

## IITA gets biotechnology stewardship certification

After completing a three-year audit cycle, [IITA](#) has become a certified member of [Excellence Through Stewardship](#) (ETS). ETS is a global organization that promotes the adoption of product stewardship programs and quality management systems for the full life cycle of agricultural biotechnology products. IITA joined the ETS organization as a member in late 2016, marking its commitment to establishing the best quality management system and product stewardship practices.



IITA's ETS certificate.

Since joining ETS in 2016, IITA has been developing and establishing recommended biotech stewardship practices to meet ETS certification requirements under the leadership of [Leena Tripathi](#), Principal Scientist and

the new R4D Director for East Africa, who leads transgenic and genome-editing research at IITA. The IITA Plant Transformation Group has established a quality management system (QMS) and adopted several best practices, where

teams go above and beyond to meet and exceed stewardship requirements. The best practices include a documentation system, availability of critical records, accessibility of documents and standard operating procedures (SOPs), regulatory

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## Study lifts the lid on plantain consumer preferences, adds fresh insights for breeding programs

Over the years, breeders have developed and distributed high-yielding, disease-resistant plantain varieties, but adoption rates have been limited. To understand why, scientists from [CGIAR-IITA](#) have published the results of a [new study](#) revealing end-user (consumer) perspectives about desirable qualities/characteristics of the plantain fruit and its derivative food products.

The research, carried out within the [RTBfoods project](#), aims to identify quality traits that determine the adoption of new root, tuber, and banana (RTB) varieties developed by breeders in five African countries (Benin, Cameroon, Côte d'Ivoire, Nigeria, and Uganda).

The scientists published their research in the [International Journal of Food Science](#)



Plantain sold at roadside in Osun (Photo by Esme Stuart, IITA).

[and Technology](#) in September 2020. The study calls for plantain breeding programs to be aware of what end-users consider essential traits. Understanding this would ensure that they do not develop varieties that may have a higher yield and better disease resistance but lack the “must-have” quality traits that stimulate adoption.

According to the study, fruit pulp texture (firmness/softness), color, and taste stand out as the most critical fruit quality traits that impact plantain-derived food products. It suggests that, along with mainstream breeder-desired qualities such as fruit and bunch size, these three qualities should be essential selection criteria for new hybrids in plantain breeding programs.

The researchers gathered data through focus group discussions and key informant interviews in plantain farming communities of three states in Nigeria’s plantain growing belt—Delta, Osun, and Rivers.

The study also makes a strong case for breeding programs to seek localized understanding of the diversity of plantain food products and processing methods as a critical aspect for developing the next generation of hybrid plantain varieties. In particular locations, *dodo* (*fried ripe pulp*) may be a more popular plantain food product

than *boli* (*roasted unripe-ripe pulp*) or boiled plantain. Therefore, in such locations releasing a suitable variety for making good quality *dodo* is a step in the right direction towards successful end-user adoption.

The study also explores the question of whether plantain breeding programs could affect gender inequality. However, there was no evidence to indicate that quality traits for improvement could impact gender inequality. The researchers observed minor gender differences between men and women regarding preference for bunch size. However, this could only indicate that while men focus more on yield (for sale), women might have spread their preferences more over the other characteristics (related to home consumption) such as taste.

Citing some limitations of the study, IITA Social and Gender Scientist [Bela Teeken](#) notes that this study’s data was predominantly collected from rural communities and therefore offers a “part” of the bigger picture. “A large quantity of the plantain produced is sold out and transported for sale to consumers in urban areas. So we need further research on preferences related to urban use to complement the end-user preferences highlighted in this study,” he notes.



*Fried plantain or dodo is a popular dish in Nigeria (Photo by Delphine Amah, IITA).*

The study authors also call for “rapid progress” in developing breeding technologies that will support easy assessment of the important quality attributes identified, such as texture, color, and taste across the different stages of ripening in plantain.

“Most of these end-user preferred traits are influenced by several underlying physicochemical factors that may not be easy to select using current breeding tools,” explains [Delphine Amah](#), IITA Plantain Breeder. “Plantain is an important food security and cash crop, and we believe the outcomes of this study will result in major improvements in the next line of hybrid varieties that we shall offer to farmers,” she adds.

## **IITA gets biotechnology stewardship certification** Continued from page 1

compliance, and competent staff. There has been continuous and sustained training of the team and partners on stewardship and local regulatory requirements, e.g., National Biosafety requirements for biotech activities. The group has a shared understanding of Incident Response (External and Internal), Corrective and Preventive Action, and Continuous improvement through the training.

Member organizations have up to three years to complete the “ETS Global Stewardship Audit,” which a third-party auditor conducts to verify that stewardship programs and quality management systems are in place. IITA started this process early this year with an ETS Gap Assessment. An ETS readiness and internal audit followed in July 2020 to assess the Plant Transformation system, policies, and operations that drive and support the stewardship program;

check if the action plans recommended in the gap assessment were completed satisfactorily; and confirm IITA’s readiness for ETS Certification Audit. Between August and October 2020, the ETS certified external auditor reviewed the IITA Plant Transformation group’s operations in Kenya. Following the successful completion of the audit, Eric Van Ausdal, the ETS Director of Outreach & Membership, sent the Global Audit Certificate to recognize this accomplishment.

IITA receiving this [certification](#) means that the Institute has efficient biotechnology quality management systems in place. These systems or practices include but are not limited to responsible management, handling, governance, oversight, and traceability.

Stewardship is a lifecycle approach to product management. It is a responsible

way of managing agricultural technology products from their discovery to their development and use, and eventual discontinuation.

IITA becoming a certified ETS member, shows its commitment to stewardship of biotech-derived products and quality management systems for the full life cycle of agricultural biotechnology products.

The ETS audit included IITA’s biotechnology research and development based in Nairobi, Kenya with banana, particularly bacterial wilt resistant bananas and other crops such as cassava and yam. IITA is also moving higher up the biotechnology chain by using genome editing in its research.

IITA is planning to include its operations at Headquarters (Ibadan, Nigeria) in the next ETS audit. Tripathi is the contact person for ETS membership.



# Rwanda uses tricot approach to identify the best potato and cassava varieties in various agroecological zones

Governmental (and nongovernmental) agencies regularly develop and release improved crop varieties for the market. In some cases, varieties are released with little information about their performance outside controlled environments. In Rwanda, the Rwanda Agricultural and Animal Resource Development Board (RAB) has recognized this as a problem and looked for solutions to address the lack of information on the release of novel cassava and potato varieties.

The establishment of citizen-led trials across Rwanda hopes to provide information on the success of varieties across the different agroecological zones. Almost 400 tricot (triadic comparison of technology options) trials of new cassava and potato varieties have been created by [IITA](#), the International Potato Center (CIP), RAB, One Acre Fund, and the Alliance of CIAT and Bioversity International, as part of the two-year *Scaling tricot* project.

Tricot empowers farmers to select a variety they prefer across multiple characteristics. Tricot sees farmers given packages containing three randomly selected varieties, and they are requested to select which is the “best” and “worst” across these characteristics (e.g., yield, disease resistance, marketability). Through its exclusive use of digital tools, tricot reduces both the financial burden of trials and the burden on farmers through small plot sizes.

Tricot has been tested and validated globally and applies a more hands-off approach to on-farm trials, allowing farmers to follow their normal crop management strategies. This ensures more realistic on-farm conditions and reliable data for tricot’s analysis tool—ClimMob. This information could then be used to guide spatially explicit variety recommendations.

## How are trials conducted?

In tricot trials, a farmer receives a package of varieties, a guide for managing their trial, and an observation booklet. The farmer is ‘blind’ to the real names of the varieties until the end of the trial. Each farmer cultivates their varieties as they would with their own variety, observes the trials, and ranks the varieties throughout the trial. Farmers will identify which variety was “best”

and “worst” for a suite of characteristics. These preferences are then collected by project staff over the phone.

“We are using this innovative and proven citizen science approach in Rwanda to generate variety recommendations. Tricot allows us to move away from one-size, top-down recommendations. Farmers are in charge; they tell us which variety they prefer. When you bring hundreds of small trials together across very different environments, like we are doing, you generate a lot of data. This allows for robust analyses and after a few seasons will allow the project to generate spatially explicit variety recommendations,” explains Dr Rhys Manners, Data Scientist and project lead in IITA-Rwanda.

Reacting to the expected project outcome, Dr Placide Rukundo, the Potato Program leader at RAB said: “This approach will increase the adoption of new potato varieties because farmers are carrying out their observations and they will make their conclusion on the tested materials. On the research side, the tricot approach has important qualities to evaluate new crop varieties; it permits us to work with many farmers in various agroecological zones. Farmers provide the information on variety performance and the yield quality and quantity of tested varieties. With this approach, researchers are confident that the end product recommended by scientists will meet end-user preferences.”

For Dr Athanase Nduwumuremyi, head of the Cassava Research and Technology Transfer Program at RAB, “We are expecting this new approach to ensure

new cassava varieties are tested and delivered to many farmers in various agroecological zones and districts. The technology looks simple for farmers to participate. The traditional approach for on-farm trials in which a scientist/breeder leads all activities seems expensive, and farmers’ involvement is limited. For the tricot approach, much of the activities will be conducted by farmers and less by scientists/breeders. This will save resources that could be allocated for trial follow-up, data collection, and on-site trial visits by scientists/breeders. Also, it will facilitate new variety dissemination, increase farmers’ access to seeds of new varieties, and ultimately, it will accelerate the adoption of new varieties in Rwanda.”

The Scaling tricot project will go beyond identifying varieties using on-farm trials; it will also conduct consumer analysis to determine the marketable varieties. “Establishing the best varieties in terms of yield and disease resistance is great, but we need to go one step further and identify market preference through consumer analysis. We don’t want to be recommending unpalatable and unmarketable varieties,” Manners emphasized.

Funded by the CGIAR Research Program on Roots, Tubers and Bananas ([RTB](#)), scaling tricot project trials will reach 11 districts across Rwanda. These are Nyamagabe, Nyaruguru, Huye, Nyanza, Ngororero, Nyabihu, and Gicumbi for potato trials and Bugesera, Kamonyi, Ruhango, and Nyanza for cassava varieties trials. Both potato and cassava are major food and cash crops grown throughout Rwanda.



*Planting the first tricot trials for cassava and potatoes.*

# Rural female farmers contributing more to Cameroon's local economy—IITA-CARE study

According to a 2014 [International Labour Office](#) (ILO) study, about half a million young women and a quarter of a million young men can grow food, make goods, and provide services to others in Cameroon. However, several challenges impede the impact of their activities. The study shows that these factors comprise unemployment, poverty, and underemployment, despite agriculture being the highest labor-employing sector (about 70% of Cameroon's workforce).

A recent study carried out by Djomo Raoul under the [IFAD-funded IITA-CARE](#) project explored young female grain farmers' contributions in rural Cameroon to the local economy.

While Cameroon's agribusiness practice operates in a market economy way, findings from the study show that young female maize farmer-marketers pay more for farm labor than their male counterparts. This phenomenon indicates their impact on the rural economy, unlike the rice farmer-marketers who pay less than their male counterparts do for labor. More women market their rice for higher prices than their male counterparts.

Although the female maize farmers pay more for labor, which is better for the local economy, it also means lower returns for them, unlike the male maize farmers who also have access to credit. According to the study,



*IITA scientist in a maize-cassava intercrop field with farmers.*

when farm laborers receive a living wage, more non-farm workers can also earn a living wage, as earnings are spent and earned and otherwise cycled through the local economy. Where farm laborers go unpaid, fewer people can afford to purchase goods and services from others, so less money cycles through the local economy. Thus, those who pay for farm labor contribute more to their local rural economy than those who do not.

According to Raoul, farmers who pay for labor contribute more to the local economy in the Far North Region, North Region, and the West Region of Cameroon where the study was carried out, than those who do not.

The study also showed that maize and rice production and marketing in Northern and Western Cameroon contribute to higher living standards among locals, raising local food security and promoting development in rural communities, where nearly half the population lives.

The findings reveal that if more young Cameroonians choose agribusiness entrepreneurship, they can partially solve rural un- and underemployment, especially among young women. Young women can also be as productive and successful as young men, especially at producing and marketing grains like maize and rice if policymakers can establish enabling environments through gender-positive policies.

## Take responsibility! Stop the spread of COVID-19!

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

### Got a story to share?

Please send your story with photos and captions every Tuesday to [iita-news@cgiar.org](mailto:iita-news@cgiar.org) or Katherine Lopez ([k.lopez@cgiar.org](mailto:k.lopez@cgiar.org)) and Uzoma Agha ([u.gha@cgiar.org](mailto:u.gha@cgiar.org)) for headquarters and Western Africa, Catherine Njuguna ([c.njuguna@cgiar.org](mailto:c.njuguna@cgiar.org)) for Eastern and Southern Africa, and David Ngome ([d.ngome@cgiar.org](mailto:d.ngome@cgiar.org)) for Central Africa.

