IITA news
No. 2672, 19–23 December 2022

One CGIAR launches in Tanzania, fanning expectations for 2023 and beyond

IITA-CGIAR, the One CGIAR Convener for Tanzania, in collaboration with the Tanzania Prime Minister's Office (PMO)—host of the National Agricultural Sector Development (ASDP) Coordination Unit and the Ministry of Agriculture, convened a two-day National Stakeholders Forum to launch and promote One CGIAR in the country. Sixty-two participants from the government, private sector, international development organizations, and donor institutes attended the event in Dodoma on 13 and 14 December. The Hon. Permanent Secretary, Prime Minister's Office on Policy, Parliament Affairs and Coordination, Dr John Anthony Jingu, officiated the event.

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Hon. Permanent Secretary, Prime Minister's Office (Policy, Parliament Affairs and Coordination), Dr John Anthony Jingu addressing the workshop participants.

Remote-sensing models to enhance Banana bunchy top virus (BBTV) surveillance in Africa

The IITA-CGIAR team has published a method using drones and satellite imager-based remote sensing approaches for mapping banana farms to guide surveillance for the detection and mapping of the banana bunchy top virus (BBTV) spread and support data-informed decision-making on BBTV containment strategies in sub-Saharan Africa.

Bunchy top disease-affected banana plant in Ipokia LGA in Ogun State of Nigeria. Photo: IITA/L. Kumar

The study, Banana Mapping in Heterogenous Smallholder Farming Systems Using High-Resolution Remote Sensing Imagery and Machine Learning Models with Implications for Banana Bunchy Top Disease Surveillance, was published in the peer-reviewed, open access Remote Sensing journal.

BBTV has emerged as a major threat to banana production in sub-Saharan Africa (SSA). The virus infection results in severe dwarfing (bunching) of the shoots and cessation of fruit production, denting the food and income security of smallholder farmers.

BBTV is an introduced virus in Africa, first reported in the 1960s in the Democratic Republic of Congo (DRC). The transboundary spread of the virus is unabated, as the single introduction event has spread to 15 countries in SSA, assisted by the ubiquitous banana aphid (*Pentalonia nigronervosa*) and vegetative propagation and distribution of virus-infected planting materials.

"Since 2010, the new spread of BBTV was confirmed in seven countries, including Benin, Nigeria, and Togo in West Africa; Tanzania and Uganda in East Africa; and Mozambique and South Africa in Southern Africa," said IITA Virologist and Head of Germplasm Health Unit, Lava Kumar, who is leading the ALLIANCE for controlling BBTV spread and recovering banana production in the region, and co-author of the study.

Surveillance by scouting across large areas is a critical requirement for the early detection of BBTV occurrence in farms, mapping the extent of its geographic spread, and deploying control measures. However, it is laborious and requires surveyors to visit banana fields looking for infected plants. This task has been challenging and requires local individuals to guide the survey teams to the banana fields and is often marked by the unintentional omission of several banana farms from the assessment.

Remote sensing and machine learning (ML) models provide a wealth of data from a particular geographical location, including detecting and monitoring the physical characteristics of a geographical area, mapping vegetation and crop types on the local and regional scales without making physical contact.

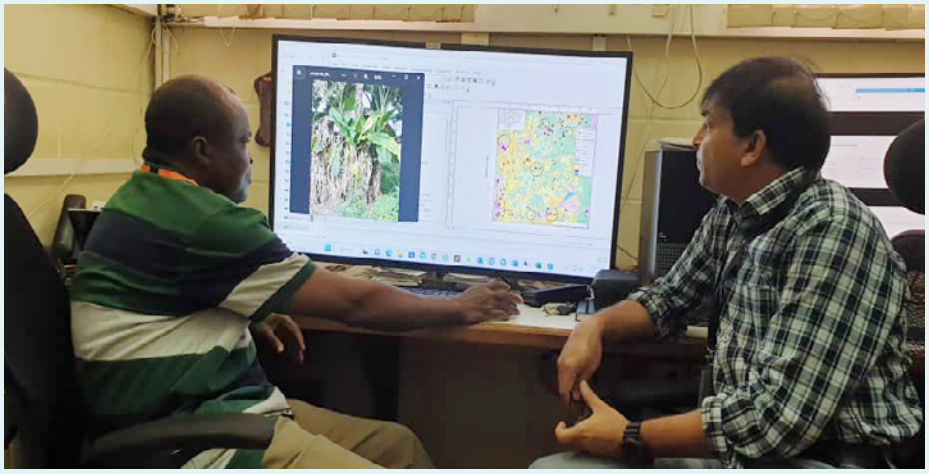
IITA researchers have combined high-resolution imagery from unmanned aerial vehicles (UAV) and medium-resolution Synthetic Aperture Radar (SAR), Sentinel 2 imagery with Random Forest (RF), and Support Vector Machine (SVM) analytics for identifying infected banana plants and fields for targeted BBTV surveillance.

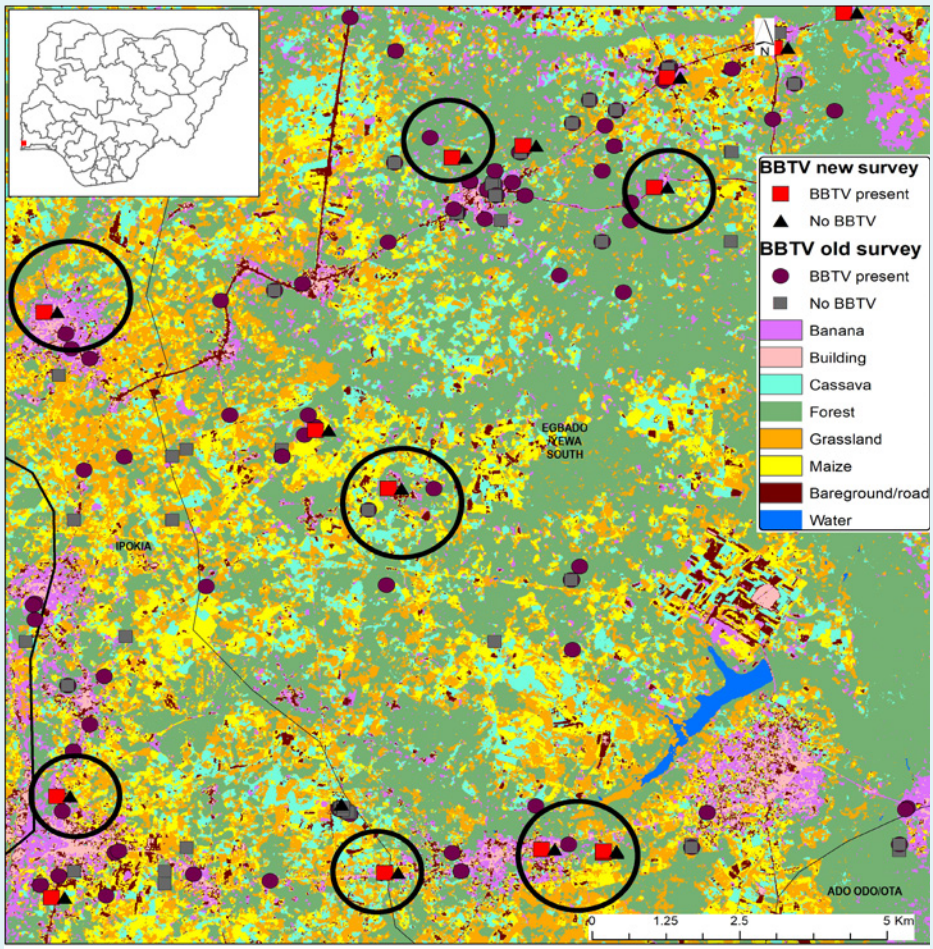
IITA-GIS Support Services Manager and lead author, Alabi Tunrayo, revealed that ML performed relatively better in classifying the land cover, achieving means overall accuracy (OA) of about 93% and a Kappa coefficient (KC) of 0.89 for the UAV data. Applying fused SAR and Sentinel 2A data, the model gave an OA of 90% and a KC of 0.86. IITA Geospatial Data Scientist and co-author, Julius Adewopo, said that the findings confirm the model's usefulness for predicting infection in banana and other crops in SSA's heterogeneous smallholder farming systems.

As part of verifying the accuracy of the high spatial resolution cropland maps generated by the models, the researchers have done ground truthing and detected 17 new farms with BBTV with the developed models in Ogun State, which were missed during the conventional surveys.

The study recommends the adoption of the model for other crops in heterogeneous smallholder farming systems to increase their productivity.

For more information about this work, contact: Lava Kumar (l.kumar@cgiar.org) and Tunrayo Alabi (t.alabi@cgiar.org). *Contributed by Lava Kumar and Anita Akinyomade*





Top: The IITA team using machine learning models for detecting bananas in the mixed cropping systems in Nigeria. Photo: IITA/L. Kumar. Bottom: Prediction of bananas and identification of bunchy top-affected fields in mixed cropping systems in Idologun region, Nigeria. Image: IITA/T. Alabi

One CGIAR launches in Tanzania, fanning expectations for 2023 and beyond

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The forum aimed to clarify One CGIAR, its initiatives to be implemented in Tanzania, and all ongoing bilateral CGIAR-led projects in the country. The meeting also aimed to identify critical gaps of national importance for communicating back to respective initiatives and CGIAR centers to be considered in the planning phases. It was noted that Tanzania is currently working on the next implementation plan of ASDPII. This was timely, so CGIAR activities and programs would be included in the national framework to kick off in late 2023.

IITA Eastern Africa Regional Hub Director Dr Leena Tripathi noted that the One CGIAR transition is dynamic—based on CGIAR's partnerships, knowledge, assets, and global presence—and aims for greater integration and impact to solve today's, and tomorrow's interconnected food, land, water, and climate crises. "One CGIAR is stepping up its engagement and consultations, striving to ensure that the views of our valued country and regional partners are incorporated in our research strategy," she said.

One CGIAR Convener for Tanzania, Dr Regina Kapinga, highlighted Tripathi's remarks on CGIAR's engagement in Tanzania for the last 25 years. Previously, CGIAR centers independently implemented their activities, but the new CGIAR is more unified and integrated. It was endorsed in 2019 with one mission, integration, coordination, alignment, collaboration, and joint implementation of programs for a common goal.

In his remarks, the guest of honor, Hon. Jingu, noted the importance of investing in research and development to develop the agricultural sector in Tanzania. He also urged the researchers to focus on finding solutions that cater to climate change challenges for farmers' sustainable agriculture. "I also urge the national research partners operating in our country to learn from this consortium which has over 50 years of experience in finding solutions to strengthen and develop the agricultural, livestock, and fishery sector in the country," he said.

One CGIAR would implement 11 research initiatives in the country, including Ukama Ustawi: Diversification in East and Southern Africa, gender equality, seedQual, market intelligence, and plant health. These will contribute to five global impact areas: Nutrition, Health and Food Security; Poverty Reduction, Livelihoods and Jobs; Gender Equality, Youth and Social Inclusion; Climate Adaptation and Mitigation; and Environmental Health and Biodiversity.

The participants also discussed the alignment of One CGIAR initiatives and contribution to ASDP II national priorities. As the One CGIAR country convener for Tanzania, IITA has a critical role in collaborating with the ASDP Coordination Unit from the Prime Minister's Office to facilitate engagement with national partners, especially the government and other key actors in the agricultural development sector. This would ensure coordination and alignment with the national agricultural development strategic plan through the ASDP II framework. *Contributed by Gloriana Ndibalema*

IITA Eastern Africa Regional Hub Director Dr Leena Tripathi (sitting fourth from left) with other participants at the event in Dodoma.

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.

Bangladeshi High Commissioner to Nigeria seeks collaboration in digital agriculture and agribusiness

The Bangladeshi High Commissioner to Nigeria, Mr Masudur Rahman, and his team paid a visit to the IITA-CGIAR office in Abuja on 21 December. The visit aimed to establish bilateral ties with Nigeria through IITA. The High Commissioner was received by the Integrated Agriculture Activity (IAA) Chief of Party, Prakash Kant Silwal; Executive Manager of Innovative Youth in Agriculture (I-Youth), Aline Mugisho; IITA Research Associate Alhebhoria Daniel; and IITA Field Security Coordinator, Captain Palash Abul-Kawsher (rtd).

In his remarks, Rahman said collaboration in digital agriculture and agribusiness is possible between the two countries. "Nigeria and Bangladesh have a long-standing relationship. We have been partnering in different areas, including education and sports. Setting up a virtual interaction program between scientists at IITA and Bangladeshi businessmen and technology entrepreneurs would benefit both countries immensely," he said. According to him, a partnership in agriculture will be another compelling avenue through which diplomacy between the countries can be cemented.

Responding to the High Commissioner, Silwal highlighted the role of IITA in transforming African agriculture, emphasizing how the Institute, through IAA, supports smallholder farmers in Nigeria's northeast. He also highlighted the market approach and seed system as it relates to the seven focus crops of the Activity and how the IAA boasts countless success stories.

The I-Youth Executive Manager explained how IITA's passion for empowering young people through agriculture continues to strengthen youth economically in 28 African countries. She said IITA, through I-Youth, has mobilized projects worth millions of dollars for young people in the continent.

The IITA team will work out possible collaboration arrangements.

Contributed by Joke Fayemi

IAA Chief of Party, Prakash Kant Silwal (center), led the IITA team that received Bangladeshi High Commissioner to Nigeria, Mr Masudur Rahman (second from right), and his team.

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