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Maximizing Africa's comparative advantage in agriculture

DG Nteranya Sanginga addresses researchers and staff at IITA during R4D Week 2015.

As governments in many African nations make efforts to grow their economies through agriculture, IITA is repositioning its science to meet this increasing demand. To fully exploit this potential, scientists working in the east, west, central, and southern Africa Hubs of IITA are in the Institute's headquarters in Ibadan, discussing new findings and progress in agricultural research and how IITA's science can be better packaged to meet the needs of millions of Africans. The meetings also detail opportunities for sustainability.

The annual meeting, tagged "Research for Development (R4D) Week", featured a presentation by Nteranya Sanginga, IITA Director General. Sanginga highlighted IITA's progress in developing an index for measuring the impact of its projects and poverty reduction. He also gave a thorough analysis of the Institute's financial status as well as directions for action in 2016.

There were also back-to-back presentations by scientists on the different research themes: plant production and plant health, natural resource management, social science crop breeding and biotechnology; lunch seminar on Open Access, intellectual property, and capacity development; poster presentation sessions; a panel debate on seed systems; as well as CGIAR Research Program (CRP) planning focusing on CRP Phase 2 by Ylva Hillbur, DDG Research.

Guest presentations were also delivered by Keith Wiebe, Senior Research Fellow, IFPRI and Ousmane Badiane, Director for Africa at IFPRI.

The week-long R4D week commenced on 23 November and concluded with a town hall meeting led by the CGIAR Board of Trustees Chair Bruce Coulman and a dinner organized by the IITA's Women's Group.

Left: Charity Mutegi of IITA-Kenya gives a testimonial on being a woman scientist in IITA. Right: Jane Bennett of the University of Capetown talks on gender during R4D Week.

Mississippi State University and IITA join efforts to fight aflatoxins

Mississippi State University has joined the list of partners working with IITA to address the problem of aflatoxin contamination in Africa. Other partners include the United States Department of Agriculture (USDA), Nigeria's National Agency for Food, and Drug Administration and Control (NAFDAC); the African Agriculture Technology Foundation (AATF), the World Bank, the African Union, and national research and extension systems (NARES) across Africa.

Prof Yao (2nd in front row from left) and IITA staff in Abuja after the seminar.

The Mississippi State University aims to bring to the table rapid aflatoxin testing devices that will assist researchers and farmers in testing their farm produce. The university has developed several kits for testing grains for aflatoxin contamination, and one of such which has reached an advanced level is *aflagoogle*—an image capturing device—that captures grains that are contaminated with aflatoxins.

Haibo Yao, an Associate Professor with Mississippi State University while presenting a seminar in IITA Abuja Station on 3 November, said the instrument would provide rapid detection of aflatoxins in a cost-effective and efficient manner.

Produced by the fungus *Aspergillus flavus*, aflatoxins are toxic substances that contaminate grains, mostly maize and groundnut. The toxins undermine both health and trade. The toxins cause liver cancer, suppress the immune system, and retard the growth and development of children. Infected crops are either sold cheaply or are destroyed. Prof Yao, who is working with Alpha Kamara, IITA Agronomist and Head of IITA-Kano station, visited Nigeria, 2–6 November, to have a better understanding of the aflatoxin problem in Nigeria. The team inspected maize fields across the IITA-Kubwa station and some communities in Niger State to have firsthand information on maize production and storage practices.

Kamara said the initiative to jointly work on aflatoxins especially in the development of affordable testing kits would help farmers to address the problem of aflatoxins.

"At the moment, not many people are aware of aflatoxins. We need instruments that will help producers and grain dealers detect as quickly as possible the level of contamination. This first step is very important for effective control," he added.

Gbassey Tarawali, IITA Head of Abuja station, lauded the team for agreeing to work on such innovative research that would create impact on Africa.

YIIFSWA launches aeroponics facility at NRCRI Umudike

The Yam Improvement for Income and Food Security in West Africa (YIIFSWA) project in collaboration with the National Root Crop Research Institute (NRCRI) launched a new aeroponics system for high quality seed tuber production at the Institute in Umudike, Abia State on 13 November.

Leading the delegation of IITA at the inaugural event was Robert Asiedu, R4D Director for West Africa. He was accompanied by Norbert Maroya, YIIFSWA Project Leader; Beatrice Aighewi, Seed Systems Specialist; John Ikeorgu, YIIFSWA Country Manager for Nigeria; Morufat Balogun, Tissue Culture Specialist; Oiwoja Odihi, Communication Specialist; and Paul Emmanuel, Project Administrative Assistant.

Ikeorgu welcomed the representatives from both IITA and NRCRI. In his opening speech, he chronicled the perceived difficulties scientists had regarding yam development, stating that yam was a complex crop with a low multiplication rate.

IITA and NRCRI reps at the newly launched aeroponic facility in Umudike, Nigeria.

"However with persistence and collaborative efforts between the two institutes, I am pleased to announce that the mysteries impeding yam development have been demystified. The first mystery was broken in 2001 with the release of three yam hybrids in Nigeria and the second one is being broken today and that is the rapid multiplication of seed yam via high ratio propagation technologies such as aeroponics and the bioreactor," Ikeorgu said.

The development and dissemination of novel technologies like aeroponics for high ratio propagation of high quality seed tubers is part of the project's efforts towards establishing a sustainable formal seed system. This will ensure that smallholder yam farmers have access to and can afford high quality seed yam tuber of a wide range of varieties.

In his keynote speech, Asiedu said: "In the early years, despite the perceived impossibilities and negative reactions to research on yam due to sociocultural factors, scientists did not give up on the

crop because yam plays an important role in the lives of smallholder farmers in terms of food and income generation." He urged scientists and stakeholders to use what farmers have selected and use new science that will maintain the superiority yam has had over the years.

Asiedu inaugurated the yam aeroponics facility which was built by the IITA Facilities Management Services and "handed" the facility over to Julius Chukwuma Okonkwo, the Executive Director of NRCRI.

NRCRI has the national mandate of genetic improvement of root and tuber crops and, as a requirement, it needs to have an ample supply of pre-basic and basic seed stock of improved varieties of yam for distribution to other stakeholders.

Okonkwo thanked IITA for the many years of collaboration and called on more collaborative work between the two institutes on yam development. Two NRCRI technical staff were trained on the maintenance and day-to-day management of the aeroponics system and where given certificates at the event.

Rust blights promising soybean future in Africa, review study shows

The demand for soybean in Africa has been increasing steadily driven by the growing feed industry for poultry and aquaculture as well as for home consumption in the form of processed milk, baked beans, and for blending with maize and wheat flour. This in turn has spurred an increase in soybean production to respond to the growing demand—the crop's production in sub-Saharan Africa has doubled over the last 15 years.

However, the demand for soybean in Africa still outweighs the supply and hence a lot of soybean and soybean products are imported mostly from India, Argentina, and Brazil. In 2011, soybean imports were estimated at nearly 1.6 million tons, valued at US$1.22 billion with South Africa, Nigeria, and Kenya being the top importers.

Furthermore, the production of soybean in the continent is low and is greatly threatened by several biotic and abiotic stresses such as declining soil fertility, diseases, insect pests, and weeds. Soybean production in Africa occupies 1.3% of the total world area under soybean production and represents 0.6% of the total production.

Among the diseases, Soybean rust disease, caused by the fungus *Phakopsora pachyrhizi*, is one of the major threats to soybean production in Africa due to its rapid spread. The fungus' spores are easily blown by the wind, spreading over long distances very fast.

According to a review paper by Harum Murithi, a plant pathologist at IITA, soybean rust is known to cause massive yield losses of between 10 and 90%. The paper "Soybean production in eastern and southern Africa and threat of yield loss due to soybean rust caused by *Phakopsora pachyrhizi*" was published recently in *Plant Pathology*.

"With the current rapid spread of the disease in the area under soybean production, soybean rust is an important disease that cannot be ignored," Harun says. "Plants affected by the disease have leaves that have tan to dark brown, or reddish brown lesions. Soybean rust reduces yields mainly through reducing the photosynthetic activity of the infested leaves.

The disease was first confirmed in Uganda on experimental plots and thereafter on farmers' fields throughout the country in 1996 and all soybean grown in the country was found to be susceptible. In 1998, the disease was reported in the major soybean growing regions in Kenya, Rwanda, Zimbabwe, and Zambia. Other countries in which the disease has been detected include Nigeria in 1999, Mozambique in 2000, South Africa and Cameroon in 2001, Ghana and the Democratic Republic of Congo in 2007, and recently in Tanzania and Malawi.

The demand for soybean in Africa is steadily increasing.

The best method to control the disease is the use of resistant soybean varieties; however, this has been difficult due to the presence of different populations of the fungus across the globe. According to the study, it is important to understand the dynamics of pathogenic fungi, and its epidemiology and population genetics to enhance the effectiveness of targeted interventions that, in turn, will safeguard soybean productivity.

Congratulations!

Following their victories at the first round of The Essential Electronic Agricultural Library (TEEAL) PhD research paper competition 2015, in October, Abidemi Olutayo Talabi and Dorcas Olubunmi Ibitoye have again emerged overall first and third place winners in the final round of the competition, respectively. This stage of the competition judged submissions from researchers from East and West Africa.

The wining papers were entitled "Genetic variability and inter-trait relationships in maize under drought and low soil nitrogen environments" submitted by Talabi, IITA Research Fellow and "Performance of cowpea [*Vigna unguiculata* (L.) Walp] hybrids under drought induced and well-watered conditions" by Ibitoye.

Ibitoye

Talabi

As a Research Fellow between January 2012 and March 2013, Talabi conducted his M.Phil thesis research under the joint supervision of IITA scientist, Badu-Apraku, and Prof Fakorede of Obafemi Awolowo University, Ile-Ife.

Ibitoye is a member of staff of the National Horticultural Research Institute, Ibadan. She conducted her PhD research at IITA under the supervision of IITA scientists Ousmane Boukar and Christian Fatokun with funds from AGRA at the West Africa Centre for Crop Improvement, University of Ghana.

Welcome

Patchimaporn Udomkun, from Thailand, has joined IITA Bukavu, DR Congo as Postdoctoral Fellow—Food Scientist and Technologist. She obtained her BSc in Food Technology and MSc in Food Technology at Silpakorn University, Thailand in 2003 and 2005, respectively. She received her PhD in Agricultural Science at the Institute of Agricultural Engineering, University of Hohenheim, Stuttgart, Germany in 2015.

Prior to this appointment, she worked as an Assistant Coordinator (2008-2011) at Innovative House (small and medium-sized enterprises by the Thailand Research Fund [TRF]). She was a Researcher in the Food Technology Department, Faculty of Engineering and Industrial Technology at Silpakorn University, Thailand (2005-2008). She also worked on the project between Silpakorn University under the collaborative research program titled Sonderforschungsbereich (SFB) Research for Sustainable Land Use and Rural Development in Mountainous Regions of Southeast Asia, University of Hohenheim, Germany 2008. Email: p.udomkun@cgiar.org

Everlyne Wosula, a Kenyan national, has joined IITA Dar es Salaam, Tanzania as Postdoctoral Fellow—Vector Entomologist. She obtained her BSc in Horticulture and MSc in Agriculture Entomology from Jomo Kenyatta University of Agriculture and Technology in 1997 and 2007, respectively. She bagged a PhD in Plant Pathology and Entomology at Louisiana State University, Baton Rouge, LA, USA in 2012.

Before this appointment, she was also a Postdoctoral Research Fellow at the Department of Entomology of the University of Nebraska, Lincoln. She was a Graduate Research Assistant at the Department of Plant Pathology and Crop Physiology, Louisiana State University (2008-2012). She worked as a Field Officer at the Cereal Grower's Association in Nairobi, Kenya (2003-2004), a Tea Extension Assistant at Kenya Tea Development Agency, Nairobi Kenya (2000-2003). Email: e.wosula@cgiar.org

Yonnelle Moukoumbi, a Gabonese, has joined IITA Kano, Nigeria as Cowpea (Molecular) Breeder. She obtained her PhD in Plant Genetic Resource and Crop Protection at University of Abomey-Calavi, Cotonou, Benin in 2012. She received her MSc in Biotechnology and Plant Breeding at the University of Yaoundé I, Cameroon in 2006. She qualified as an Agronomist at the Institute of Development and Rural, Polytechnic University of Bobo-Dioulasso, Burkina Faso in 2002.

Before this appointment, she was a Postdoctoral Fellow Breeding at the Biotechnology/Irrigated Rice Breeding Unit of Africa Rice Center, Sahel Regional Station, Saint Louis, Senegal (2012-2015). She worked as a Research Associate at National Research Institute-IRAF/CENAREST, Libreville-Gabon (2002-2012), and a Research Associate at Institut Gabonais d'Appui au Developpement (IGAD), Libreville-Gabon (2002). Email: y.moukoumbi@cgiar.org

Godfree Chigeza, a Zimbabwean, has joined the IITA Lusaka, Zambia team as Soybean Breeder. He has a PhD in Plant Breeding from the University of KwaZulu Natal, South Africa. He received his MPhil in Agricultural Sciences and Graduate Diploma in Agricultural Sciences (Plant Breeding and Biotechnology) at the University of Queensland, Australia in 2003 and 2000, respectively. He obtained his Graduate Diploma in Seed Technology and BSc in Agricultural Crop Science at the University of Zimbabwe in 1996 and 1993, respectively.

Prior to this appointment, he worked as Breeder Project Lead at MRI Zambia, Syngenta Africa and Middle East (AME) (2014-2015). He was the Projects Team Lead of Maize Breeding at the Agricultural Research Council-Grain Crops Institute, Potchefstroom, South Africa (2012-2014), and worked as a Field Trial and Horticultural Manager at the Centre for Novel Agricultural Products (CNAP) Department of Biology, University of York, UK (2008-2011). Email: g.chigeza@cgiar.org

David Kolawole Ojo, a Nigerian, has joined IITA Ibadan, Nigeria as SARD-SC Soybean Scientist. He obtained his BSc (Hons) in Agriculture at the Obafemi Awolowo University, Ile-Ife, Osun State in 1979. He received his MSc in Agronomy (Crop Science) from the University of Ibadan, Ibadan in 1988. He also obtained his PhD in Plant Breeding from the Federal University of Agriculture (FUNAAB), Abeokuta, Ogun State, Nigeria in 2000.

Ojo was a Research Associate (Soybean Breeding) at IITA Ibadan (1985-1997), and a Farm Manager at Ajumoni Farms in Lagos (1983-1985).

Before his current appointment, he worked as a Visiting Professor at the National Horticultural Research Institute, Ibadan (2010). He has been a Consultant (Technical Services) at Fash-Davesons Ltd in Ibadan since 1997. He was a Lecturer of Plant Breeding & Genetics at the Federal University of Agriculture, Abeokuta. He has equally worked as a Professor of Plant Breeding at the Department of Plant Breeding and Seed Technology of (FUNAAB) from (2009-2015. Email: d.ojo@cgiar.org

Gbenga Akinwale, a Nigerian, has joined IITA Lilongwe, Malawi as Program Manager for Soybean. He obtained his PhD and M.Tech degree in Crop Management (Plant Breeding) at the Federal University of Technology, Akure, Nigeria in 2013 and 2007, respectively. He also holds a Higher National Diploma (HND) in Crop Production from Ahmadu Bello University, Kabba, Nigeria. He has a Post Graduate Diploma (PGD) in Crop Management (Plant Breeding) from the Federal University of Technology, Akure, Ondo State, Nigeria.

Before this appointment, he was Technical Advisor to The Honorable Minister of Agriculture and Rural Development on Rice Seed Systems at the Federal Ministry of Agriculture and Rural Development in 2013. He was also an Associate Principal Scientist (APS) (Seed System Specialist at Africa Rice (2009-2013). He worked as a Research Associate (Agronomy/Lowland Breeding) at the International Rice Research Institute (IRRI), IITA Ibadan, Nigeria (2008-2009). Prior to joining the AfricaRice/IRRI project, he worked at IITA as a Research Supervisor in the Cassava Breeding Unit (1996-2007). Email: g.akinwale@cgiar.org

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).