

Banana breeding project successfully implements modern track and trace system

Tagging products with barcodes for easy price retrieval in supermarkets is now a regular practice that people often take for granted. But beyond supermarkets, barcodes can be employed across a whole spectrum of settings, including by scientists in their research.



Barcoded trees in a banana breeding field.

The [Accelerated Breeding Better Bananas](#) project has developed, adapted, fine-tuned, and deployed a fully operational Banana breeding Tracking Tool (BTracT), which uses barcodes. Researchers now use BTracT to routinely track each step of the breeding process of the breeding pipeline, from where the male parent's pollen comes from to how the cooked product tastes.

Each plant in each location receives a specific barcode identity. Apart from parental pedigree and taste details, BTracT records agronomic performance, pest resistance, plant stature, color, and feel of cooked bananas. These details are stored on the global banana breeding database [MusaBase](#) for all to access. The banana breeding process is extensive, and the performance of plants studied over several years can help identify the best performing and most suitable bananas with the most desired traits.

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IITA, AfS partner to promote biotech communication



IITA researcher Sarah Macharia observing genome edited banana plants in the glasshouse.

Partnering with the Cornell Alliance for Science (AfS), IITA has launched the Biotech Communication Capacity Building program to implement Africa's training activities. Launched in September 2020, the 4-year project plans to address misinformation around crop biotechnology, specifically genetically modified organisms (GMOs) and genome-edited products. Another object is countering conspiracy theories and disinformation campaigns that hinder understanding of climate change, synthetic biology, and agricultural innovations.

The IITA component of the project will focus on leadership development and capacity building of effective science messengers. These messengers include but are not limited to scientists, media practitioners, farmers, and policymakers. The learning programs will focus on the benefits of genome editing (GE) and GMOs and why it is important to regulate these products in [a science-based and informed manner](#).

According to [Patricia Nanteza](#), the IITA project manager, “African countries need to regulate the products of genome editing and GMOs based on science and evidence. In the past, there have been policies that have been passed based on fear and popular opinion. These policies have succeeded in closing out agricultural innovation in Africa, yet the continent’s farmers need improved seed to fight the ever-evolving pests and diseases and unpredictable climate change.”

Patricia further explained that the project presents an opportunity to showcase the technology to stakeholders for what it is—a technology that offers the continent tools to produce better food quality and quantity for improved food security. “We know that GMOs and genome editing are not a silver bullet that will solve Africa’s food insecurity problems, but we are aware that quality seed is ‘[the most vital and crucial input for crop production](#)’. It is one of the ways to increase productivity without increasing the acreage of land under cultivation,” she said.

She noted that despite [Africa having vast arable land](#), wildlife, and the highest equatorial mountains and tropical rainforests globally, it still has the second-highest number of hungry people after Asia. “It is unfair that one

in five African children is malnourished and goes to bed hungry. It is unfair that African farmers continue to lose their crops due to droughts or pests like fall armyworm or diseases like banana bacterial wilt when a solution is available in the form of genome-edited or genetically engineered crops. This project is here to appeal to minds through training stakeholders on the possibilities of new agricultural innovations.

“We look forward to countries regulating animal and crop products from GE technology based on scientific evidence. The Alliance is proud to be associated with IITA—Africa’s leading research partner that is already working on [genome-edited products](#) such as banana, resistant to brown streak virus,” Patricia said.

Patricia is now based in Nairobi, Kenya.

The project is funded by the Bill & Melinda Gates Foundation and will work with other institutions, including, [Open Forum on Agricultural](#)



IITA project manager of the Biotech Communication Capacity Building program, Patricia Nanteza.

[Biotechnology in Africa](#) (OFAB), [African Biosafety Network of Expertise](#) (ABNE), [International Livestock Research Institute](#) (ILRI), BeCA, national research institutions, and farmer organizations.

The Alliance for Science is a global science communication initiative based at Cornell University in New York, USA.

Remember these COVID-19 prevention and control measures

1. Wear face masks in public spaces
2. Maintain physical distancing of at least 2 meters
3. Wash hands and sanitize regularly
4. Practice respiratory hygiene
5. Stay at home when sick with related symptoms

**Safety is everyone’s responsibility!
Let us work together to stop the pandemic.**

Take responsibility! Stop the spread of COVID-19!

Always clean your hands; practice physical and social distancing; wear face masks properly; avoid crowds and public places; keep a 2-meter distance from the next person; and practice general sanitation and hygiene.

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“Having real-time upload of data allows supervisors to keep track of operations while away from the Station. If a problem occurs, I am aware of it almost at the same time as the people on the ground. It also simplifies reporting as data needed for reports can quickly be accessed, also from anywhere in the world,” [IITA](#) Banana Breeder [Allan Brown](#) explained.

While banana is an important food and cash crop for millions of subsistence farmers in developing countries, its yield is still low. In Uganda, for example, the average yield of banana is 10 t/ha/year, yet has a potential yield of 60 t/ha/year and above. The low yield is attributed to both abiotic and biotic constraints.

Banana breeding is the most feasible intervention to solve these constraints and involves several extensive steps. Accurately tracking a breeding program’s

progress and performance at all the different levels but BTracT simplifies this process. By helping identify the best hybrids without laboriously wading through reams of data, BTracT is transforming banana breeding and revolutionizing the whole process.

BTracT allows data capture on handheld devices, synchronizes data from various locations, and enables querying and analytics on a central dashboard. “This definitely makes data collection much more efficient and accurate, to the joy of the research assistants... We now receive data much more timely, usually the day after collection,” said Violet Akech, a research associate on banana improvement at the Sendusu station.

BTracT is now fully operational with the IITA banana breeding programs in Sendusu, Uganda and Arusha, Tanzania,

across the entire workflow. It is also fully integrated into [MusaBase](#), enabling seamless real-time data handling and data flow.

“We are now able to mine the data collected to improve the efficiency of the breeding program and also have important insights into biological processes that have been bottlenecks in banana breeding. We see this as an important step towards being a data-driven breeding program,” added [Trushar Shah](#), one of the system’s developers.

Several private companies involved in banana tissue culture and seedling distribution systems are already enthusiastic about adapting BTracT to their systems. The banana breeding team is working closely with all interested partners to extend the use of BTracT to these systems.

ENABLE-TAAT backed startups flourish in Kaoma

On a recent tour of startup activities by ENABLE-TAAT trained youth in Kaoma District, Zambia, [IITA](#) Southern Africa Research and Administrative Hub (SARAH) Director, [David Chikoye](#), commended youth agripreneurs for their flourishing enterprises. Chikoye visited the startups to monitor their work and progress. The 2-day visit allowed for in-depth interaction between the Director and the youth-in-agribusiness.

In 2018, ENABLE-TAAT conducted aquaculture and poultry training activities for a group of 30 youths in Kaoma. Afterward, the training recipients split into

three clusters: Innovative, Mulamatila, and Future Feeders youth groups. Before this time, these Kaoma youth had had very little exposure to aquaculture and poultry as sources of livelihood.

Chikoye inspected their current Food Basket, Fish Farming, Poultry, and Horticulture activities and was impressed. He applauded their efforts to showcase the youth-in-agribusiness initiative and the Technologies for African Agricultural Transformation (TAAT) through the Food Basket Demo establishment in Kaoma district.

The youth have currently renovated and fertilized three fish ponds in readiness for stocking. They are also constructing a one-thousand bird capacity poultry house.

The Director urged the youth to remain committed to their startups and encouraged them to establish more fish farming, poultry, and horticulture projects. He was hopeful to see more young people thriving in agribusiness. He further assured them of his continuing support, promising to return to Kaoma around June 2021 for a ‘braai’ (a local delicacy of roasted fish and sauce) when they would be harvesting their fish.



SARAH Director David Chikoye (fourth from left) with ENABLE-TAAT trained youth monitoring one of their aquaculture startups in Kaoma District.

Maiden Naija Farmer Reality TV show on a learning visit to IITA Abuja

The Co-coordinator and Chief Executive Officer, Dr Chigbo Okoli, and 15 Farm Mates of the maiden edition of the Naija Farmer Reality TV Show recently visited the [IITA](#) Abuja Station on a field tour. The visit provided an opportunity for the Farm Mates to see some aspects of agriculture taught in the Farm House. It showcased some of the latest technologies that IITA has developed.

The Head of IITA-Abuja Station, [Gbassey Tarawali](#), received the Farm Mates in a

welcome ceremony at the Institute. He gave a brief background on IITA's activities, highlighting the model, approaches, and lessons learned. He also spoke of youth employment through the agricultural value chains. He was emphatic that agriculture presented hope for the youth in Nigeria and Africa in general.

Following Tarawali's remarks, IITA Yam Seed System Specialist [Beatrice Aighewi](#) gave a presentation on "Recent developments in yam seed systems". She emphasized the

many opportunities that abound in yam seed multiplication.

In his response, the show's CEO thanked IITA management for the opportunity given to the Farm Mates to visit IITA. He explained the project's aim and objectives, among which was to provide a solution to youth unemployment and help resolve insecurity caused by youth restiveness and joblessness.

"Rounding up the over two months' stay in the House with an IITA tour will go a long way in buttressing the teachings received from different farm owners. We sincerely appreciate the opportunity to learn more in IITA," Okoli said.

The visit's highlight was the practical aspect that saw the Farm Mates cutting and planting yam vines at the screen house. Aighewi gave them a detailed lesson on the new technology of yam seed multiplication using vine cuttings. The Farm Mates also went to the cassava field, where they demonstrated their interest in going into the cassava value chain. The visit ended with a general tour of the Station.

Responding on behalf of the Farm Mates, Joyce Chinwende-Okoroji thanked the Management and staff of IITA. "We appreciate and will put in practice all that we learned in IITA today," she said.



Top: At IITA-Abuja, (L-R) Dr Beatrice Aighewi, Dr Chigbo Okoli, and Dr Gbassey Tarawali. Bottom: IITA staff with the TV show team and Farm Mates.