybrid seed producer and marketing company like BRAC Seed, is gaining the trust of farmers who are directly or indirectly involved in field production activities and observing results of quality yields.

To attain quality yields, we have to ensure that farmers are supplied with quality hybrid seeds, which basically come from quality foundation seeds. QBS is one of the leading seed companies that is exclusively producing high quality foundation seeds for African seed companies," he points out.

Before learning about the services offered by QBS, Dr Ziaur says one of the challenges his organisation faced was unavailability of reliable foundation seeds and delayed access to technical expertise which in turn slowed down the supply of foundation seed for commercial hybrid seed production programmes.

"QBS always responds in time when we need foundation seeds to support our certified seed production programme," he says, adding that with the foundation seeds from QBS, BRAC Seed has introduced a new drought tolerant hybrid maize, called Champion F1, in the Ugandan seed market.

Like BRAC Seed company, QBS and its service is not new to other seed companies across the region. According to Sylvia Horemans, Chief Executive Officer of Kamano Seed Company, the formation of QBS brought relief to most seed companies in Zambia.

"They have taken up a lot of work from seed companies by growing our foundation seed. All we have to do now, is to request to QBS to produce foundation seed so that we only focus on production of certified seed," explains Sylvia.

She notes that QBS has helped her organisation, a company that produces improved seeds and markets them to smallholder farmers, to improve its business because of provision of technical knowhow that allows seed companies like hers to focus on other production operations as the burden of

foundation seed production is taken care of by QBS.

"So far, QBS has been producing foundation maize for companies, but we hope they can extend their services to other seed crops including soya beans, sorghum, millet, groundnuts, cowpeas and beans. This range of crops has a lot of recycled seed which has caused the yields to be very low," she states.

Across the border in Malawi, Demeter Agriculture Ltd is enjoying the fruits of its working relationship with QBS. The organisation's General Manager, Prashant Khatri, says that before they used the services of QBS, they did not have the breeding material in the quality they wanted, but now this situation has changed.

"They are able to supply the quantity and quality on time in all seasons when we need foundation seeds to support our certified seeds production programme," says Prashant.

As result, Prashant says that his organisation is now able to compete favourably in the market as the performance of hybrid is satisfactory and adds value to their operations.

It is estimated that 80 percent of seed companies struggle to produce a consistent supply of quality foundation seed due to technical, infrastructural, and financial challenges.

As QBS continues to change lives of smallholder farmers through helping seed companies to gain access to high quality foundation seed, the seed companies that spoke to ProAgri magazine called on QBS to continue supporting their operations to ensure a win-win situation for all parties for improved productivity for smallholder farmers in Africa.

When certified seed is produced from quality foundation seed, it means that the end product that gets to farmers will deliver the intended genetic gain – meaning the farmer will reap the full value intended by the breeder with improved yield and quality, which will in turn contribute significantly to increased agricultural productivity.

https://www.proagri.co.za/en/good-news-for-seed-companies-and-farmers-in-africa-qbs-offers-a-sustainable-supply-of-foundation-seed/

Mechanization and digital agriculture

Entrenching cassava mechanization initiatives for higher yield

Nigeria is rated the largest producer of cassava in the world when its farmers are harvesting fewer than 10 tonnes per hectare with numerous challenges, including the myth that cassava farms do not require fertilizer, as the chemical will contaminate the crop, and the belief that cassava does well with minimum rain and minimum weeding.

Apart from being the largest producer, Nigeria is acknowledged globally as the country that consumes cassava the most. While other countries of the world use cassava as animal feeds, ethanol, starch and other industrial products, here in Nigeria, it is one of the staples eaten the most daily.

Nigeria has explored using High Quality Cassava Flour as a substitute in the wheat flour confectionaries, and master bakers experimented with about 20 per cent of cassava flour addition in bread baking, prompting a move to deepen industrialization of the product to reduce forex on wheat importation.

Despite these realities and potential, production cost is very high and productivity per hectare is still very low, necessitating adoption and maximisation of farm mechanisation, which is capable of resolving the twin challenges.

In 2013, the African Agricultural Technology Foundation (AATF) introduced one of its programmes, Cassava Mechanisation and Agro-processing in Nigeria (CAMAP). The programme was started in the South-Western states of Oyo, Osun, Ogun and Ondo, as well as the North Central's Kwara, with an initial number of about 2,000 farmers.

The CAMAP initiative is working towards revitalising the cassava industry through mechanised production and post-harvest handlings along the value chain. The project aims to improve cassava productivity through increasing the operational efficiency and improving market linkages for smallholder farmers. With this approach, the project is enhancing food security, improved incomes and means of livelihood for farmers, processors and marketers in the cassava sector.

It will be recalled that the government-initiated mechanization scheme launched in 2014 by the former Minister of Agriculture, Dr Akinwumi Adesina, in Zamfara State, has not recorded much progress funds and sustainability have become stumbling blocks to the initiative. Hence, stakeholders believe that the private sector-led initiatives in farm mechanization and value chain development are the wands that could make great impact on the sector.

In four countries, Nigeria, Uganda, Zambia and Tanzania, CAMAP also promotes good agronomic practices, encouraging farmers to use improved stem varieties, fertilisers and herbicides, and ensure timely farm operations.

Since its launch in 2013, the project has increased the efficiency and timeliness of operations, the key results being about 200% increase in yields, about 100% increase in incomes, improved quality of life and attraction of more women and youths into cassava farming as a business.

Mechanisation has increased the efficiency and timeliness of operations and this has attracted women and youths into cassava farming who are now trained in farming as a business.

Impact of National Centre for Agricultural Mechanisation
One of the principal partners of the programme in Nigeria is the National Centre for Agricultural Mechanisation (NCAM) in Ilorin, Kwara State.

With its mission of accelerating mechanization in agriculture in Nigeria, NCAM became the chief technical driver of the project, ensuring that imported machineries followed the nation's technology transfer rules.

While reiterating the importance of mechanization to productivity and food security, Mr Faleye Tope, a chief agricultural engineer with the centre, said: "We have never seen anything like the facilities AATF brought into the country for the project. For us, it was an eye opener seeing a machine that can plant cassava and harvest it.

"Following the mandate of our centre, we were able to study one of the machines, dismantled it, opened it up and reproduced it using available materials. We and AATF were able to train over 100 operators for the various equipment, as well as farmers on what was expected of them."

Mustapha Lateef Olalekan is one of the farmers who participated in the programme in Isheyin, Oyo State. He disclosed to The Guardian that: "Our group is made of nine youths with four of us being graduates. We decided to venture into farming when employment was not forthcoming. We had attempted other farm projects before then, but it all ended in disappointment. When we heard about CAMAP, we decided to give it a trial though the way the officers

presented the story to us was too good to believe."

He said the project provided them with the necessary implements, including the cassava planter and harvester, their first time of seeing such. "AATF also supported us with financial incentives to ensure that we maintain the farm. At harvest, our joy knew no bound as we were able to get 25 tonnes per hectare as against eight to 10 tonnes previously harvested. That was highest that has ever been attained in the area."

Chief Emmanuel Oyeleso, the Olupo of Oluponna in Ayedire Local Government area of Osun State also expressed how the training and exposure to the use of farm machineries have transformed the way agriculture is practiced.

"The project is the best I have seen since people have been coming here to do projects. The yield was wonderful. My people benefited greatly. I was able to buy a car from the proceeds. I employed a lot of people to work on my farm, and above all, I increased the size of my farm from fewer than 20 hectares to 84 hectares because I have seen a miracle," he said.

"My children have asked me to stop farming, but with a programme such as CAMAP, why do I have to stop? Previously, it takes over 15 people more than eight hours to plant cassava on my farm for me, but CAMAP came with the cassava planter and it took less than an hour. CAMAP is about the power of technology, it is not magic," he added.

Mrs Amosu Kikiolomo, based in Iwo area of Osun State, said CAMAP had not only saved her children's education, but also opened her eyes to see that cassava mechanization is a money spinner.

"In just one season of planting cassava according to the guidelines given to us by the CAMAP officers, I was able to send my daughter to the university to study agriculture, expand my farm and have now become recognized as a cassava supplier in my area."

CAMAP was introduced by AATF to increase cassava production through mechanisation across the value chain, add value to the cassava industry through value addition and creation of market linkages, capacity building of local entrepreneurs to design prototypes machines, manufacture, maintain and repair the necessary equipment for cassava planting, harvesting and processing. The programme was able to excel in Nigeria within five years.

The challenge, as with many other not-for-profit organizations' projects in Nigeria, is what happens when the foundation hands off over the project? Already, farmers are lamenting the gradual withdrawal of AATF from the project. Most of the farmers who participated in the programme are wondering why the government has not taken it over, following the huge success it recorded.

The Olupo of Oluponna said: "The government has to take over the project. AATF has tried and introduced us to the novel way of farming cassava, taken us out of the old ways of planting cassava to a new way of achieving fantastic results. It will be good for the government to take over from there."

Mrs Amosu said the government intervention is necessary now that cassava farmers have increased their outputs significantly. "Some days, we go to the market and we are told not to bring in cassava because the market is saturated. The government should step in to ensure that we start adding value to the cassava, which we are producing in large quantity."

They urged the government not let the initiative that increased income and reduced drudgery of farmers, especially women, go on extinction, saying, it has increased yield per hectare from seven to nine tonnes to over 25 tonnes and benefited over 543,000 smallholder farmers and their families.

https://guardian.ng/features/agro-care/entrenching-cassava-mechanisation-initiatives-for-higher-yield/

Consolidating Nigerias comparative advantage on cassava production through-mechanisation

Nigeria is often referred to as a cassava nation since it is the country with the largest production of cassava in the world, producing about 50 million metric tons annually from a cultivated area of about 3.7 million hectares(ha).

According to the Food and Agricultural Organization (FAO), Nigeria accounts for cassava production of up to 20 per cent of the world, about 34 per cent of Africa's and about 46 per cent of West Africa's production. The national average yield of cassava is estimated at about 9.5MT per ha, as against potential yield of up to 40 metric tons per ha. Close to two-thirds (66 per cent) of total production is in the southern part of the country, while about 30 per cent is in the north-central, and 4 per cent in other parts of the north.

The crop is predominantly grown by smallholder farmers on small plots for family consumption and local sale. Large scale commercial plantations have been rare, until recently when

the government of Nigeria started promoting cassava as an industrial crop. Despite the high volume of production, the yield is very poor. Nigeria has one of the worst yields in world records.

Because yields are low, you need to cultivate more land. When you look at cassava farming in Nigeria, you can see it is done by peasant farmers, people who have from 1 to, at most, 5 ha for their own consumption and immediate sale. Cassava consumption for food accounts for 65 per cent of production. The remaining 35 per cent all goes to the industry.

All the above statistics and scenarios have been transformed significantly following the introduction of the Cassava Mechanization and Agroprocessing Project (CAMAP) in Nigeria in 2013 in South Western states by the African Agricultural Technology Foundation (AATF).

The programme worked towards revitalizing the cassava industry through mechanized production and agro-processing along the cassava value chain.

The project improved cassava productivity through increasing the operational efficiency and improving market linkages for smallholder farmers. With this approach, the project enhanced food security, incomes and livelihoods for farmers, processors, and marketers in the cassava sector and reinforced Nigeria's dominance as the global leader in cassava production.

AATF launched the programme in four countries – Nigeria, Uganda, Zambia and Tanzania to promote good agronomic practices, encouraging cassava farmers to use improved stem varieties, fertilizers and herbicides, and ensure timely farm operations.

In Nigeria, the project is implemented in Oyo, Ogun, Osun, Kwara, Ondo, Edo, Delta, Niger and Ekiti and has recorded some milestones as it increased the efficiency and timeliness of operations the key results being 200 per cent increase in yields, 100 per cent increase in incomes, improved quality of life and attraction of more women and youth into cassava farming as a business.

Testimonies:

The Olupo of Oluponna, Chief Emmanuel Oyelso in Osun state described the project as showcasing the power of technology and not magic.

"I have been involved in farming over the years but have never witnessed anything like CAMAP. With little activities, we were able to increase our harvest by over 200 per cent. CAMAP brought machineries that did the planting, first time we ever saw anything like that and as if that is not enough, they also brought machines that harvested the cassava and linked us to manufacturing companies that need cassava for their operations, we sat and negotiated how much one ton of cassava should be, it has never been that good," the chief said.

"I have been able to acquire a new car, expand my farm to 84 hectares and all this is as a result of the success I achieved through CAMAP. My cassava harvest went from nine tons to 30 tons per hectare, previously, I would need about 15 persons to plant one hectare of cassava for me manually in 8 hours but since CAMAP introduced us to planting machines, one hectare is planted in less than an hour.

I supply cassava to companies using it for various productions, something we have never experienced. The challenge of transportation and market were properly handled under the CAMAP programme because as you are harvesting there is a truck standing by to transport to companies who are ready to pay you cash. We have never had so much money in our hands," he added.

Another Chief, Solomon Oyerinde of Odofin in Iwo area of Osun said the project was superb. "I have never accessed a cassava planter before but through CAMAP, we not only saw the planter and harvester but used it on our farms and the result is what is holding me back, I can't leave cassava farming."

According to Oyerinde, "we started as a group of 120 farmers with most of us having either one hectare or more. No one in the group has harvested more than 10 tons in the past so when the CAMAP officials were telling us we can get more than 10 tons we never took them seriously but when it was time for harvest, we couldn't believe our eyes. I got 30 tons per hectare and that alone changed my mentality about the use of mechanization in agriculture."

The programme was a great one, in short a time, it was able to show that farming is a profitable venture, I started farming cassava five years before CAMAP was introduced to us and all what I was unable to achieve in those five years, my one season with CAMAP made it possible.

"The great harvest was not the sweetest part of the programme, the ready and waiting buyers and transporters and the fact that we got our payment once not in piece meal to me is the greatest gain for us from the project," the Odofin High Chief noted.

Kayode Akanbi, headed one of the Clusters created by CAMAP to coordinate cassava farmers in Olaoluwa local government area of Osun state and according to him, participating in the CAMAP programme was like going to school. "We were taught a whole new way of farming cassava. The project was able to disprove the age long myth of not adding fertilizer to cassava because we added and saw wonderful results.

"CAMAP showed us how to plant cassava, when and how to apply fertilizer, how to monitor and control weeds and how to harvest, all these processes were machine-based, planter, harvester and loader. In less than two cassava planting seasons we saturated the market and made so much money that assisted us to give our families comfort, we were no longer stranded when school resumed as money for school fees was already available," he added.

Having learnt how to scale up production of cassava, it is important that the federal government through the cassava value chain unleash a nationwide programme that will carry forward the lessons from CAMAP that has made it possible for farmers to get as much as 30 tons per hectare.

https://agronewsupdates.com/2020/08/04/consolidating-nigerias-comparative-advantage-on-cassava-production-through-mechanisation/

COVID-19: Cassava Digital Application Helping Nigerian Farmers

As African smallholder farmers struggle with restrictions imposed on them due to the Covid-19 Pandemic, digital applications are gradually opening new vistas of opportunities for them, ensuring they are not left out of the revolution.

One such application is the recently released cassava mechanization services application referred to as "Agridrive App" that allows farmers to request for various mechanisation services from their farms.

The App, which is accessible on mobile phones in both online and offline modes has special features that farmers and mechanization equipment operators require ranging from tractor mechanisation service booking application, tractor tracking, equipment inventory, extension services, weather reports, Call Centre Service (for the market, produce price, transportation, storage and farmer event information), Internet of Things (IoT), machine learning, and artificial intelligence (including

predictive analysis regarding future mechanization market opportunities).

The App is GPS enabled and allows farmers to choose their farm locations.

When a farmer needs a service, the farmer simply fills the required details including size of the farm and the preferred date for the service.

The request is then automatically entered into the system and sent to the system administrator with a copy to the farmer.

The application is also targeted at encouraging youth farmers, majority of whom have abandoned farming due to various reasons, by easily availing them with some of the technological solutions they seek.

Agridrive Ltd, the owner of the App, is a subsidiary of the African Agricultural Technology Foundation (AATF) that offers cassava mechanization services across the crop value chain including ploughing, harrowing, planting, herbicide application, weeding, harvesting, and logistics operations for marketing.

George Marechera, Managing Director, Agridrive Ltd, said the App is a good example of how access to digital technology can offer significant advantages to smallholder farmers even during times of need such as this COVID-19 period.

The App is effective in ensuring business continuity while also reducing contact between Agridrive staff and farmers which reduces the risks associated with the spread of COVID 19 by promoting social distancing.

This is because the App enables farmers to book and pay for mechanisation services without the need for personal contact with the mechanization equipment service provider.

This also ensures the continued provision of much needed food in Nigeria thereby averting food insecurity related to Covid-19.

The App is leveraging digital technology to transform the delivery of mechanization services to enable farmers to overcome temporary COVID-19 related constraints and ensure better and more effective service delivery especially in remote areas in Nigeria.

Farmers in Oyo and Ogun state are currently using the App to book services covering approximately 260 hectares for ploughing and harrowing, and a further 160 hectares for cassava planting.

"As a commercial farmer, the App helped me to have access to mechanization services from my home," says Boluwaji Durogbola, a farmer based in Oyo State, Nigeria. Alhaji Lukman, another farmer in Ogun State, also used the App to book for ploughing and harrowing services of 160 hectares in Ogun State and noted that the App also saved money and time that would have been spent looking for cassava mechanization services.

He added that "due to the COVID-19 Pandemic, there has been an increase in the loss of income and remittances which is seriously reducing most people's ability to buy food.

The App has helped me to overcome the disruption in domestic food supply chains and loss of income that is being experienced by many people as the Coronavirus Crisis unfolds".

In their study entitled "Connected Agriculture: The role of mobile in

driving efficiency and sustainability in the food and agriculture value chain", Vodafone, Accenture and Oxfam stated that "Mobile communications can help to meet the challenge of feeding an estimated 9.2 billion people by 2050".

The App is definitely an important mobile communication tool that can help us meet this food and health security challenge.

African Agricultural Technology Foundation (AATF) is a not-for-profit organization whose mission is to make available, to smallholder farmers, agricultural technologies that ordinarily would not be accessible to them.

AATF empowers farmers to transform their livelihoods by equipping them with better tools and inputs that would take a longer time to reach them and often cost a lot more (would be unaffordable) without the organization's intervention. This is mainly done to boost productivity of smallholder farmers, hence food security and poverty reduction.

Agridrive Limited is an agritech company working with farmers to unlock agribusiness opportunities in Africa. With offices in Nigeria and Kenya, it provides end to end innovative market edge agribusiness solutions to farmers throughout the continent.

The company philosophy is anchored on creating business opportunities for farmers through developing quality products and services as well as new markets.

Its story is imprinted on excellence and quality that ushers a new world of wealth creation through agribusiness while leveraging the power of agricultural technology.

http://www.tgnews.com.ng/2020/07/29/covid-19-cassava-digital-application-helping-nigerian-farmers/

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