

IITA and CRS sign MoU to strengthen strategic partnership to improve rural livelihoods

Catholic Relief Services (CRS) and IITA have formalized their ongoing strategic partnership to leverage their complementary strengths better to achieve common goals.

to formalize this collaboration and continually learn to more effectively work together by bridging the research-to-development divide.

IITA and CRS have developed more effective programming of projects in a range of geographies in Africa and topics that support smallholder farming communities. IITA's Deputy Director General, Partnerships for Delivery, Kenton Dashiell and CRS Vice President Shannon Senefeld signed the MoU on behalf of the two organizations.

Through the MoU, IITA and CRS have identified a range of potential areas for collaboration. These include sustainable landscapes/soil and water management, climate change adaptation and mitigation including drought resistant varieties and supply chain engagement, payment for environmental services, impact evaluation, knowledge management and capacity development, market access and inclusive business models, nutrition, beans and cassava, and dry-season forage options.

Continued on page 2



Women farmers admire improved cowpea variety from IITA.

The two organizations, with their shared aim of empowering poor and vulnerable people through solutions that strengthen health, wellbeing, and livelihoods of families and communities, have been

working together for many years and have developed novel ways of engagement.

The two organizations recently signed a memorandum of understanding

STMA trains Francophone stakeholders on proficiency upgrade

A 5-day training course on variety testing and seed production of open-pollinated and hybrid seed was held 21–25 August at IITA, Ibadan, for stakeholders from Francophone partner countries of the Stress Tolerant Maize for Africa (STMA) Project.

The training aimed at upgrading the skills of field technicians, seed specialists of public and private institutions, and production managers of seed companies in the conduct and management of field trials, techniques of quality seed production,



Tahirou Abdoulaye giving a presentation at the STMA training.

and management of seed business, particularly hybrid maize seed. Nineteen participants from Mali (10) and Benin (9) took part in the course. During the training, the representatives were briefed on the major achievements of the Drought Tolerant Maize for Africa (DTMA) Project which has now metamorphosed to STMA.

Speaking at the opening session, [Michael Abberton](#), IITA Deputy Director, Research for Development, West Africa, applauded the participants, and wished them a successful course. He went on to highlight the significance of maize and seed systems as a key component of the value chain. "Maize is not only a major food crop important for food security, but it is also used as a key input in animal feed industries. The crop has become a major source of household incomes and provides employment to input dealers and other auxiliary service providers," Abberton stated.

[Baffour Badu-Apraku](#), IITA Principal Scientist and Maize Breeder, explained that the training was necessary to instill a better understanding of handling variety

and inbred line maintenance and breeder seed production of STMA techniques to participants. "...This training course is very important. At least 60% of the course time will be devoted to hands-on experience. This will guarantee good skills, full understanding of maize variety testing, and seed production," Badu-Apraku said.

A maize selection expert, Coulibaly Mamadu, from Mali, expressed his heartfelt appreciation for the training and assured the dissemination of the experience, knowledge, and information received to other seed experts in Mali.

As a way of ensuring strong partnership and encouraging innovation for sustainable maize production among the participants, [Tahirou Abdoulaye](#), IITA Outcome/Impact Socioeconomist for West Africa, highlighted the urgency to effectively and efficiently produce foundation and certified seed of both open-pollinated and hybrid varieties in their respective seed companies. "I am positive that if the participants put all the experiences acquired into practice, they would

greatly improve their performance, skills and capabilities," he added.

The training comprised lectures, demonstrations, practical sessions, and assignments. Presentations were made on constraints to maize seed production and deployment, facilitating the establishment and operation of seed companies, various experimental designs, management of trials and seed production fields, data collection and analysis, types of maize varieties and hybrids, mechanics of seed production of open-pollinated hybrids, and community-based seed production.

In conclusion, Dr Laouli Mohammed Nasser urged the participants to put into practice the knowledge they learned and replicate it in their respective countries.

STMA is coordinated by the International Maize and Wheat Improvement Center ([CIMMYT](#)) and [IITA](#). It is funded by the [Bill & Melinda Gates Foundation](#) and the United States Agency for International Development ([USAID](#)).



Group photograph of STMA participants and the organizers.

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According to the MoU "By formalizing this collaboration both IITA and CRS will be well positioned to connect knowledge and insights from a range of disciplines, including the natural sciences, to solve complex challenges facing the rural poor."

"CRS and IITA have a special relationship that bridges research and development to produce major impact for the rural poor in Africa. We continually seek opportunities

to collaborate to advance our common agenda, looking for synergy between our complementary capacities."

The partnership between CRS and IITA is based on a hybrid approach between research and development. In this approach, research findings and capacities are aligned to development needs in a pragmatic way; research and development actors collaborate to document and reflect on advances; and,

collectively, all participants learn about what works well to provide sustainable rural livelihoods for the rural poor in diverse contexts.

In the MoU, the agreements that will govern the expectations of the two organizations and any donor requirements, financial terms, intellectual property terms, or other organizational requirements applying to a specific collaborative effort, are clearly spelled out.

N2Africa success stories: Rwanda

This is the first in a series of articles on the beneficiaries of the N2Africa project, a large-scale, science-based, research-in-development project focused on putting nitrogen fixation to work for smallholder farmers growing legume crops in Africa. The project which is now halfway through its second phase is working in DR Congo, Ethiopia, Ghana, Kenya, Malawi, Mozambique, Nigeria, Rwanda, Tanzania, Uganda, and Zimbabwe. The first stories will focus on beneficiaries from Rwanda.

Claudine Mukayakode dreams big

Soybean production and processing have changed her status in the society

Before N2Africa's intervention, Claudine Mukayakode, 47, from Mareba secteur, Bugesera District, did not consider soybean an important source of income. She grew some of it to feed her family as it is a rich source of protein. However, today, and thanks to the technologies introduced by the project to not only increase soybean production but to also process it, soybean has changed farming for the married mother of six children. She is on her way to becoming an entrepreneur.

"Before N2Africa, I had no development agenda. I intercropped the crops in my farms—beans, soybean, maize, and cassava—in no particular order. As a result, my soybean production was very low although I enjoyed growing the crop because I knew that by feeding my children with soybean, they would not have kwashiorkor," she said.

"When N2Africa project was started in 2010, I was selected among its first partners because I was already growing soybean and was a committed farmer. Now my farming skills for soybean have improved because I was selected to participate in the dissemination of new technologies on soybean and bean production."



Claudine and her husband Manassé.



Climbing beans in Rwanda. (Photo by Neil Palmer/CIAT).

N2Africa introduced technologies to maximize yield in the fields through intercropping and rotation of key staples, maize and cassava with soybean and common bean and the use of appropriate inputs such as organic matter, inoculum and fertilizers, and improved high-yielding varieties.

"These technologies resulted in increased yields and made me realize that soybean could produce as much or more than beans. I therefore intensified my soybean production and whereas before I used to get 30 kg from my small piece of land (0.125 ha), production went up to 270 kg and it was extraordinary.

"In 2013 I was part of a group of 26 women who were trained on the different ways of processing and adding value to soybean. Here my dreams of a better life started because I saw that the 30 kg of soybean I had at home was worth more than 100 kg of beans. During this training, I learned how to make tofu, soymilk, dumplings, soy tea, and others."

After the training, Claudine started processing her soybean using local material such as the mortar (Isekuru) and pestle (Umuhini) into milk, tofu, and the popular donut balls for sale and her business grew.

My business grew and soon I could not satisfy the demand from my customers and once again the N2Africa project helped me by granting an electric machine to pound the soybean. Today, I am a supplier of soybean-based products and am recognized throughout the Bugesera

District. My business has allowed me to move from category 1 of Ubudehe (socioeconomic categorization of the population in Rwanda) to category 3.

Claudine is not done yet. She wants to expand her business and operate beyond the District of Bugesera and also get her products certified by the [Rwanda Standards Board \(RSB\)](#). She also wants to reach out to other women who participated in the training with her so they can join her and become shareholders in a company that she intends to set up. In future, she sees herself as a President and CEO of a soybean processing plant that would produce various products.



Claudine processing soybean.

Celestin Gashirabake: From a subsistence farmer to an agrodealer

[Gashirabake Celestin](#) is a member of [TWIZERANE Farmers Association](#) which has been working with [N2Africa](#) project since 2010 when it hosted two agronomic trials showcasing new improved varieties and the use of inputs. Through the project, the group, which has 25 members, has learned about and adopted new improved farming practices that have seen their legume yields increase tremendously.

“Before N2Africa started working with us, we used to grow our crops traditionally. We did not use improved crop varieties or apply any fertilizer. The crop yields were always low. However, after we started interacting with the N2Africa project team, we saw the difference between the new improved technologies and our traditional farming methods, especially on the use of inoculation for soybean coupled with the use of DAP fertilizer and planting in rows. They significantly increased production of bush bean and soybean,” he said.

“As a group, we used to produce only for home consumption. We shared among ourselves what we produced. To illustrate how much we have benefited from N2 Africa, we used to produce 80–100 kg of bean and share it among the 25 members. With improved technologies introduced by N2Africa, we have increased production to nearly 400 kg,” he said.

Celestin was selected by the members of his group to become the lead farmer and was trained by the N2Africa project to assist other farmers in biological nitrogen fixation (BNF) technologies. He also participated in study tours organized by the project.

“I attended several training sessions organized by N2Africa around BNF, including a study tour to Western Kenya to visit farmers growing soybean for collective marketing. From there, I changed my perception of agriculture and moved away from subsistence to commercial farming. My group, TWIZERANE, started a community-based seed production enterprise”.

“I also started selling the seeds of the new bean and soybean improved varieties (produced by the group) to other farmers. Since there was no store selling inputs in our community (Musenyi), I introduced mineral fertilizer (DAP) and pesticides, because farmers were asking for them and for advice on how to use them. Because I was trained on agronomic practices, I was capable of helping them”.

Celestin's aim was to become a certified agrodealer in his sector of Musenyi to supply inputs to his fellow farmers. He therefore made it his responsibility to get certification for input distribution. This was



Celestin standing outside his agrodealer shop.

to support farmers' adoption and the use of any of the inputs introduced in the sector to farmers.

“I made an application to the [Ministry of Agriculture \(MINAGRO\)](#) in 2014 for the certification to permit me to sell inputs. Because of the technical knowledge I had acquired from the N2Africa project, which had been empowering me for more than 4 years, I was able to participate in a training organized by the National Agro Dealers Network, and received a certificate to sell agricultural inputs as an authorized agrodealer,” he said.

With this certification, Celestin applied for and received a loan from a [Savings and Credit Cooperative \(SACCO\)](#) of 1 million RwF and with his savings of 1 million RwF, he used these to grow his business. Starting with a bag of DAP (50 kg) he increased to 5 bags (250 kg) and from 2 bags (100 kg) of urea per season. In 2016, he sold 11 t of fertilizers (DAP and urea) and nearly 5 t of seed (2 t soybean, 1 t maize, and 1.5 t bean). This season, he is expecting to reach 15 t.

Celestin is also selling soybean inoculants, hermetic storage (PICS) bags, vegetable seeds, agriculture tools, and pesticides. This initiative has made timely access to inputs every season to farmers in Musenyi sector. He reaches approximately 6000 farmers each season.

According to Celestin, the awareness created in the community through the exposure to N2Africa technologies made sale of fertilizers and seeds more demand driven, making sale of inputs easy.

“My next step will be to open another shop in the next community to help farmers from that village because they walk long distances to come to my current shop. I will also buy a motorbike to facilitate my travels around to provide technical advice to other farmers. I will also extend my shop to have a separate space for storing fertilizers and seeds and add other items like safety equipment. I also intend to start collecting

soybean from farmers and sell to Soyco Mt Meru Company.”

N2Africa in Rwanda

N2Africa started working in Rwanda in February 2010 in the first phase of the project. It partnered with the [government Rwanda Agriculture Board \(RAB\)](#) to research on technologies and three national NGOs to disseminate technologies to the beneficiaries.

Geographical location: The project covers five administrative districts, two in the high altitude Northern Province for work on climbing bean and one district in the southern Province, and two districts in the Eastern Province for work on soybean and bush bean crops. In total the project covers 13 action sites from five districts. To date the project has reached more than 30,000 households directly with BNF technologies. These beneficiaries were reached with direct dissemination packages and/or a demonstration plot hosted by farmers' groups/cooperatives.

Technologies disseminated: N2Africa worked to promote and boost the production of soybean and common bean—both climbing for high altitude areas, and the bush bean type for the other areas. Farmers were given a dissemination package based on the technology being promoted. These included:

1. Bush bean and cassava Intercrop: With seeds of improved high-yielding bean varieties, mineral fertilizer, and cassava cuttings plus a field book with protocol on land preparation and crop management.
2. Climbing bean and maize rotation: Seed of improved high-yielding varieties of climbing bean, mineral fertilizer plus a field book for the rotation.
3. Soybean and maize rotation: Seed of improved high-yielding soybean and maize varieties, fertilizer, inoculant, and a field book.

The technical message was about increasing crop productivity and improving soil fertility through biological nitrogen fixation with legume crops.

Scientists identify first-ever genetic markers associated with resistance to two deadly cassava diseases

Scientists identify first-ever genetic markers associated with resistance to two deadly cassava diseases. A team of scientists have successfully identified genetic markers linked to resistance to Cassava Brown Streak Disease (CBSD) and Cassava Mosaic Disease (CMD) in two cassava varieties—Namikonga and Albert—grown by farmers in Tanzania. The varieties can withstand the devastating CBSD and CMD, respectively. The markers can be used to speed up the long and expensive conventional breeding process for cassava varieties with dual resistance to the diseases.

Namikonga and Albert, which are genetically related, have been grown by farmers in hotspot areas for many decades and have shown high resistance for a long period. Namikonga is tolerant to CBSD but highly susceptible to CMD whereas Albert is highly susceptible to CBSD but resistant to CMD.

The international team, drawing scientists from Tanzania, Kenya, South Africa, and the United States, crossed the two Tanzanian varieties and studied a large population of the progeny over two seasons in two disease hotspot areas in the country. They detected the main resistance to CBSD on chromosomes 2 and 11 and that of CMD on chromosome 12. Several other genomic regions in different chromosomes had a minor influence on the expressed resistance.

The team has published their findings in a paper titled "[QTL associated with resistance to cassava brown streak and cassava mosaic diseases in a bi-parental cross of two Tanzanian farmer varieties, Namikonga and Albert](#)" in the *Theoretical and Applied Genetics: International Journal of Plant Breeding Research*.

CMD and CBSD are among the greatest constraints to production in East, Central and Southern Africa where cassava is a major crop for both food and income for millions of smallholder farmers and nearly all varieties are susceptible to either one or both diseases. In Tanzania, the second largest cassava producer in East Africa after Uganda, the diseases have reduced yield by more than half from 10.5 t/ha to only 5.5 t/a in the last 20 years.

Efforts to control the diseases were initiated in the early 1930s at the East African Cassava Research Institute at Amani in North-eastern Tanzania. Due to a lack of resistance in cassava varieties, the breeders made crosses with wild cassava species and successfully developed several hybrids. Namikonga is suspected to be one of them and has subsequently been adopted by the local communities and given a local name. To date, Namikonga is one of the best sources of CBSD resistance in conventional breeding programs. Namikonga and Albert are genetically related through a West African cassava variety TME117.

"The studies have enabled us to better understand the location of genes we suspect are associated with resistance to CBSD in the DNA of the farmer-preferred cassava variety, Namikonga, and CMD in the variety Albert. Once validated, this will help speed up breeding through marker-assisted selection (MAS) which shortens the breeding cycle and reduces the offspring population that breeders have to work with. Breeders will be able to quickly narrow down from the thousands of offspring to only those with the desired markers," says Esther Masumba, a molecular breeder from



Cassava roots affected by CBSD which causes a dry brown root.

the Ministry of Agriculture, Livestock and Fisheries, Tanzania. She was part of the research team and conducted this study as part of her PhD studies at the University of Pretoria, South Africa.

The application of molecular markers in breeding and selection of crop varieties can reduce both breeding time and costs.

"We are very happy with the findings of our studies which are a result of over six years of research. It is an important milestone in the efforts to revive cassava production in East, Central, and Southern Africa where the two diseases continue to threaten the region's food security."

"For West Africa, where there is great fear of CBSD spreading and with devastating effects on the food security, the markers can assist in preemptive breeding," adds [Morag Ferguson](#) a molecular breeder from IITA and also one of the team members.

The research team will now continue to validate these markers for their applicability in marker-assisted breeding (MAB).

Announcements

- **RTB-Independent Steering Committee (ISC) Annual Face to Face Meeting**, Dar es Salaam, Tanzania, 6–8 September 2017
- **Africa RISING going to scale in Eastern Province of Zambia Review and End-of-Project Meeting**, Lusaka, Zambia, 7–9 September
- **Hands-on Basic Molecular Biology Techniques**, IITA, Ibadan, Oyo State, Nigeria, 11–15 September
- **International Workshop on Measures to Control the Spread of Maize Lethal Necrosis in Africa**, IITA, Ibadan, Oyo State, Nigeria, 25–28 September
- **R4D Week**, IITA, Ibadan, Nigeria, 20–24 November
- **Basic Bioinformatics Workshop**, IITA, Ibadan, Oyo State, Nigeria, 23–25 November

Got a story to share? Please email it with photos and captions every Wednesday to Katherine Lopez (k.lopez@cgiar.org), Jeffrey T. Oliver (j.oliver@cgiar.org), Catherine Njuguna (c.njuguna@cgiar.org), or David Ngome (d.ngome@cgiar.org).