

Musa project develops hybrids of local Tanzanian cooking banana “Mchare”

The banana breeding team at [IITA](#), in partnership with the national research team in Tanzania, has developed hybrids of one of the most popular cooking bananas in Tanzania and part of the East African Highland cooking banana called “Mchare.” These hybrids were bred with disease-resistant wild bananas and are high yielding with high levels of resistance against key pests and diseases.

This exciting new achievement has been developed as part of the five-year initiative [Breeding Better Bananas](#), which seeks to boost banana production in Uganda and Tanzania. The initiative is led by [Rony Swennen](#), IITA Senior Banana Breeder.

The breakthrough was among the achievements reported at the third annual project planning meeting held recently at [Nelson Mandela African Institution of Science and Technology \(NM-AIST\)](#), Arusha, Tanzania, 23-25 April.

“Mchare banana is vital to the economy and food security of the Tanzanian Northern highlands and are also very important in Uganda, Kenya, DR Congo and islands of Eastern Africa. Currently, there are no improved Mchare banana varieties available to farmers. Instead, farmers have been growing their own varieties, which unfortunately are low yielding and very susceptible to deadly diseases, especially Fusarium Wilt disease,” said [Allan Brown](#), IITA Banana Breeder in charge of the *Mchare* breeding efforts.

“Here at the Nelson Mandela African Institution of Science and Technology, we have now developed the first ever hybrids in the history of the crop in Tanzania,



Dr Allan Brown, IITA Banana Breeder in charge of the Mchare breeding efforts talking to visitors about the multi-partner banana improvement research project.

and this year, they have been planted out into the field for further evaluation. This represents a giant leap forward, but much of the credit belongs to the IITA staff consisting of young Tanzanian men and women who have worked tirelessly on this. They come from this region and know how much it means to the farmers in the area,” he adds.

The guest of honor at the meeting, Cyprian Ebong, the interim Executive Secretary of the [Association for Strengthening Agriculture Research in East and Central Africa \(ASARECA\)](#), applauded the project and the efforts it is making to boost regional banana production. He also noted that while the global export value of banana has steadily increased from US\$9 billion to \$11.8 billion between 2012 and 2016, the

share of this market for African countries has been minimal.

“There are only two African countries among the top 10 banana exporters, Cameroon and Côte d’Ivoire. And one of the reasons for this is the very low productivity of banana. This project is making use of modern science to improve banana, which gives us hope for improving the crop’s production,” he said.

Ebong further congratulated the project for developing improved hybrid *matooke* in Uganda as well as the *mchare* varieties, towards closing the yield gap; identifying molecular markers that are associated with desirable traits to speed up the breeding process, while major efforts to train future banana researchers

in Africa are being made through the support of numerous MSc and PhD students.

“The technologies being developed within this initiative also have the potential to be scaled out across other vegetatively reproduced crops, such as cassava and sweet potato,” he added.

Feedback from the project’s scientific advisory committee at the close of the meeting was particularly positive. They singled out the strengthened communication and collaboration across the various project objectives and work package teams. The project is composed of five work packages, which represent the major objectives of the project; each work package has a team of researchers working towards these objectives with partners coming from a range of organizations and countries across the world. Everybody is working towards the main project goal of speeding up banana breeding.

“We have noted improved cohesiveness across the project teams, which is great to see. The capacity building efforts of the project are working very well. Keep up the good work and do not lose sight of why you are doing it,” said [Steve Rounsley](#), Senior Director, Applied Genomics at [Genus PLC](#) and Chair of the Committee.

The first work package, [Banana breeding pipeline](#) led by the [National Agriculture Research Organization](#) (NARO)-Uganda consists mostly of banana breeders. Its principal objective is to improve banana breeding efficiency and to speed up the process. The team has developed the first *mchare* hybrids and are also pretesting hybrids of another East Africa highland cooking banana, *matooke*, developed in collaboration between IITA and NARO and thus named [NARITA](#).

The second work package, led by [Stellenbosch University](#), South Africa, is focused on the [control of pests and diseases](#). The team is conducting studies to better understand the pathogenicity, spread, and damage caused by these pests and diseases, as well as to develop rapid diagnostic tools and faster screening mechanisms to quickly identify resistant varieties. The major diseases that are being addressed by the project are Fusarium wilt and black leaf streak diseases (Sigatoka disease), while the major pests are the



The guest of honor, Cyprian Ebong, the interim Executive Secretary of ASARECA giving his speech.

plant parasitic nematodes (microscopic worms) and banana weevils. The team has established that black Sigatoka disease is spreading to new areas, perhaps due to climate change.

Work package three, [leveraging the genetics of traits in banana breeding](#), seeks to identify and make use of genetic and genomic tools to develop molecular markers or predictive models for early selection in banana breeding. It is led by the IITA team in Uganda.

The fourth work package, [evaluating end users’ preferences](#), led by [Bioversity International](#), has been conducting detailed participatory studies with farmers to understand their preferences. It has also been conducting multilocational participatory varietal selection (PVS) with farmers to ensure that new varieties are acceptable to farmers, consumers, markets, and other users. Key to this work package are the national research partners in Tanzania and Uganda with field trials in Bukoba, Arusha, and Mbeya (Tanzania), and Kawanda and Mbarara (Uganda).

Work package five, [harnessing data](#), has been responsible for setting up [MusaBase](#), a database that enables banana breeders to easily collect, store, and share their breeding data as part of efforts to improve the efficiency of their efforts and to create global access to all the data (genotypic and phenotypic data as well as field layouts). This is led by the [Boyce Thompson Institute](#), USA.

Capacity building is key to this initiative with numerous MSc and PhD students actively involved and supported in the project. Students enthusiastically presented posters to share their research findings during the meeting. The project also organized a two-day workshop on technical writing to support students and research staff in scientific writing skills. This was conducted by [Scriptoria](#).

Running parallel with the science writing course, IITA and [Swedish University of Agricultural Sciences](#), Sweden, jointly organized a Genomics Selection in Plant Breeding workshop—from theory to practice, conducted by distinguished scientists [Dr Jose Crossa](#) ([International Maize and Wheat Improvement Center - CIMMYT](#), Mexico) and [Dr Paulino Pérez-Rodríguez](#) ([Colegio de Postgraduados](#), Mexico).

The Breeding Better Bananas project presents a concerted effort by a multitude of partners from across the globe to speed up banana breeding in East Africa. The initiative is led and coordinated by IITA but the work is conducted in close cooperation with the national partners in Tanzania and Uganda as well as international partners from Australia, Belgium, Brazil, the Czech Republic, India, Kenya, Malaysia, South Africa, Sweden, and the USA.

This project is being conducted within the framework of the [CGIAR Research Program on Roots, Tubers and Bananas \(RTB\)](#).

Photo reports

Africa RISING in Malawi and Zambia

The Africa RISING project management team recently visited different project sites in Malawi and Zambia. The five-day visit to the two countries provided an opportunity to review the implementation of project activities and assess how farmers are applying the technologies promoted by Africa RISING.

During the visit, the management team also got an opportunity to interact with farmers and get first-hand feedback on the value of the technologies.

See the Zambia visit photo report: <https://spark.adobe.com/page/6mgR6jpa6wpVG/> and the Malawi visit photo report: <https://spark.adobe.com/page/6mgR6jpa6wpVG/>.



R4D Special

Assessing impact of AR4D technologies on poverty reduction in farm households in Central Africa

Over the years, both researchers and nonresearchers have often wondered whether agricultural research-for-development (AR4D) interventions by research institutes have contributed significantly to reducing poverty in smallholder farmer households in Africa. To resolve this challenge, a team of researchers led by [IITA](#) socioeconomists carried out a study titled "[Who benefits from which agricultural research-for-development technologies? Evidence from farm household poverty analysis in Central Africa](#)", published in the World Development, ScienceDirect journal. The study was carried out to demonstrate to AR4D institutions, donors, policy makers, and other stakeholders which technologies actually contribute to poverty reduction in many smallholder households in Burundi, DR Congo, and Rwanda.

The researchers observed that AR4D technologies were often evaluated without reference to the different groups of people in the country, therefore, they said there has not been much evidence on the distributional impacts of the technologies. To fill in this knowledge gap, they evaluated the degree to which different AR4D technologies—improved crop varieties, crop and natural resource



CIALCA introduced many AR4D technologies to farmers in Central Africa. Photo by P. Lepoint, Bioversity International.

management technologies, and postharvest technologies—contributed to poverty reduction among adopting farm households in Burundi, Eastern DR Congo, and Rwanda.

Using the poverty index in each of the country, the researchers identified the households that benefit most or least from adopting certain components of AR4D technologies. Finally, they investigated the impacts of the intensity

of adoption of AR4D technology components on farm household poverty distribution. Their findings provide useful information for prioritizing research investment decisions for effective poverty reduction and contribute to literature on agricultural evaluation..

For practical purposes, the team used the [Consortium for Improving Agriculture-based Livelihoods in Central Africa](#) (CIALCA) project to demonstrate how

different AR4D technologies contributed to poverty reduction. The CIALCA project which comprised three CGIAR centers—IITA, [Biodiversity International](#), and the [International Center for Tropical Agriculture](#) (CIAT)—was established towards the end of 2005 in Burundi, Eastern DR Congo, and Rwanda. Its main goal was to overcome the effects of the conflicts that had disrupted food production and exacerbated rural poverty in selected communities through improving agricultural productivity.

The selection of intervention communities was based on having similar characteristics, namely, reasonably high poverty levels with low food and nutrition security, highly degradable soils but with high agricultural productivity potential, relatively good access to local markets, and the presence of development organizations. CIALCA developed and disseminated 30 AR4D technologies in selected communities in the three Central African countries including: improved crop varieties (IV); crop and natural resource management (CNRM) technologies; and postharvest (PH) technologies including processing, storage, and marketing.

The researchers collected data from 2,665 randomly sampled smallholder farm households in Burundi, Eastern DRC, and Rwanda using a standardized questionnaire. The adoption of AR4D technologies was measured based on self-reported adoption of CIALCA improved varieties, CNRM, and postharvest technologies. At baseline, all farmers had not been exposed to CIALCA technologies and hence there was no adoption. Then farmers were exposed to CIALCA technologies through local development partners such as agriculture-based organizations having activities in the study areas. CIALCA trained local partners and transferred CIALCA technologies to them through farmer groups. In some areas CIALCA trained farmers directly and at the same time disseminated technologies to them.

The team's findings from the impact assessment of agricultural interventions



Training women farmers in DRC.

at both the micro and macro levels have demonstrated that adoption of AR4D technologies reduced rural poverty by about 13% from about 60% of poor adopters. A large share of the poverty reduction was attributable to adoption of improved crop varieties (32%) followed by postharvest technologies (28%), while adoption of CNRM technologies contributed 26% with the rest (14%) being attributed to unmeasured factors.

These findings, the researchers said, “reflect two interesting policy propositions: first designing program interventions that can support easy access to postharvest technologies along with affordable, improved seeds can accelerate the rate at which rural households can move out of poverty, suggesting that efforts to outscale AR4D technologies are essential for sustained poverty reduction.”

Furthermore, their findings showed that the impact on poverty reduction attributable to adoption of postharvest technologies is nearly equal to the impact attributable to adoption of improved crop varieties. However, they contended that without improved crop varieties and CNRM technologies, the impacts attributable to postharvest technologies

are limited, and/or not sustainable.

The team's findings from their sample of households in Central Africa further showed that adoption of different components of AR4D technologies have varying impacts on poverty reduction. On the one hand, the relatively poor farm households make high productivity gains from adopting improved seed that are more likely to enable them to improve their expenditure power towards the poverty line. On the other hand, adoption of postharvest technologies that induce agricultural commercialization enable the relatively better off farm households to move out of poverty much faster than adoption of other AR4D technologies. Their findings further indicate that adoption of crop and natural resource management technologies tend to benefit both the relatively poor and better households in pursuit of improving household incomes the same way.

The team of researchers comprised John Herbert Ainembabazi, [Tahirou Abdoulave](#), [Shiferaw Feleke](#), [Areaga Alene](#), Paul M Dontsop-Nguezet, Pierre Celestin Ndayisaba, Cyrille Hicintuka, Sylvain Mapatano, and [Victor Manvong](#).

Got a story to share?

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Youth Minister from Côte d'Ivoire lauds IITA Youth Agripreneurs' projects

The Minister for Promotion of Youth, Youth Employment, and Civic Engagement of Côte d'Ivoire, The Hon. Sidi Tiémoko Toure, lauded the [IITA Youth Agripreneur](#) program in Tanzania and said that he is "impressed with the program and convinced that agriculture holds great potential for tackling youth unemployment in Africa."

The Minister said this during his recent visit to the [IITA Eastern Africa \(EA\)](#) hub in Dar es Salaam, Tanzania, to learn about the Institute's Agripreneur program which engages youth in agribusiness.

The government of Côte d'Ivoire is establishing a similar program this year under the Empowering Novel Agri-Business-Led Employment (ENABLE) youth program funded by the [African Development Bank](#) (AfDB) and led by IITA as a major partner. The visit was therefore an opportunity for the team to learn first-hand from the IITA-Tanzania Youth Agripreneurs.

During the visit, Hon. Toure toured the IITA-EA hub offices at Mikocheni, Dar es Salaam, and the Kwembe Youth Excellence Center, approximately 50 km south of Dar es Salaam where the youth carry out their agribusiness enterprises. These include production of animal feed, keeping of poultry (layers and broilers), rearing of rabbits, processing of cassava into high quality cassava flour, and fish farming.

"I am impressed with what I have seen. It clearly shows what the youth can do if we trust them and give them support," said Hon. Toure.

"The opportunity for agriculture to address the problem of youth unemployment and securing food for the rest of the population is immense. These are the two common challenges we are facing in many countries here in Africa. There are so many businesses we can create along the value chains that the youth can engage in," he added.

The Hon. Minister and his party were received by a team from IITA-EA hub composed of [Adebayo Abass](#), Value Chain Specialist, and [Regina](#)



The Côte d'Ivoire Youth minister (second from left) listening to IITA Tanzania Youth representatives explaining about their livestock feed production process.



Côte d'Ivoire Youth minister (center) in a group photo with some of the IITA Tanzania Youth Agripreneurs and IITA staff.

[Kapinga](#), IITA Head of Advocacy and Resource Mobilization, who are also the youth mentors, and some youth Agripreneurs. Also present were [Eveline Odiambo](#), Regional Administrator; Edith Kazimoto, Senior Human Resources Officer; and Eveline Massam, Communication Assistant.

"We have learnt a lot from this experience and we now see many

opportunities in agriculture. Our target is to mobilize more youth to engage in agribusiness and to expand our businesses. However, the attitude of youth towards agriculture is still a major challenge as many of them perceive agriculture and agribusiness very negatively," Veronica Kebwe, the IITA-Tanzania Youth Coordinator, told the minister during the visit.

According to Kapinga one of the challenges facing the youth as they try to engage in agribusiness is lack of access to loans and funds due to tough financial requirements. This in turn limits the youth's prospects to grow and expand their businesses, hence,

the need to involve many stakeholders and especially policy makers.

The Minister said his ministry had already selected the first 20 youth drawn from various regions in the country to undergo business

incubation. He also said the Ministry would like IITA to provide guidance and technical backstopping. He was also keen on the youth in Côte d'Ivoire to visit and spend time with the team in Tanzania and Nigeria to learn hands-on skills and be inspired.

Workshop on “Validation of the revised and harmonized standards for seed system in DRC”

On 4 April, [IITA](#) organized a workshop on the validation of the revised and harmonized standards for healthy cassava plant materials production, control, and certification. This was coordinated within the framework of the [Action to Control Cassava Brown Streak Disease in the Democratic Republic of Congo](#) (CBSD-DRC) project.

The workshop was chaired by the General Secretary for the Ministry of Agriculture, Mr Evariste Bushabu, who officially opened the session. It registered the participation of several institutions involved in seed regulation, including the National Seeds Service (SENASEM) and the National Agricultural Research Institute (INERA) and IITA as well as donors such as the [Food and Agriculture Organization of the United Nations](#) (FAO), [United States Agency for International Development](#) (USAID), and PDPC.

In his opening speech Mr Bopeming welcomed the efforts of IITA, INERA, and SENASEM, not only for updating of standards for the production of healthy cassava stem but also for the implementation of a strong seed system sector with the aim of agricultural production improvement in DRC. He pointed out that only the seeds from registered varieties in the national catalog can be multiplied and marketed through the country from now.

He also thanked the donors for their long-standing support of providing



L-R: Dr Nzola Mahungu, Country Representative of IITA-DRC; Ir Augustin Kadima, delegate of USAID; Evariste Bushabu, General Secretary of the Ministry of Agriculture; Clement Kandu, Coordinator of SENASEM, at the workshop on CBSD.

the tools for good management of the cassava plant subsector in DRC.

Welcoming the participants, Country Representative of IITA-DRC and Coordinator of the CBSD project, [Nzola-Meso Mahungu](#), stated that for good productivity in the agricultural sector, Africa—in particular Congo—needs to produce a quality seed system for the development of value chains. So it is “necessary to review and harmonize the national seed system standards for the regulation of healthy cassava plant production to allow the plant material producers

to contribute more in fighting CBSD, which mainly spreads by stem cutting exchanges, as well as other diseases.”

Also, Mahungu used the opportunity to welcome the support of USAID by funding the promotion of the cassava crop in Africa and particularly in DRC.

Participants at the workshop included delegates from the University of Kinshasa, FAO, Ministry of Agriculture, [HarvestPlus](#), USAID, IITA, INERA, SENASEM, National Service of Popularization (SNV), and the private/youth sector.

Events

- 7th International Food Legume Research Conference, 6–8 May, Palais des Congrès, Marrakech, Morocco
- GCP21 IVth International Cassava Conference: Cassava: Cassava Transformation in Africa , 11–15 June, Cotonou, Benin