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Researchers address challenges facing Zambia's aquaculture value chain

As the global population increases, leading to more consumption of animal protein, aquaculture remains as the key to delivering proteins and micronutrients to people, especially in low-income countries such as Zambia. Aquaculture is an economic activity with the potential to be as important as agriculture for smallholder producers, in terms of socioeconomic development and food security.

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Female researcher (middle) with fish farmers in Zambia.

Orphan legumes: Key to food security in Africa

Africa's growing population, expected to reach 2.5 billion by 2050, is taking its toll on food production and consumption. This is a major source of concern for governments across the continent.

Despite rich biodiversity and excellent potential for self-sufficiency in food production, several challenges, such as land degradation, climate change, lack of access to fertilizers, poor agricultural infrastructure, banditry, and insurgency, are continuously impeding sustainable agriculture, leading to low agriculture productivity, among other issues.

The Africa yam bean—the flowering plant, tubers, and dried bean pod—is an orphan crop with a huge potential to address food security.

To address these challenges, IITA-CGIAR is deploying research technologies across 30 countries to help smallholder farmers access improved varieties and clean seeds and increase productivity. With Africa's food security dependent on a few major crops, and many of them providing only basic energy sources in diets, there is a need to address the combination of zinc, iron, and vitamin A deficiency as well as the high hidden hunger index (HHI) in sub-Saharan Africa.

A recent study explored indigenous African orphan legumes and their potential for food and nutrition, crop diversification, and climate resilience. According to the study carried out by researchers from IITA's Genetic Resources Center (GRC) and the University of Ibadan, promoting the cultivation of African orphan—neglected or underutilized—crops due to their cultural linkage with the regional food habits of the communities in Africa can improve food and nutrition security.

These orphan crops, particularly legumes, are nutritionally rich foods with untapped genetic diversity, which adapt to harsh climate conditions and poor marginal soils. These legume crops also contribute to improving soil fertility because these crops can nodulate and fix nitrogen with varying degrees of effectiveness.

According to the study, despite the wide distribution of orphan legumes across sub-Saharan Africa, these important crop species have low yields. They are rarely used partly due to a lack of improved varieties and adequate research attention. Hence, the availability of large and diverse germplasm collections is an essential resource for crop improvement on the continent.

IITA-GRC conserves a collection of orphan legumes, particularly the Bambara groundnut, African yam bean, and Kersting's groundnut, that have been characterized and evaluated for their key traits in crop improvement efforts.

The study reveals that new collections are also being built to fill gaps and widen genetic diversity. These will support breeding that can be used further with Genomic-assisted breeding (GAB) tools to develop faster, cost-effective, climate-resilient cultivars with high nutrition value for farmers.

However, this requires a significant investment of resources for applying modern breeding to orphan legume crops if their full potential is to be realized. There is limited climate modeling research done on indigenous orphan legumes. So, more efforts are also needed now to model future climate signals for orphan legumes compared to other major food crops of Africa.

Despite their impressive climate resilience and nutritional profiles, using conserved collections in crop improvement has been limited due to a lack of knowledge on phenotypic and molecular diversity information. Presently, several genomic research activities, including genetic diversity, linkage mapping, and marker-trait association, are in progress using genotyping by sequencing at IITA-GRC.

Many African indigenous legumes are almost forgotten and are no longer widely cultivated due to factors such as high cost of inputs, lack of improved varieties, little or no research on some of the crops, long cooking time, and low seed yield. Hence, there is an urgent need to capture this diversity to avoid genetic erosion and extinction.

The study summarized the economic potential, utilization, and constraints to yield production in these three orphan crops as research on them is still far behind compared to other legumes such as cowpea, groundnut, and soybean.

A successful hybridization of the available landraces can make a difference in promoting an alternative to diversifying the African cropping system and food diets. Under the harsh climate regions of Africa, orphan legumes could be used as an alternative crop to avoid complete crop failure due to climate change. With the use of GAB, this hybridization can contribute to developing improved varieties that yield more and have improved resilience and high nutritional value. This could help address food shortage and nutrition deficiencies among the rural population. It could also generate income for women and rural farmers in Africa.

Contributed by Timilehin Osunde

Africa yam bean seeds.

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Zambia is a landlocked country in southeast Africa, endowed with water bodies. Fish from the "capture fisheries" in the country are usually the only accessible and affordable source of animal protein for resource-poor populations in rural areas, providing 55% of the animal protein in Zambian diets. Fish is also a key source of income, food, and nutrition. However, capture fisheries no longer meet the national demand for fish.

A significant challenge confronting the development of the aquaculture value chain in Zambia is ensuring that the larger scale commercial sector can continue to grow and generate economic benefits for the country while simultaneously safeguarding inclusive and sustainable growth of smallholder production systems.

Researcher talking to women producing nutrient-dense fish powder.

Smallholder fish farmers in Zambia.

Recently, researchers from various agricultural organizations, including IITA, carried out an in-depth, mixed-method aquaculture value chain study in Zambia to provide relevant stakeholders with necessary information on the contribution of aquaculture to economic growth and its inclusiveness, as well as social and environmental sustainability. The information would help stakeholders decide on the proper intervention process to employ.

The results revealed that for smallholders to achieve better production outcomes from fish farming, they need improved access to inputs and other necessary resources, such as training to increase their management skills, and links to output markets that demand their products. Results also showed that increasing the supply of microfinance to farmers would increase their access to improved fingerlings and feeds. The researchers stated that there should also be efforts to strengthen technical knowledge of aquaculture and business skills.

The researchers also pointed out the need to design and test appropriate aquaculture labor-saving technologies with women, men, and youth, with a focus on testing and promoting integrated aquaculture systems and water management practices to enhance the productivity of smallholders. They added that comprehensive studies of the smallholder aquaculture sector are also needed to determine the right innovations, such that technologies developed by stakeholders in the sector would address the needs of smallholder farmers and other value chain actors.

Steven Cole, IITA Senior Scientist and Gender Specialist, mentioned that the technologies would also need to address the social and gender issues that constrain women from meaningfully participating in and benefiting from aquaculture in Zambia.

Contributed by Ochuwa Favour Daramola

STEP targets Rwandan expansion

In line with its founding objectives, the Start Them Early Program (STEP) has continued to create opportunities in the agricultural sector for young, school-age children in three African countries—DR Congo, Kenya, and Nigeria. To pursue this further, the TAAT-STEP project team in DR Congo recently embarked on a four-day visit to neighboring Rwanda, exploring expansion opportunities to reach young people in the country.

The STEP delegation—Samuel Mugambi, Welissa Mulei, Bobo Tangabanga, and Kavunja Kusinza—met with the Nyamasheke District Vice Mayor for social and economic affairs, Hon. Athanasie Mukankusi. The meeting resolved that the team would use IITA's existing presence in Rwanda to facilitate collaboration on knowledge transfer to enhance the value of Rwandan youth through STEP projects in secondary schools.

The team also visited two schools in the district: Saint Nicholas School, Nyamasheke, and EAV Ntendezi School, Nyamasheke. Afterward, the TAAT-STEP team met with the IITA Rwandan Country Representative Matieyedou Konlambigue to discuss concerns and a strategy to get the initiative off to a strong start. Konlambigue assured the team of his complete support to ensure the success of Rwandan collaboration.

Contributed by the STEP Team

The STEP team with Sister Marie Marguerite, the School Supervisor at Saint Nicholas School, Nyamasheke.

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.

Got a story to share?

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

Tanzanian District Commissioner applauds IITA for empowering youth in agribusiness

Malinyi District Commissioner Mathayo Maselle has praised IITA for providing youth with opportunities in agribusiness through capacity building and empowerment after visiting the Institute's booth at the recent National Farmers Exhibition "Nane nane" held in Tanzania's Morogoro region.

IITA promoted the IITA Youth Agripreneurs (IYA) incubation program, which empowers youth in agribusiness. IYA has trained young agripreneurs across Africa on mindset change, agribusiness activities, and proposal writing and has facilitated access by youth to credit through partnerships with financial institutions. "Youth empowerment is a good initiative. The government has been in the forefront in issuing loans; training youth on where to invest will help solve the employment challenge we are currently facing," Maselle said.

Moreover, the District Commissioner applauded the technologies and innovations IITA displayed during the exhibitions. He highlighted the need to enhance strong collaboration between the government and IITA to ensure that the country and the population are aware of and benefit from the technologies that develop the agriculture sector. He noted that this would increase food security and improve income and livelihoods for smallholder farmers.

Visitors at the IITA booth were interested in the innovations and services offered by IITA's youth program and requested more information. "I would like to advise my fellow youth to respect and value agriculture, especially agribusiness because it provides us with food and income," said Farida Juma, a 28-year-old vegetable farmer from the Kibaha district.

"You are doing great work. I suggest using media to promote this program so that you can also reach out to marginalized people in the villages where more youth need these opportunities," advised Karata Hendrish, a 24-year-old from the Tanga region.

During the *Nane nane* exhibitions, Tanzanian Prime Minister Hon. Kassim Majaliwa launched a new youth initiative, Building Better Tomorrow: Youth Initiative for Agribusiness (BBT-YIA), under the Ministry of Agriculture. The BBT program's primary goal is to enhance youth engagement in the agricultural sector for sustainable and improved livelihoods. It will contribute to Agenda 10/30, which envisages increasing youth employment and attaining a 10% growth rate in the agricultural sector by 2030.

Contributed by Hadi Rashid

IITA research associate, Jacob Njela (left) creating awareness on the cut-single–node technology for producing cassava seeds in a short period. Photo: Hadi Rashid/IITA

IITA Executive Assistant, Director's Office, Veronica Kebwe showing one of the cakes made by a group of youth who underwent training to Malinyi District Commissioner, Mathayo Maselle, and how to use the Nuru App at the IITA booth. Photos: Hadi Rashid/IITA