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Africa RISING partners kick off phase 2 with a science for impact event

Approximately 80 people representing different organizations and a diverse group of partners in agricultural research and development gathered in Dar es Salaam to participate in the Africa RISING science for impact event. The 17–19 January meeting also doubled up as a launch event for a second 5-year phase of the USAID-funded Africa RISING program. The choice of venue, Tanzania's port city of Dar es Salaam, bore a historical significance—this was the "birthplace" of the program 5 years ago.

Irmgard Hoeschle-Zeledon, Manager Africa RISING East/Southern Africa and West Africa projects.

Participants at the Africa RISING science for impact event in Dar es Salaam.

Over the 3-day event, participants, including implementing partners from six Africa RISING countries, representatives from USAID, and local and international development organizations reviewed the research achievements of Africa RISING phase 1 while at the same time proffering options for the next step—getting the technologies (at scale) into the hands of smallholder farmers.

Day 1 focused on phase 2 elements, zooming in on what had changed, what was new, and what remained from phase 1, and a poster-bus-stop process that went on to day 2, providing a rich 360⁰ view of the technologies developed, tested, and refined by partners from the six program countries.

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Scientists say new spacing could guarantee more yield for cowpea

CGIAR scientists are recommending a new spacing regime for cowpea that could give farmers up to 79% more yield if adopted. The new spacing is a result of a study on the Effects of plant density on the performance of cowpea in Nigerian savannas, conducted during the 2013 and 2014 growing seasons at the IITA experimental stations in Kano and Zaria.

The study addressed the need to devise a viable alternative that would help limit the bottlenecks that farmers undergo in cultivating cowpea—a highly nutritious crop yet easily susceptible to *parasitic weeds*, and pest and disease infestation. It looked at the large disparity in farmers' yield (0.3 Mg/ha) and yield obtainable on experimental plots (1.5–2.5 Mg/ha) and proposed simple agronomic practices that could help reverse the trend.

Cowpea is both a delicacy and livelihood crop for many African households.

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By simply adjusting plant density, researchers found that grain yield significantly improved from 1.20 Mg/ha for a density of 133,333 plants per ha to 2.16 Mg/ha for a density of 400,000 plants per ha. Yield also increased by 68% when planted at a density of 266,666 plants/ha and 79% when planted at a density of 400,000 plants/ha.

These findings could potentially benefit over 20 million people in West and Central Africa depending on cowpea for their livelihood.

But how can the smallholder African farmer immediately start getting more from his field? The study explains that in addition to planting improved cowpea varieties, farmers must immediately change from using the current 75 by 20 cm spacing with two seeds planted per stand (this spacing gives 133,333 plants/ ha) to double or triple rows on ridges spaced 75 cm apart to achieve corresponding densities of 266,666 and 400,000 plants per ha, respectively.

According to the study, these densities gave higher crop performance in terms of light interception, biomass production, yield, and yield components.

"The answer is very simple. Since cowpea like any other grain crop in northern Nigeria is grown on ridges spaced 75 cm apart, the only option to increase plant density is to increase the number of rows planted per ridge from 1 to 2 or 3 rows. This way, smallholder farmers can increase cowpea grain and fodder yields if they adopt a density of 266,666 plants or more per ha in cowpea cultivation," said the scientists.

The study was conducted by IITA's Alpha Kamara, Abdullahi Tofa, Stephen Kyei-Boahen, Reuben Solomon, and Nkeki Kamai, and Hakeem Ajeigbe from the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT).

Africa RISING partners kick off phase 2 with a science for impact event **Cont'd from page 1**

Day 3 assessed various scaling models and approaches used to achieve impact at scale.

Big, achievable vision of success

In his opening remarks, IITA Director for Central Africa and Chair of the Africa RISING Program Coordination Team Bernard Vanlauwe explained the targets and ambitions of phase 2 of the program. "We have achieved a lot in terms of identifying best-bet technologies in phase 1. In the second phase we therefore need to adopt dynamic scaling approaches to ensure that these technologies get into the hands of millions of farmers who are counting on us. While this is something we (as project implementers) have expressed a lot of appetite for, our donor—USAID—has made this an imperative for us as an extra motivation," he said.

At the program level, Africa RISING has set itself a target to scale sustainable innovation technologies to more than 1 million households in the six project countries through various development partnerships. The program is working on various arrangements for co-investment for wider uptake and adoption of its outputs which will in turn generate a "partnership dividend" that allows a research project like Africa RISING to actually generate impact at scale.

Continuity with evolutionary change

"Africa RISING phase 2 will be a fine blend between continuity from phase 1 and evolutionary change," explains Peter Thorne, Africa RISING Ethiopia Project Manager. "IITA and ILRI will continue leading the program, which will retain its geographic focus on Ethiopia, Ghana,

Bernard Vanlauwe, Africa RISING Program Coordination Team Chair.

Malawi, Mali, Tanzania, and Zambia. IFPRI will lead on data management, monitoring, and impact assessment. And ILRI will continue to lead a communication and knowledge sharing component at program level," he added.

The three regional projects that make up the Africa RISING program—West Africa, Ethiopia, and East/Southern Africa, will therefore use lessons, where appropriate, to improve the program's ways of operating (for example, in terms of cross-project harmonization). This will significantly broaden engagement with development partners which, backstopped by target Africa RISING research, will be able to generate impact on Feed the Future target indicators at scale.

"To achieve the best results, the Africa RISING program has to channel the wealth of experiences and lessons learned from phase 1 and make them into successful implementation strategies and plans for the second phase," notes Irmgard Hoeschle-Zeledon, Manager, Africa RISING West Africa and East/Southern Africa Projects.

Program-wide synergies will be built around shared analyses, common research questions, coordinated communities of practice, and learning supported at the program level by investments in M&E, communications and knowledge sharing, and a light coordination structure.

At a critical point and building on good foundations

Siboniso Moyo, ILRI program leader and Africa RISING Program Coordination Team member, notes that the shared vision and commitment by project partners are two critical elements that currently abound within the program, hence the optimism.

"Africa RISING is not the culmination of a journey, but a continuation of one that we all set off on 5 years ago. We had extensive synthesis in the first phase. I am certain you all appreciate that there were great achievements in the first phase, but we also have to learn from some challenges. We are at a critical point, transitioning from one phase to another and we are confident that we have good foundations to build on. We can visualize together and commit to delivering on set objectives of the program which we will all come back to in 5 years' time and check that we have delivered," she said at the close of the event.

Controlling the twin viral cassava diseases in East Africa through breeding—major victories, but fight is far from over

Cassava farmers in Eastern Africa have been watching in despair as two viral diseases—cassava brown streak disease (CBSD) and cassava mosaic disease (CMD)—ravage their valuable crop. Edward Kanju, IITA cassava breeder based in Tanzania, has spent the last 11 years at the Institute leading regional efforts to develop improved cassava varieties with tolerance or resistance to the two diseases. He shared his 11-year journey, progress and challenges at a recent seminar presentation at the IITA Eastern Africa hub in Dar es Salaam, Tanzania.

According to Kanju, IITA started cassava research in the region in 1984 by establishing the East and Southern Africa Research Centre (ESARC) in Uganda. In 1994, the East African Root Crops Research Network (EARRNET) was formed to address the outbreak of the CMD pandemic. The disease, which causes discoloration and curling of the leaves, affecting photosynthesis, drastically reduces yield. It was first reported in Uganda in the 1990s and had rapidly spread to neighboring countries.

"The collaboration of IITA, EARRNET, and the National Agricultural Research Organization (NARO) of Uganda led to the release of 12 improved cassava varieties with good resistance to CMD between 1993 and 2003," Kanju said.

"Through EARRNET, these varieties and hundreds of promising breeding lines were shared and released in the neighboring countries of Burundi, DR Congo, Rwanda, and Tanzania by their respective national research systems. Planting materials were made readily available to farmers through various initiatives such as the Crop Crisis Control Project (C3P) and the Great Lakes Cassava Initiative (GLCI). We were very successful in combating CMD," he said.

In 2004–2005, when the researchers were winning the war against CMD, a new disease arrived on the scene in Uganda. This was CBSD. It was actually not a new disease since it had been reported to be endemic in the coastal lowlands of Tanzania, Kenya, and Mozambique in the 1940s. However, this was the first time it was reported to have spread in mid-altitude areas.

The disease was worse than mosaic disease because its symptoms were not obvious until the roots were harvested and the dry brown rot was found when chopping or peeling. The roots then could not be used in any way, not for food for humans or livestock or for any raw material.

The lead cassava breeder at NARO asked IITA for CBSD-resistant germplasm from its breeding program in Tanzania. As a result IITA sent 5,000 botanical seeds derived from CBSD-tolerant cultivars grown in Tanzania. In 2012, out of the 5,000 seeds shared, 14 derived breeding lines were found to be resistant to mosaic disease but only three showed resistance to CBSD.

Out of the three, the Uganda government recently (2015) officially released one (MM 2006/0130–NARO-CASS 2). All three promising clones are now extensively used as parents to generate better performing new varieties in the country. Seeds from these families have also been shared with the national breeding programs of Burundi, DR Congo, Malawi, Rwanda, and Tanzania to broaden their cassava genetic base and be able to develop new improved varieties suitable for their agroecologies.

In searching for other sources of resistance the team introduced germplasm from IITA-Ibadan: "We also requested germplasm from IITA Ibadan, West Africa, to screen for resistance to CMD and CBSD and have identified two genotypes that are doing very well. They have been evaluated under high disease pressure at Sendusu, Uganda, since 2005 to date," Kanju said.

The breeding efforts have also gone hi-tech and are using advances in biotechnology to reduce the time it takes to deliver new varieties: "We are also working with molecular geneticists to identify the sources of resistance in varieties which are showing good resistance to the diseases. With such information, we will be able to use marker-assisted breeding to reduce the breeding time to less than six years. We will also be able to stack together the different resistance genes in new varieties," Kanju said.

Edward Kanju.

Five countries (Malawi, Mozambique, Kenya, Uganda, and Tanzania) have also come together to speed up breeding for resistance/tolerance to the two diseases. They have shared their five best materials which are being tried along with local checks in various sites in the five countries. This is under an initiative known as "The New Cassava Varieties and Clean Seed to Combat CBSD and CMD" (5CP) led by IITA.

Therefore, according to Kanju, while a lot has been accomplished in the last 11 years there is still a lot to be done to control the two diseases. For instance, there is a great need to pyramid genes of resistance to the two diseases so as to decrease the probability of resistance breakdown.

"There is also a need to develop truly CBSD resistant varieties. Truly resistant varieties have very low virus concentrations and therefore will not spread the diseases easily as tolerant ones," he said.

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 Adaobi Umeokoro (a.umeokoro@cgiar.org).

Global partnerships for improving cassava

Cassava is a tough plant. It can withstand drought and grow in marginal soils while still yielding its crop of starchy roots. Its roots can stay in the ground, waiting for harvest until other food sources run low. But breeders and scientists in Africa are working to make cassava even tougher, developing varieties that are resistant to pests and disease.

One of those researchers is Ismail Yusuf Rabbi, a cassava geneticist at IITA in Ibadan, Nigeria. He visited the Boyce Thompson Institute (BTI) and Cornell University last week to discuss his ongoing collaboration with NextGen Cassava, a Cornell-led project funded by the Bill & Melinda Gates Foundation and the Department for International Development (UKaid). The project aims to use Big Data to accelerate cassava breeding.

Rabbi Ismail.

Cassava is vital to food security and serves as a major staple crop in Africa, Latin America, and some parts of South Asia. But its production is threatened by cassava mosaic virus and cassava brown streak disease as well as several pests. Rabbi and colleagues are working to develop varieties of cassava that are resistant to these diseases. They also aim to increase the starch content of the tubers and to develop high-yielding varieties which will reduce pressure on the limited land and water resources.

"I can say that there has not been a more exciting time to be a researcher on the continent and to work on a crop that feeds more than 500 million people," said Rabbi.

Cassava breeding is a slow process, but Rabbi and colleagues from IITA, the National Root Crops Research Institute (NRCRI) in Nigeria, and the National Crops Resources Research Institute in Uganda hope to speed things up using the genetic resources in NextGen's cassavabase.org, which can help breeders to pick the best parental varieties and provides a unified platform for sharing cassava breeding information.

"It's a great tool to have because, first of all, it's open access meaning that the data that we produce can be used not only by ourselves, but by the cassava breeding community worldwide." They can also record their field observations directly using handheld tablets or phones.

Rabbi is working with BTI's Associate Professor Lukas Mueller to develop efficient ways to collect and store data and with Geneticist Jean-Luc Jannink of the USDA Agricultural Research Service to use that data to better predict the performance of new varieties. IITA also partners with national breeding programs in Nigeria, Tanzania, and Uganda to improve cassava crops.

"There's an African saying which goes like this: 'walk alone and go faster, or walk together and go farther,'" said Rabbi. "We're happy to work with BTI and anyone else who is willing to come with us on this journey."

To improve cassava crops, IITA partners with the NRCRI breeding centers in Nigeria, the National Crops Resources Research Institute (NaCRRI) in Uganda, and, most recently, the Department of Research and Development in Tanzania. Other partners include the US Department of Energy, and educational and training programs at the West African Centre for Crop Improvement in Ghana and Makerere University in Uganda. *-contributed by Patricia Waldron, BTI*

Installation of GEM rice parboiling technology improves local rice production and business in the Lafia IP

The SARD-SC rice commodity value chain, executed by AfricaRice, in collaboration with National Cereals Research Institute, has installed energy efficient GEM rice parboiling technologies and innovations in the Lafia Innovation Platform, Nasarawa State, Nigeria. In addition, a total of 1,215 rice parboilers, including 915 women and 300 men, were trained on processing and value addition of locally produced rice and the efficient use and management of the GEM rice parboiling technologies.

The formal launch of the Lafia IP took place recently and was attended by the IITA/ SARD-SC project Coordinator, Chrys Akem and AfricaRice representative in Nigeria, Francis Nwilene.

Akem remarked that the SARD-SC project has faced challenges in effectively addressing gender equity on the active involvement of women in project activities. He noted that the deployment of the GEM rice parboiler in the Lafia IP has fully demonstrated that pairing gender-sensitive technologies with a positive institutional change can significantly bring about gender mainstreaming into agricultural projects.

The representative of the Emir of Lafia, Hassan Ahmed, pledged support and commitment from the local authorities for the progress of the IP.

As part of the IP process, the capacity of 37 youth groups has been developed in rice processing and value addition as well as operation of equipment and farming tools. The Lafia IP also received a milling machine and other farming equipment from AfricaRice through the Japan Emergency Rice Initiative.

To date, over 1,200 women households have been reached through the GEM technology and innovations in the IPs in

Lafia Innovation Platfrom members working on the GEM technology parboiler.

Nigeria. The GEM is being rolled out in combination with enhanced packaging and branding of locally produced rice to attract urban market rice-consuming households and contribute to raising incomes of women and employment opportunities for youth in the rural economy. Significant changes have been observed in Nasarawa as a result of the GEM installation and training: improved quality of parboiled local rice, increased incomes, job creation, positive mindset towards collective action, and improved well-being of rice parboilers who are members of the IPs.

The quality of the parboiled rice is already attracting consumers within and outside the community of Lafia. A total of 249 customers bought IP rice for consumption while 50 bought for trading. The chairman of the Lafia IP, Jonathan expressed his satisfaction thus: "We like the efficiency of the GEM facility and the new methods to process rice. With the installation of the GEM facility combined with the training on its use, our members have changed their mindset in rice processing and they have adopted good processing practices."

Furthermore, other rice farmers outside the IP have started reaping the benefits of their training on the use of the GEM technology at the individual household level. One such people is Martha Shagar, a member of the Women parboiler group, *Ayimon*, based in Lambaga village, Lafia. She said "I find the new methods and practices to process rice very useful and more efficient than our traditional processing activities. The quality of my rice is better than before and the profit also increased. With the new technology, I got a profit of 20,000 Naira on a bag of 120 kg. Thanks to the SARD-SC project and AfricaRice."

CNN report features IITA scientist

Last month, CNN reported on "*Armyworm invasion destroys crops in southern Africa*" which featured Georg Goergen, IITA's entomologist. The report highlighted the destructive potential of the new invasive species that was recognized early by Goergen following its initial detection in West Africa and focused on the spread of the fall armyworm and the havoc the caterpillar is causing in Malawi, Zambia, and Zimbabwe.

Goergen Georg.

Earlier last year, the pest was reported to have invaded Nigeria and Togo and expanded its range in eastern Africa. It is now speculated to invade Kenya and Tanzania if control is not established.

Goergen is currently involved with research efforts to find actionable solutions to control the caterpillars. Another article on this was also published in "Spektrum der Wissenschaft", the German equivalent of Scientific American.

Armyworm invades and causes severe yield loss for many crops of economic importance.

'Super Farmer Reality TV Show' crew visit IITA-Abuja

The promoters of the 'Super Farmer Reality TV Show' visited IITA, Abuja station to "seek areas of mutual collaboration."

The high-powered team was led by the former DG of National Orientation Agency (NOA), Idi Farouk and former Executive Director of Programs and Board Member of Nigeria Television Authority (NTA), Peter Igho.

They expressed delight at the IITA Youth Agripreneurs model and thanked IITA for establishing the youth in agribusiness program.

The Head of IITA-Abuja Station, Gbassey Tarawali, who received them, expressed appreciation to the visitors for coming to see "how the IITA Youth Agripreneurs works" and requested the visitors to send a formal expression of interest on the intended collaboration with IITA.

The Super Farmer Reality TV Show is a 13-week TV reality show that promotes Youth Agripreneurship. It is the first of its kind in Nigeria and IITA Youth Agripreneurs are expected to feature in the show which would be shown on local television channels in Nigeria such as NTA, AIT, and Channels TV stations.

A group photograph of staff of the IITA Abuja station with visiting team.

IITA Youth Agripreneurs in Kinshasa commence horticulture and fish farming

The IITA Youth Agripreneurs in Kinshasa (IYAKIN) have fashioned two new business initiatives to help provide nutritious meals for DR Congo nationals. This move is a response to the challenges of food insecurity and growing poverty in the country.

The young farmers say they are joining efforts with government through agribusiness to fight food insecurity, which continues to affect rural and urban populations, particularly Kinshasa, the city's capital. As a result, IYAKIN is leveraging on agribusiness as a way out and has begun fish and horticulture farming in Kasangulu—a rural county located 35 km away from downtown Kinshasa on the main road to the port city of Matadi. On this 5.5-ha field, IYAKIN now cultivates pepper, sweet melon, okra, tomato, radish, and eggfruit; and also stocked three ponds with over 5,000 fingerlings of catfish *(Clarias* sp.*)* and *Tilapia* to be sold in Kinshasa and its environs later this year.

"Horticulture and fish farming are two value chains that are contributing to the reduction of poverty in DR Congo. These ventures are highly profitable because of their high demand and the added health benefits that they give," said Ghislain Mbesse, IYAKIN Communication Officer.

The Agripreneurs also hope that the new enterprises will create jobs for other youth and also contribute to the reduction of imported horticultural products into the country.

Left: Sandrine Bussa, an IYAKIN gives feed to the young fingerlings in the pond. Right: Agripreneurs tending their vegetable field.

ATASP-1 set to begin nationwide training of youth on seed production

The Agricultural Transformation Agenda Support Program, Phase One (ATASP-1) has concluded plans to train over 200,000 youth nationwide on seed production, processing, and packaging.

This decision was reached during a strategic meeting held in Abuja to discuss the process of implementation. Speaking after the meeting, the ATASP-1 Outreach Program Coordinator, Gbassey Tarawali explained that the training has huge potentials to "create employment and wealth across the value chains of the three ATASP-1 mandate crops—rice, cassava, and sorghum."

The National Coordinator of ATASP-1, Haruna Akwashiki, stated that the training would commence in February and would be conducted in three locations—ICRISAT Kano, NCRI Badeggi, and IITA Kubwa-Abuja. Akwashiki explained that the program was aimed at "closing the demand gap in seed production in Nigeria."

The Technical Consultant to the program, O. Oyebanji, lauded the idea of "creating youth seed entrepreneurs, as it will reduce youth unemployment and the seed deficit in Nigeria."

ATASP-1, which is a five-year program being implemented in the seven states of Kano, Jigawa, Enugu, Anambra, Niger, Kebbi, and Sokoto, aims "to contribute to employment generation and shared wealth creation along the commodity value chains (cassava, rice, and sorghum), as well as food and nutrition security."

Cross section of participants brainstorming on issues during the meeting.