

'Six Steps' toolkit sparks excitement among cassava farmers



Villagers working with IITA field workers during the harvest activities

Farmers in Oyo State were in awe when the African Cassava Agronomy Initiative (ACAI) of the International Institute of Tropical Agriculture (IITA) conducted some harvest operations on farm plots set up to demonstrate the [Six Steps to Cassava Weed Management and Best Planting Practices](#), one of the project's agronomic recommendation toolkits.

IITA-ACAI last year set up demo plots in various communities and villages in the state to allow local farmers compare root yields obtained from a cassava farm cultivated using the Six Steps to Cassava Weed Management & Best Planting Practices toolkit (tagged *demo*), and those cultivated according to local traditional methods called *Farmers Practice*.

At the Soku community in Oyo West Local Government Area, the farmers who trooped out in their numbers to watch the harvest exercise on 30 June, 2020, could not hold back their surprise as they looked at the two plots (demo versus Farmers Practice). Despite being planted the same day and on the same land, the crops on the demo plots appeared better in height and health.

To unveil what was beneath the plots, the ACAI harvesting team measured out an area 10 m by 10 m on both plots, and the villagers assisted in pulling out the roots. The IITA plot

was the first to be harvested. The villagers were impressed. But when it was the turn of the Farmers' Practice plot, laughter greeted the first few roots uprooted.

In the end, the harvest from a 10m by 10m area of the demo plot had more bigger cassava roots than the farmers' plot in the same site .

The story was the same in communities like Aba Ola, a village in Iseyin LGA; Basi in Afijio LGA; Ofiki in Iwajowa LGA; and Eye Osoka, also in Iwajowa LGA. All the harvesting took place in June and July 2020. Researchers are collating the results from Oyo and Benue for quantitative analysis.



Harvested cassava roots

What made the difference?

The Six Steps to Cassava Weed Management and Best Planting Practices toolkit guarantees higher yield, more income and less stress on farmers! In the words of Godwin Atser, IITA Digital Extension & Advisory Services Specialist, who led the establishment of the plots in June last year. "Farmers who used the Six Steps toolkit have more than doubled their cassava yield from the national average of 9 tons per hectare to more than 20 tons per hectare," he added.

Adebayo Olawale, a farmer who witnessed the setting up of the plots and the harvesting at Soku, said he and some of his fellow farmers thought the IITA-ACAI team were only attaching sophistication to farming.

"When they were using measuring tapes, marking the field, going back and forth, we thought they were just doing unnecessary drama," he said. "We thought they were just wasting time."

Olawale who spoke on sighting the two plots before the harvesting began, observed that no manual weeding operation was conducted on the IITA-ACAI demo plot, apart from the application of herbicides at land preparation and planting. He disclosed that the Farmers' Practice had three manual weeding operations in addition to the application of herbicides'.

"When they (IITA-ACAI team) came to set up the field, they first applied glyphosate on the growing vegetation and waited for two weeks," he explained. "When they came to plant, they applied Lagon, a pre-emergence herbicide. We discovered that the field was clean and free of weeds for months. Later they came back and applied another herbicide (post-emergence herbicide). During planting, they also observed spacing of 1m by 0.8m."

At Aba Ola, Mr. Oluwaloseyi Oyeleke, a tractor operator and cassava farmer who also witnessed the establishment of the demo plots last year recalled: "The IITA-ACAI team first sprayed the land with herbicides and left it for two weeks. At the end of the two weeks, they came to plough. As a matter of fact, I did the ploughing. They planted the next day and applied pre-emergence herbicide, and left. We didn't see them until about three months. It was amazing that even at those three months, only a few weeds were seen sprouting. They had come with another



Group of farmers impressed by the harvest operation

herbicide, which they applied as a form of [post-emergence](#). After that, they didn't do anything and the field remained as clean as this."

Oyeleke stated that the harvesting exercise had convinced him about the efficacy of IITA-ACAI's agronomic recommendations and expressed willingness to adopt it on the land he had just prepared for the new planting season.

The Baale of Soku, Chief Afolabi Samson Olusola, who also spoke to *Cassava Matters*, expressed certainty that after seeing the wonders of the 'Six Steps,' the people would adopt it in the next planting season. According to him, "it is now evident that investing smartly on your farm will produce more yield". He said the day's event had shown that following the Six Steps to Cassava Weed Management and Best Planting

Practices, applying fertilizer if required, and using improved stems would produce a higher yield.

Urging his people to spread the good news, the community head said: "I urge you all to tell those who are not here, that we've seen something wonderful in farming. The troubles of weeds are gone. It is better to use herbicides rather than manual weeding. It will reduce stress and improve yield."

The *Six Steps to Cassava Weed Management and Best Planting Practices* is one of the four Decision Support Tools developed by ACAI through the Cassava Weed Management Project (CWMP). Other tools are on *Tailored Fertilizer Application Recommendations*, *Scheduled Planting & Harvest Recommendations*, and *Recommendations for Cassava Maize Intercropping*.

These tools are rolled up in [AKILIMO](#), an all-in-one agronomic advisory tool developed by the project.

IITA GoSeed and Umudike Seeds get new trucks to ease movement of planting materials



IITA Deputy Director-General, Partnerships for Delivery, Dr. Kenton Dashiell, cutting the tape during the commissioning ceremony

The International Institute of Tropical Agriculture (IITA) has procured two new trucks for the pioneer Early Generation Seed companies (IITA GoSeed and Umudike Seeds) to enhance the transportation of improved planting materials to different locations in the country.

The 18-ton trucks were purchased with funds from the Building an Economically Sustainable, Integrated Cassava Seed System (BASICS) project, which started its second phase, BASICS-II three months ago.

According to Dr. Mercy Diebiru-Ojo, the Vegetative Seed Production Expert at IITA, one of the trucks belongs to IITA GoSeed, and the other belongs to Umudike Seeds of the National Root Crops Research Institute (NRCRI), Umudike, Abia State. Both firms are partners leading the second component of the BASICS-II project for the development of Early Generation Seeds Enterprises.

Dr. Diebiru-Ojo noted that despite BASICS being a cassava project, the trucks will be available to service distribution of planting materials and seeds of all the crops in IITA.

IITA Deputy Director-General, Partnerships for Delivery, Dr. Kenton Dashiell, while speaking at the commissioning of the trucks on 7 August 2020, commended the decision to give access to other crops, describing it as a sign of the team spirit and synergy in the BASICS-II project.

"I want to highlight the great team spirit and teamwork of BASICS and now BASICS-II," he said.

"They are showing the real spirit that we are here to transform African agriculture and that we are here to support the whole of IITA. They could have easily said this vehicle is for cassava and nothing else since it was bought from a cassava project...I did not make any appeal. I don't think anyone else did. But they have already pledged that it is for the benefit of all IITA crops. So, big thank you to BASICS-I and BASICS-II teams," Dr Dashiell added.

Also speaking at the ceremony, IITA Director General, Dr. Nteranya Sanginga lauded IITA GoSeed for doing a great job, undeterred by the COVID-19 pandemic. According to him, the feat the firm achieved by observing

safety protocols and continuing to serve farmers despite the pandemic, contributed to the reasons donors retained faith in IITA.

Dr Sanginga however, urged all the units under the Business Incubation Platform (BIP) to show the cost:benefit ratios of their operations and actualize the aim of commercialization for which they were set up.

The Project Manager of BASICS-II, Prof. Lateef Sanni, had earlier assured that BASICS-II was already ensuring the continuity of BASICS-I without hitches.

According to him, "We are scaling to other states in Nigeria. Oyo and Ogun have joined, courtesy of GIZ. We have just fixed a meeting with Ekiti. The scaling is working, not just in cassava. Reports from Kenya and the rest of East Africa is also very positive."

IITA Program Manager for Roots, Tubers & Banana, Richard Ofei, explained that the need to acquire the trucks became critical owing to the losses being accrued due to the inability to move large quantities of planting materials.

AKILIMO incorporated in cassava farmer financing program by top agricultural banks in Tanzania



Tanzania Agricultural Development Bank and National Microfinance Bank to finance cassava farmers in Tanzania

AKILIMO agronomy advice tools for cassava farming will be an integral part of the new program by the Tanzania Agricultural Development Bank and National Microfinance Bank to finance cassava farmers in Tanzania. The banks have collaboratively issued a loan product worth US \$1.3 million for 421 cassava farmers affiliated to 43 farmers' groups in Handeni district, Tanga region.

All recipients of the loan facility will receive training on the use of AKILIMO decision support tools and application of the agronomic recommendations provided by the tools. The program was launched in Handeni on 17th June at an event graced by representatives from partnering organizations, government agencies and private sector players.

ACAI project coordinator for Tanzania, Dr Frederick Bajjukya highlighted the importance of AKILIMO recommendations in cassava cultivation. Dr Bajjukya assured stakeholders of continued support from ACAI and IITA in providing agronomy advice and making the relevant technologies available for farmers to use.

"We are hoping that using new technologies farmers will increase their production and as a result income and be able to meet the loan obligations," Dr Bajjukya said.

The farmers and bank officials attending the event were introduced to the various formats of AKILIMO tools that they would be interacting with in the coming days. ACAI will organize training sessions with government-affiliated extension agents to prepare the farmers for the planting season.

Among those partnering in the program include farmer groups from Handeni district, National Microfinance Bank, Tanzania Agricultural Development Bank (TADB), World vision, Tanzania Cassava Producers and Processors Association (TACCAPA), Cassava Seed Growers Association (CSGA), Kilimo joint, and IITA.

Source: [Akilimo Updates](#)

Getting the correct postemergence herbicides for cassava farmers in Nigeria, by experts



Weed-free cassava field

Weeding in cassava is a tortuous and a back-breaking exercise that limits the ability of farmers to expand their cropped area. However, scientists working with the African Cassava Agronomy Initiative (ACAI) of the International Institute of Tropical Agriculture (IITA) have identified some postemergence herbicides that farmers can use during the growing period of cassava to tackle weeds.

These postemergence herbicides, though not exclusive to cassava, have been adapted in the framework of the Six Steps to Cassava Weed Management & Best Planting Practices toolkit for use in cassava to control weeds.

In Nigeria, postemergence herbicides include glufosinate ammonium, which is currently branded as Lifeline, Slasha Gold, Basta, e.t.c., says Prof. Friday Ekeleme, Principal Investigator on weed control measures in IITA. "But fluzifop-p-butyl branded as Fusilade forte e.t.c. can also be applied if the weeds in the cassava field are grasses," he added.

How is the postemergence herbicide applied?

The application of postemergence herbicides requires care and skill to avoid damage to the cassava. This is because the postemergence herbicides used in cassava are not selective, meaning that they will harm cassava if they come in contact with the green parts of the cassava crop, including the green stems and the leaves.

"To avoid the postemergence herbicides touching the green parts of cassava, farmers are encouraged to use spraying shields that are usually attached to the nozzle of the sprayer," Prof. Ekeleme said.

"There is however, an exception, and that is Fusilade Forte... Fusilade Forte can be applied directly to the cassava crop to kill grasses (narrow leaf weeds only). If the field has a combination of both narrow and broad-leaf weeds, apply glufosinate ammonium," he explained.



Women farmers going through a flier on the Six Steps toolkit

Six Steps to Cassava Weed Management & Best Planting practices

Researchers in IITA have packaged the knowledge on the use of postemergence and preemergence herbicides in cassava farming systems into an extension toolkit known as the Six Steps to Cassava Weed Management & Best Planting practices (simply called 'Six Steps'), for dissemination to farmers.

The 'Six Steps' is a set of agronomic recommendations including tillage and plant nutrition that enables farmers to grow cassava (or cassava intercropped with maize) with minimal interference of weeds, thereby pushing up the yield threshold of cassava.

ACAI has further bundled the toolkit into AKILIMO—a one-stop-shop advisory tool for farmers.

According to IITA Digital Extension and Advisory Services Specialist, Godwin Atser, who is leading the dissemination of the 'Six Steps' toolkit, farmers are being advised to apply post-emergence herbicides only when the cassava crop is 8 weeks old and above.

Besides, postemergence herbicides should be applied when weeds cover 30 percent of the field, and they are at 4-6 leaf stage.

IITA Director for Development & Delivery, Dr Alfred Dixon, called on farmers to follow the 'Six Steps' for optimum control of weeds, stressing that the toolkit comprises all the recommendations necessary for weed control.

He stressed that the effective control of weeds was crucial for higher cassava productivity and urged farmers to contact IITA for the toolkit for the use on their farms.

Scientists from IITA, Wageningen and University of Florida are optimizing crop models for improved predictions



The scientists drawn from the International Institute of Tropical Agriculture (IITA), Wageningen University (WUR), University of Florida (UF) and the African Plant Nutrition Institute (APNI) work on AKILIMO model

Scientists working with the IITA-managed African Cassava Agronomy Initiative (ACAI) project have made significant advancements in crop modelling to improve the yield predictions underlying the AKILIMO decision support tools. The team is evaluating the performance of the Light Interception and Utilization (LINTUL) and Decision Support System for Agrotechnology Transfer (DSSAT) to predict the attainable yield of cassava in well-managed agronomic field trials.

The scientists are drawn from the International Institute of Tropical Agriculture (IITA), Wageningen University (WUR), University of Florida (UF) and the African Plant Nutrition Institute (APNI). They are part of the ACAI team that has been developing AKILIMO decision support tools using field research data and simulation models to create a robust prediction engine that provides site-specific recommendations for cassava agronomy.

Both LINTUL and DSSAT are designed to predict crop growth and yields as affected by genotype, soil and daily and seasonal climate variations in temperature, solar radiation and rainfall. However, DSSAT is more data-intensive by simulating in great details dry matter allocation to different plant organs as compared with a simpler mechanism based on dry matter partitioning used in LINTUL. So far, LINTUL has been used to predict water-limited yield used in the AKILIMO prediction engine together with GIS data to provide recommendations. Predictions using DSSAT are expected to be more robust and precise, and also integrate a conversion of dry to fresh matter, which is important to quantify revenue, as farmers either sell their produce on the fresh root market, or to starch factories and disaggregate prices based on starch content.

The team held a virtual workshop in June to evaluate the performance of the two models using all geospatial and crop data

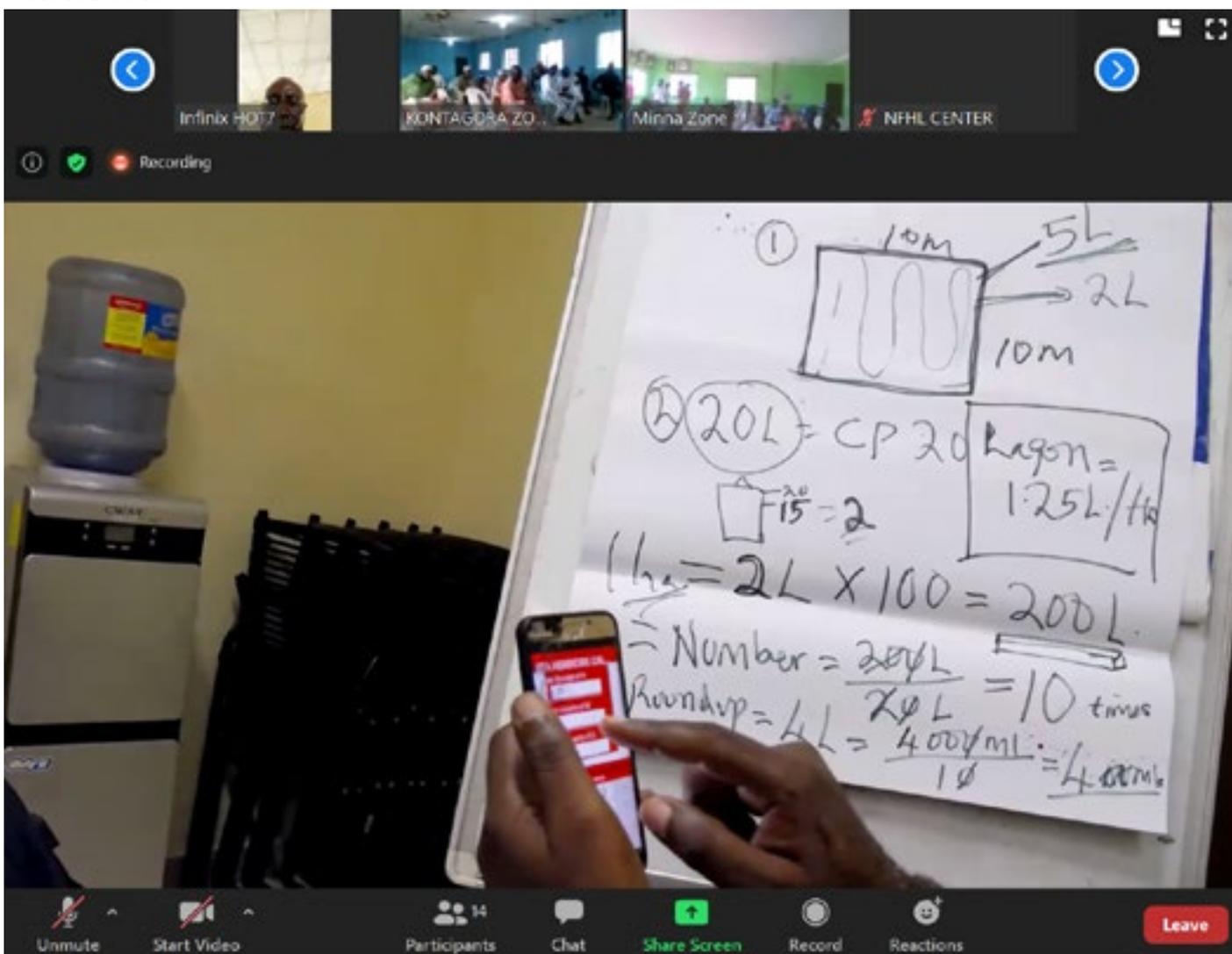
gathered over the past 4 years of project implementation. Given the different parameterization, the two models could perform differently under varying agro-ecological conditions.

According to ACAI and IITA Data Scientist Meklit Chernet, it is important to understand the strengths and the limitations of the two models to improve the prediction of AKILIMO decision support tools.

The team is currently calibrating and investigating the models using the field data collected by ACAI in order to perform a side-by-side comparison. Based on this outcome, simulations will be run across 20 years of historical weather data and the intervention areas in Nigeria and Tanzania, which will be integrated in the back-end of AKILIMO, and permit not only better yield predictions, but also measures of uncertainty or risk to better inform the users of AKILIMO.

Source: [AKILIMO UPDATES](#)

IITA-ACAI trains NAERLS extension agents in Niger and Kaduna



Screenshot of online training on the use of the IITA herbicide calculator

The African Cassava Agronomy Initiative (ACAI) of the International Institute of Tropical Agriculture (IITA) has conducted a virtual training for extension agents in Niger and Kaduna states in Nigeria, successfully disseminating the Six Steps to Cassava Weed Management and Best Planting Practices, as well as other good agronomic practices in the face of COVID-19 hurdle while adhering to safety precautions.

The Training of Trainers (ToT) event was held via Zoom for extension agents under the National Agricultural Extension and Research Liaison Services (NAERLS) based in Ahmadu Bello University (ABU), Zaria, with support from the Alliance for Green Revolution in Africa (AGRA). The training covered the Six Steps to Cassava Weed Management and Best Planting Practices, Cassava-Maize Intercropping, and calibration of knapsack backpack sprayers for herbicide application.

Observing social distancing and other safety protocols, participants logged on to the training while gathered at various locations, which included NAERLS conference room, Zaria, Bida Zonal Office, and Kontagora in Niger State. Members of the agency's National Farmers Helpline were also in attendance.

The training, which was held on 17 June 2020, came weeks after extension agents working with ACAI's partners— the Justice Development and Peace Movement (JDPM), Oyo; and the University of Agriculture Makurdi (UAM)— resumed training activities under a cautious regime following months of COVID-19 lockdown which coincided with the start of a new farming season.

According to the training facilitator and IITA Digital Extension and Advisory Services Specialist, Godwin Atser, IITA-ACAI resorted to virtual training as part of efforts to ensure that the restrictions caused by the pandemic never hampered the dissemination of IITA-ACAI agronomic recommendations to farmers, and to avert hunger and mitigate the effects of the looming economic recession.

"Virtual meetings have become the new normal," Dr. Esther Ibrahim, AGRA Associate Program Officer, who spoke before the commencement of the training, said. "We should accept it as it is and make the best use of it."

In his address, the Executive Director of NAERLS, Prof. Mohammed Khalid Othman, said he was particularly excited about

the herbicide component in the training, saying: "This training is essential for farmers and extension agents because we need to know how to handle our agro-chemicals."

The online training was in two parts – a theoretical session on the Six Steps to Cassava Weed Management & Best Planting Practices; Cassava-Maize intercropping; types of weeds and herbicides; and a practical session where participants learnt how to calibrate knapsack sprayers for proper herbicide application. They were also taken to fields outside their meeting venues for practical demonstrations.

IITA Digital tools like IITA Herbicide Calculator, *CassavaMatters e-market*, and AKILIMO were also discussed.

NAERLS is responsible for development, collation, evaluation, and dissemination of proven agricultural innovations and to research on extension methodologies and policy. The online training was moderated by Prof. Chris Daudu, an Assistant Director of Research and the Project Manager for the Community Based Adviser model of USAID/AGRA/NAERLS.



Screenshots from the practical training session



Screenshot of Godwin Atser conducting online training on Six Steps toolkit

Researchers help inform cassava breeding worldwide



Harvesting of cassava roots

Scientists in Cornell's NextGen Cassava project have uncovered new details regarding cassava's genetic architecture that may help breeders more easily pinpoint traits for one of Africa's most vital crops.

Their findings are reported in a study, published July 31 in *Plant Molecular Biology*.

The scientists analyzed large breeding populations measured extensively over successive years and stages of selection in multi-environment field trials in Nigeria. The genome-wide association analysis explored genomic regions most responsible for desirable traits in cassava, a food crop that provides the main source of calories for 500 million people across the globe.

The scientists found more than 40 quantitative trait loci associated with a total

of 14 traits, responsible for characteristics such as disease responses, nutritional quality and yield. The traits were classified broadly into four categories – biotic stress, quality, plant agronomy and agro-morphology.

"Our findings provide critical new entries into the catalogue of major loci available to cassava breeders," said Ismail Rabbi, a molecular geneticist and plant breeder at the International Institute of Tropical Agriculture (IITA) and a member of the NextGen project. "These markers should greatly improve cassava research and provide another powerful tool for the breeders' toolbox."

"Cassava is an incredibly useful food and industrial crop today and will be more so in the future as climate change reshapes agriculture everywhere, but first we must better understand its complex genome," said

Chiedozie Egesi, NextGen program director and co-author on the study.

Based in the Department of Global Development, the NextGen Cassava Breeding project supports scientists from many disciplines with advanced technologies and methods. The project works to empower smallholder cassava farmers in sub-Saharan Africa by developing, releasing and distributing improved cassava varieties.

Plant diseases and pests like cassava mosaic disease (CMD) and cassava green mite are major constraints to cassava production in Africa, India and across Asia, including Vietnam and Thailand. Infections of CMD can lead to yield losses of 82%, or more than 30 million tons each year.

Source: Cornell CALS

This newsletter is produced by African Cassava Agronomy Initiative (ACAI) in collaboration with the BASICS projects.

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