

Research finds no basis for farmers' negative perception of the quality of fertilizers in Tanzania

Soil fertility and nutrient management are crucial factors in crop production. However, fertilizer adoption in Tanzania (and indeed Africa) remains below the recommended rate contributing to poor crop yields and poverty. This is partly due to farmers' persistent belief that the quality of fertilizers in the market is substandard.



A Tanzanian farmer evaluating beans with NPK fertilizer applied at an IITA demonstration plot.

However, a recent study titled "[Misperceived quality: Fertilizer in Tanzania](#)", published in the *Journal of Development Economics* found no reliable evidence to support farmers' beliefs that the fertilizers available to them in local markets were of poor quality.

The study found that farmers judged the nutrient quality of the fertilizers through physical attributes (visible caking, powdering, foreign material like bugs or small bits of dirt, or discoloration). Many fertilizers appeared degraded, and farmers relied on these observable attributes to incorrectly assess nutrient content. This reduced their trust in fertilizer and their willingness to buy.

The study, led by Hope Michelson, Associate Professor at the Department of Agricultural and Consumer Economics, the [University of Illinois at Urbana-Champaign, USA](#) in collaboration with [IITA](#) and the [University of Sussex](#), explored the reasons for the underuse of fertilizer. **to page 2**

American Phytopathological Society honors IITA scientist

[IITA](#) Principal Plant Pathologist [Ranjit Bandyopadhyay](#) has been recognized as a Fellow of the [American Phytopathological Society \(APS\)](#). He will receive the award in July 2021 during the APS annual meeting. APS grants this honor only to a few members to recognize distinguished contributions to plant pathology. Fellow recognition is based on significant contributions in one or more of the following areas: original research, teaching, administration, professional and public service, and/or extension and outreach.



Dr Ranjit Bandyopadhyay has had a long and distinguished career in the CGIAR system. Photo: IITA Communication

Bandyopadhyay has a 42-year-long and distinguished career at two CGIAR centers—[ICRISAT](#) and IITA. He has conducted and led important research in multiple host-pathogen systems and has helped resolve some critical plant disease problems. However, his most significant efforts have been in reducing aflatoxin contamination through biocontrol using atoxigenic fungi.

He moved on-the-shelf concept technology into development and commercial application through multi-institutional, multinational, and multidisciplinary partnerships to address the complexities of aflatoxin contamination. This effort has inexorably changed the tactics used for aflatoxin control, providing safer food for consumers, increasing the profitability and safety of crops, and consequently, the incomes of smallholder farmers and crop-associated industries in many African countries.

His ability to work through complex issues with people whose agendas do not always overlap underlies the massive success of the Aflasafe Initiative,

which he founded. He has been the driving force behind the initiative—from research to commercialization. His ability to promote a vision of Africa with much smaller losses due to toxin contamination to a broad, nonscientific audience takes a unique set of talents to succeed. The use of Aflasafe products by smallholder farmers indicates that the fundamental vision Bandyopadhyay has been pursuing is ringing true for the people who can benefit from it the most.

His efforts have left a legacy of human capacity development and laboratory infrastructure for plant pathology across Africa. He has mentored over 60 scientists, postdocs, students, and technicians from 23 countries, including 19 African countries. Many of his mentees manage national or regional aflatoxin biocontrol programs in Africa, and two of them are among the 11 recipients of the APS Hewitt Award. Another mentee received the Norman Borlaug Award for Field Research and Application from the World Food Prize Foundation.

Bandyopadhyay's research and extra-scientific efforts have been repeatedly

recognized both within and beyond the CGIAR system. The awards he has received include the Outstanding Scientist Award from IITA and ICRISAT, the Outstanding Achievement Award from the National Grain Sorghum Producers Board of North America, the Agents of Change for Aflatoxin Mitigation Award from the African Union, and the APS International Service Award. He has published more than 145 journal articles, edited several books, and helped organize multiple conferences.

Bandyopadhyay is an enthusiastic advocate for all aspects of plant pathology and has used his time and boundless energy to make integrated aflatoxin management centered on biocontrol a real path leading to improved health for millions of Africans. His scientific contributions are significant, but his real contribution is safer food for millions of consumers and higher income for tens of thousands of farmers.

More information: https://www.apsnet.org/members/give-awards/awards/Pages/2021_Bandyopadhyay.aspx

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The research team purchased and analyzed 633 fertilizer samples from 225 sellers in Morogoro, which were then tested in laboratories in Kenya and the United States. The results confirmed that the quality of fertilizers is good. Only 2 out of 300 urea samples did not meet industry standards.

Moreover, the study found that the nutrient content in marketed fertilizer, especially for urea, was consistent with recent large-scale assessments undertaken by the [International Fertilizer Development Corporation \(IFDC\)](#) across sub-Saharan Africa.

“Why does that belief of rampant product adulteration persist among farmers? We found evidence of a quality inference problem in the market: 25% of fertilizer samples showed degradation

in physical attributes, but there is no (statistically significant) correlation between the fertilizer's physical characteristics and its unobservable nutrient content,” said [Victor Manyong](#), an Agricultural Economist and Emeritus Director based in Tanzania, who was part of the research team.

Manyong further added that farmers are willing to pay less for untested fertilizers than for lab-certified fertilizers. But when presented with information about the good quality, farmers frequently revise their beliefs and increase their willingness to pay, even at a higher price.

The study notes that problems related to physical attributes likely begin upstream in the supply chain. The long supply chain process affects the

physical appearance of the product. Manyong explained that these issues are generally attributable to poor packaging and repackaging, transport and storage conditions, and a lack of unbiased information on fertilizer quality in the domestic markets for users to make a comparison.

The [Tanzania Fertilizer Regulatory Authority \(TFRA\)](#), under the fertilizer Act No. 9 of 2009, was established to enforce laws, policies, and regulations governing the manufacturing, importation, and use of and trade in fertilizers or fertilizer supplements. The Act also provides fertilizer quality control and requires fertilizer dealers to ensure that fertilizer or fertilizer supplements are packed and labeled in the manner prescribed in the regulations.

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.

GIZ–GIAE and IITA target job creation and increased maize and cassava productivity in Nigeria

The Green Innovation Centre for the Agriculture and Food Sector Program (GIAE) – Nigeria is launching an 18-month project to boost maize and cassava production and create jobs for youth and women in the value chains. The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) implements GIAE on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ). [IITA](#) will be implementing the new project in four states—Kaduna and Kano for maize and Ogun and Oyo for the cassava value chain.

(3) building a cassava seed system where farmers will be involved in the production and sale of quality cassava stems to generate additional income.

The grant will also train farmers and extension agents in modern maize and cassava production using digital solutions on good agricultural practices (GAP), [Six Steps to Cassava Weed Management and Best Planting Practices](#), and other IITA digital tools like the herbicide calculator, [AKILIMO](#), Seed Tracker, and [cassava e-market](#).

Sanne Chipeta, Head of Project, Green Innovation Center for the Agriculture and Food Sector—Nigeria, GIZ, noted that the collaboration with IITA would help improve productivity and food safety in the value chains, contributing to food and nutritional security. In addition, the individual activities will help to create new employment and livelihood opportunities, especially for young men and women. She expressed optimism that the collaboration with IITA would add value and produce positive results in the maize and cassava value chain.

To execute the project in the target states, IITA, as well as previous projects implemented by GIZ in the target states, will leverage the knowledge generated by previous and ongoing projects such as the Bill & Melinda Gates Foundation-funded [Building an Economically Sustainable Integrated Cassava Seed System, Phase 2 \(BASICS-II\)](#). Other projects that will serve as knowledge banks include AgResults Aflasafe, [African Cassava agronomy Initiative \(ACAI\)](#), IFAD-Zero Hunger Project, Youth in Agribusiness Projects, TAAT Programs, and ongoing State and Federal Government-funded agricultural programs, including the Central Bank of Nigeria (CBN)-Anchor Borrowers Program, being implemented by several state governments for various value chains.



Green Innovation Centre for the Agriculture and Food Sector - Nigeria

The 18-month GIAE project will boost maize and cassava production in Nigeria.

The project will train smallholder farmers on productivity and farm safety technologies. It will also create employment opportunities for women and youth by establishing commercial seed enterprises for retailing disease-free improved stems, marketing of Aflasafe and the Purdue Improved Crop Storage (PICS) bags—a simple, cost-effective, and nonchemical agricultural storage bag.

According to the Project Manager, [Godwin Atser](#), the grant addresses three major activity areas: (1) integrated pest management (IPM) with a particular focus on tackling the presence of the invasive arthropod pest, Fall Armyworm (FAW); (2) aflatoxin and food safety with a particular focus on training female maize growers, household caregivers, and other actors on food safety and pre-/postharvest management; and

Got a story to share?

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African Yam Bean (AYB): Rehabilitating a leguminous crop with many uses

To revitalize underutilized crops in Africa, the “Bean-preneur” team organized exploratory interviews with African Yam Bean (AYB) growers and non-AYB growers in Nigeria to identify its cultivation and utilization challenges. They also used the opportunity to create more awareness about AYB’s economic and nutritional benefits among farmers and other stakeholders.



Bean-preneur team member and Tissue Culture Specialist Dr Morufat Balogun.

In the southwestern part of the country, particularly in Ekiti and Osun states, AYB attracts more patronage in terms of cultivation and consumption than other states in the region. The focus group discussion established that the cultivation of AYB in these states was still at the subsistence level with local processing for consumption. Ekiti farmers demonstrated this during the interview session through a display of bean pods, shelled raw beans, and cooked AYB from their farms. The interview facilitator, Sarafat Tijani, acknowledged this, saying, “Ekiti growers are really into AYB cultivation and consumption.”

On the knowledge of AYB cultivation and processing, most farmers stated that AYB is planted as a side crop or intercropped with other crops like yam and sorghum. As a vine crop, AYB shares staking with these crops or uses them (e.g., sorghum) as stakes.

Farmers also shared their knowledge about planting AYB around April or latest May, but not delayed till June

as this reduces yield obtainable from the crop. According to the farmers, the AYB flowering stage starts in November; thus, a growing cycle from April to January yields a more remarkable harvest. The long growing cycle explains the reason for farmers’ limited interest in AYB cultivation and intercropping with other crops.

Besides the long growing process, cooking AYB for consumption was also reported to take so long that it has to be cooked over the night to soften. Farmers identified other uses for AYB, such as processing and grinding into a paste with pepper and onion to make bean cake and *moin-moin* and other food delicacies made from other beans.

The challenges notwithstanding, farmers agreed that the crop’s economic and nutritional benefits make it a good food security crop. Its cultivation enhances soil fertility through nodulation as a leguminous crop, and it increases the yield of other crops. However, the Project Supervisor

Ademola Aina’s observation on the simultaneous production of tubers underground and bean seeds in pods by some AYB crop varieties is yet to be confirmed by some farmers’ representatives, particularly from Oyo State.

More awareness on AYB will encourage growers to explore further tuber production and hence additional income from AYB. Furthermore, the respondents unanimously agreed that AYB could be regarded as a promising food crop in combating protein-energy malnutrition due to its high nutritional profile (protein from the beans and carbohydrates from its tuber). It is also a food crop with the potential to improve food security significantly.

Based on farmers’ recommendation to develop improved varieties that are early maturing and with a shortened bean-cooking time, and consequent assurance of availability of this request, the Bean-preneur team recommends more sensitization among farmers within their groups in the selected states. Farmers’ representatives from Oyo State, where they are less informed about AYB, expressed their motivation and willingness to go into the production of AYB based on the ideas shared during the interview.

Tissue Culture Specialist [Morufat Balogun](#) stated that, after identifying challenges with AYB cultivation, the project team at [IITA](#), with collaborating partners and other interested scientists, will target breeding programs for AYB improvement. They will also establish a commercial value chain that is all-inclusive for efficient consumer satisfaction.



African Yam Bean produces beans in pods aboveground and tubers beneath.

Food security: Scaling innovation towards banana production in Rwanda

To improve food security in banana production in Rwanda, [IITA](#) has commenced a project titled “Multiplatform delivery of co-developed tools for national control and prevention of Banana *Xanthomonas* Wilt (BXW) in Rwanda: Scaling innovation for enhanced banana production and food security – ICT4BXW@Scale.”



Rwandan farmers using digital tools to measure banana growth.

In Rwanda, banana is the leading staple food and source of livelihoods for millions of households. However, despite being a major food security crop in East Africa, banana production has been severely threatened by the continued spread of BXW nationally and regionally.

BXW is a disease that causes banana plants to rot from the inside out. The disease is triggered by the bacteria *Xanthomonas vasicola* *pv.* *musacearum* (Xvm), formerly known as *Xanthomonas campestris* *pv.* The disease, which negatively impacts banana production in East and Central Africa, can cause up to 100% yield losses (per banana stand) if proper management strategies are not well implemented.

The first phase of the ICT4BXW project (2018–2020) was implemented to co-develop, test, and co-validate a smartphone-based digital tool (BXW App) to monitor BXW incidence and empowerment of banana farmers to control spread in Rwanda. Farmer promoters or local extension agents were selected from eight districts (out of the 30 Rwanda districts) and engaged in a 15-month user-centered participatory process to design and test the envisioned digital tool.

Following the successful deployment of the co-developed digital tool and related knowledge products, the project has facilitated near real-time crowdsourcing of robust surveillance data on BXW incidence, enhanced capacity of the extension support systems, and provided actionable intelligence on the spatio-temporal dynamics of BXW. Therefore, to broaden impact across all districts, the donor (GIZ) has approved funding to disseminate the knowledge products and tools within the next three years.

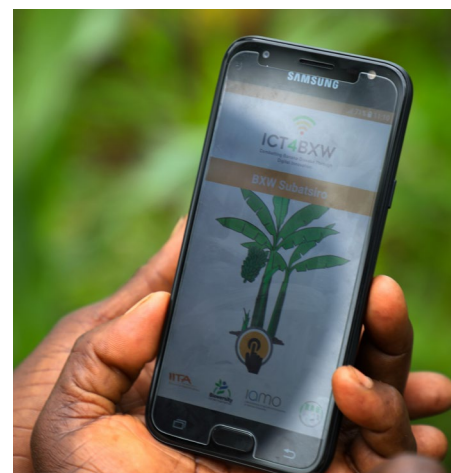
As part of its objective, the project's second phase intends to scale up the number of village-level users, such as farmer-promoters and farmers, who will use digital (and nondigital) platforms/tools to diagnose, report, and control BXW disease in Rwanda. The project will also facilitate strategic behavioral change and the capacity of stakeholders to sustain the adoption of innovative approaches for BXW control and prevention at the national scale.

The project team aims to disseminate agronomic information, control measures for BXW, and periodic alerts for BXW thresholds/threat level through both digital and nondigital

access platforms, including infographic pamphlets, available mobile channels (interactive voice response, SMS, USSD, social media, push SMS alerts), and biannual reporting to engage prospective smallholder farmers and stakeholders, beyond those that can be directly reached by the project.

Explaining the overall goal, Julius Adewopo, the project manager, noted, “We envision that the scaling of digital and nondigital tools for the surveillance and control of BXW disease in Rwanda will foster equitable decision-support for banana farmers and mitigate farm-level losses of banana productivity, to promote improved/sustained livelihoods and food security.”

The project implementation targets three levels of stakeholders to develop relevant capacity for the sustainability of the project innovation: (i) Rwanda Agriculture and Animal Resources Development Board (RAB) entities as manager/custodians of the surveillance systems; (ii) Sector and district agronomists as enablers for the next-users; and (iii) Farmer-promoters as next-users who provide direct support to farmers. This should translate into rapid delivery of BXW tools to citizens who can provide actionable data for timely intervention on BXW across diverse agroecological zones of Rwanda. Also, by adopting multiplatform delivery of decision-support for banana agronomy and BXW management, ICT4BXW@Scale will enable near real-time access to information on best practices, empower farmers to detect and diagnose BXW, and promote cohesive communication to strengthen information sharing and collective action within the banana value chain.



Digital application tools for the surveillance and control of BXW disease in Rwanda.