

Top officials of Kenya's agriculture and irrigation ministry visit KALRO/IITA Aflasafe manufacturing plant

A high-powered delegation from Kenya's [Ministry of Agriculture and Irrigation](#) led by the Cabinet Secretary (CS), Hon. Mwangi Kiunjuri, recently visited the [Aflasafe](#) manufacturing plant jointly built and operated by [IITA](#) and the [Kenya Agricultural Livestock and Research Organization](#) (KALRO).

During the visit, the CS said he was impressed with the modular plant that is now fully operational and capable of producing 10 tons of AflasafeKE01 per day but can be further scaled up to over 40 tons per day. AflasafeKE01 is an innovative biocontrol product developed specifically for Kenya where it sustainably and effectively reduces aflatoxin contamination. The construction, purchase, and installation of equipment of both the plant and lab were finalized in 2017 and production commenced in the same year.



IITA hub director Victor Manyong explaining the aflasafe production process to CS Mwangi Kiunjuri and PS Harry Kimutai. Looking on is IITA's Lawrence Kaptoge.

The CS further said he would push for enactment of relevant policies to enable farmers, especially those in aflatoxin-prone areas, to have access

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N2Africa Phase II in Borno, Nigeria organize annual meeting

To ensure effective and continuous use of legume technologies that have been introduced to enhance smallholder farmers' productivity, partners in the [N2Africa](#)-Borno phase II project came together in Kano State, Nigeria on 24–25 May to review progress and develop implementation plans focusing on addressing the gaps identified.

Being on the last year of Phase II implementation, the project team and the national partners focused on exit strategies based on the gaps identified that would ensure sustainability of N2Africa legume technologies and its relevance to legume farmers now and in future.

In his address, [Nkeki Kamai](#), Country Coordinator, N2Africa Borno, recounted the achievements of the project in the areas of building sustainable partnerships and expertise in nitrogen fixation, empowering women and youth, and ensuring food security—the aims of the N2Africa project.

“To date, we have been able to establish strong and firm partnerships with various NGOs, and public and private sector companies. In improving soil fertility, the adoption of Nodumax by farmers has rapidly increased productivity, and this has invariably improved food security, nutrition, and incomes for smallholder farmers.”

“In cowpea, we have recorded a 72% adoption rate of improved varieties. We are hopeful that the technologies N2Africa avails to farmers would be increasingly adopted by groundnut farmers as we still have over 16,000 farmers to reach,” Kamai added.

[Fred Kanampiu](#), N2Africa Project Coordinator, emphasized that “Every year we have been able to meet or exceed our target in terms of farmers reached. Presently, we have reached about 550,000 households in all the 11 countries that N2Africa project targets. We have formed partnerships which continues to address the challenges in the legume value chain and this has

helped in reaching targeted farmers. Further, we have institutionalized this project through capacity building of the staff of national partner organizations to make sure that the local experts from the countries are the ones running the show, working with the government. This has helped in the implementation of this project. This approach, we believe will make smooth the exit of the project.”

Kanampiu also added: “We have trained 300 youth ‘agripreneurs’ in Borno State, of which 200 are now running viable businesses, and that is encouraging.” These youths have been trained to initiate viable businesses along the legume value chain.

During the meeting, partners reported on key challenges from the past years and developed workable plans to address during the year.



Meeting participants in a discussion.

N2Africa phase II is funded by the [Bill & Melinda Gates Foundation](#) through a grant to [Wageningen University & Research](#) and is being carried out in conjunction with [IITA](#), [International Livestock Research Institute](#) (ILRI), the [University of Zimbabwe](#), and many other partners in DR Congo, Ethiopia, Ghana, Kenya, Malawi, Mozambique, Nigeria, Rwanda, Tanzania, and Uganda.

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to AflasafeKE01 to ensure the safety of food in the country, and for considering AflasafeKE01 as one of the inputs in the government’s subsidy program.

Hon. Kiunjuri was accompanied by the Principal Secretaries of Research and Livestock in the Ministry of Agriculture and Irrigation, Prof. Hamadi Iddi Boga and Harry Kimutai, respectively.

The IITA team was led by [Victor Manyong](#), the hub director for Eastern Africa; [Charity Mutegi](#), Aflasafe technical lead for Eastern Africa; and [Lawrence Kaptoge](#), General Technical Manager for the [Business Incubation Platform](#) at IITA (IITA-BIP) in Ibadan, who is also in-charge of the construction of the Aflasafe plant and oversees its current operations.

The team from KALRO comprised its Director General [Eliud Kiplimo Kireger](#), the two Deputy Directors General, the Director of the KALRO Agricultural Mechanization Research Institute, and other senior staff. Also present were the members of the Government of Machakos County where the Aflasafe plant is located.

Briefing the ministry officials on the plant, the team said the plant is the first modular Aflasafe manufacturing facility in the world. Aflasafe products are registered for commercial use in Kenya and five other African nations—Burkina Faso, Ghana, Nigeria, Senegal, and The Gambia. IITA also has a large-scale plant to manufacture Aflasafe in Ibadan, Nigeria.

In Malawi, Mozambique, Tanzania, and Zambia, the process of registering indigenous Aflasafe products is in progress. IITA and partners are currently identifying and developing local and regional Aflasafe products in Burundi, Cameroon, Ethiopia, Mali, Rwanda, Uganda, and Zimbabwe.

The cost of construction of the plant, including purchase and installation of equipment was about US\$1.2 million while that of developing the Kenya Aflasafe product was approximately \$2 million. The project is funded by the [United States Agency for International Development](#) (USAID) and other partners including the [Bill & Melinda Gates Foundation](#), the [United States](#)

[Department of Agriculture–Foreign Agricultural Service](#) (USDA-FAS), and the [Agricultural Research Service](#) (USDA-ARS).

DG Kireger further informed Hon. Kiunjuri and his team that IITA and KALRO will partner with and license private sector actors when the demand for AflasafeKE01 outstrips the capacity of the plant. However, they will still be responsible for producing the active ingredient that will be used for Aflasafe production by future manufacturing partners.

The team noted that the low level of awareness about aflatoxin and the product remains a challenge.

The visit was in preparation for the official launch of the plant scheduled for later in the year. The team also toured the KALRO/IITA Regional Mycotoxin Research and Training Laboratory that is supporting the Aflasafe plant and supporting the eastern Africa region in building capacity and enhancing research on interventions to address mycotoxin contamination in crop produce.

Celebrating World Environment Day 2018: combating plastic pollution

[World Environment Day](#) (WED) occurs every year on 5 June, and is the [United Nation's](#) principal vehicle for encouraging awareness and action for the protection of our environment. First held in 1974, it has been a flagship campaign for raising awareness on emerging environmental issues from marine pollution, human overpopulation, and global warming, to sustainable consumption and wildlife crime.

WED has grown to become a global platform for public outreach, with participation from over 143 countries annually. Each year, WED has a new theme that major corporations, NGOs, communities, governments, and celebrities worldwide adopt to advocate environmental causes.

The theme this year was "Beat Plastic Pollution" and was celebrated by the [IITA Forest Center](#) at two of our School Conservation Clubs—Olive Branches School, Osogbo and St. Anthony's School, Ikoyi—both in Osun state.

The event at Olive Branches School had over a hundred students in attendance with presentations from members of the Forest Center team. Speaking on the theme of this year's celebration, Ademola Ajayi, IITA Forest Center Environmental Education Assistant, took the attendees on a historical journey from the first World Environment Day celebration. Ajayi highlighted the causes of plastic pollution, its dangers to humans, animals, and the environment, and alternatives to the use of plastic. He also talked on recycling plastic waste for other products rather than single use scenarios; with this he shared the contact details of a company that gives reward points for plastic waste.

Adewale Awoyemi, IITA Forest Center Manager, used the medium to thank the school management for their commitment and punctual attendance at all Forest Center events; he said



*Students, with Forest Center team members, displaying items made from plastic waste.
Photo: O.Olubodun*

he is convinced that the school can play a leading role in environmental conservation in Osun state. He spoke further about the harmful effects of plastic pollution on the environment. Awoyemi coordinated an interactive session during which students and staff of the School asked various questions bordering on the feasibility of banning the use of plastic. Responding to questions, Awoyemi encouraged them to only use plastic that is reuseable in a sustainable way.

The highlight of the event was the display of items such as a hand bag, inflating pump, plastic flowers, raincoat, and flower pot, all from plastic waste materials.

The Forest Center team noted the need to continue to support the students and school management to help increase the level of their knowledge concerning the natural environment to the point where they would become champions for the environment.

At St. Anthony's High School, the Forest Center team celebrated the

day with the School Conservation Club (SCC) members who they were meeting for the first time.

Awoyemi highlighted the significance of SCC in the School while informing the club members about the activities of the Club and Forest Center's projection for the newly formed club.

Speaking to the club members on the significance of the World Environment Day, Ajayi reiterated the aim of this year's celebration: "to reduce the rate of plastic pollution in the world." He noted that improper disposal of plastic will come back to "hurt us" by polluting our underground water, destroying natural habitats, and causing ocean and air pollution all of which will have negative effects on humans and the environment at large.

The meeting had about 20 SCC members attending along with SCC school coordinator, Mrs Olayemi Olawale, Emerald Forest Reserve team led by Dr Modupe Oladipo, and the IITA Forest Center team.

Got a story to share?

Please email it with photos and captions every Wednesday to iita-news@cgiar.org or Katherine Lopez (k.lopez@cgiar.org) and Uzoma Agha (u.gha@cgiar.org) for headquarters and Western Africa, Jeffrey T. Oliver (j.oliver@cgiar.org) for Southern Africa, Catherine Njuguna (c.njuguna@cgiar.org) for Eastern Africa, and David Ngome (d.ngome@cgiar.org) for Central Africa.

R4D Special

Researchers predict worse impacts of climate change on plantain and educational attendance in Central Africa

The impact of climate change continues to be high but coincides with low adaptive capacity of farmers in Central Africa. A recent study explored climatic effects on agriculture and education in rural areas in Cameroon. According to the findings, the two sectors are threatened by climate disruption in the coming decades with declines in plantain yields and educational attendance.

Focusing on plantain (*Musa paradisiaca*), researchers assessed whether recent climate changes have caused reduced yields, and what were the resulting social and economic effects on rural households in Cameroon.

Climate context in Cameroon and Central Africa

The [study](#), titled *Climate warming causes declines in crop yields and lowers school attendance rates in Central Africa*, by [Trevon Fuller](#), [Paul Sesink Clee](#), [Kevin Y. Njabo](#), [Anthony Trochez](#), [Katy Morgan](#), [Demetrio Bocuma Mene](#), [Nicolas M. Anthony](#), [Mary Katherine Gonder](#), [Walter R. Allen](#), [Thomas B. Smith](#), and [Rachid Hanna](#), focused on the complex interaction between climate change, agricultural productivity, and school attendance in the period 1950–2013 across 10 regions of Cameroon. It predicted future yields and education outcomes over the period from 2030 to 2080.

According to forecasts for Cameroon, the plantain crop will be more sensitive to climate change. Notably, the increase in temperature could delay flowering and the emergence of the banana diet. Banana requires 1200 mm of water for irrigation in tropical areas, and the decrease in rainfall could cause difficulty in accessing water.

Research methods and focus

Using analysis and survey methods, the researchers were able to examine climate variability over the last 6 decades, while looking at the trends in mean annual temperature from 1950



Plantain is an important crop in the economy of Cameroon.

to 2013. Afterwards, the researchers analyzed the interactions between co-variability of climate, crop increase, and educational endpoints in the period 1991–2011.

The researchers focused their analysis on plantain yields because plantain is a staple food in Central Africa and the local economy largely depends on it; banana and plantain are Cameroon's highest agricultural export and agriculture is the largest sector of the economy.

In 2010, focus group discussions were held in the Southwest Region of Cameroon, which indicated that crop yields affected educational attainment such as rates of enrolment, literacy, and graduation in rural areas because parents use income from crop sales to purchase their children's textbooks, uniforms, and other school supplies.

Between 1991 and 2004, there was a decline in the average number of years of post-secondary education completed by students between 19 and 24 years of age, but the decrease from one period to the next was not significant. However, the level of educational attainment in 2011 was significantly lower than two decades earlier.

The school dropout rates were also linked to crop failure; plantain yield emerged as the most significant driver of the number of years of school

completed, with household wealth also being a significant factor.

Looking at annual temperature from 1950 to 2013 and from 1991 to 2011, researchers established that there was a significant increase in temperature and significant decrease in plantain yield. Using Intergovernmental Panel on Climate Change (IPCC) scenarios to develop predictions about future crop yields and educational trend outcomes over the period from 2030 to 2080, researchers predict a 39% decrease in plantain yields and 51% in education outcomes by 2080.

How climate might drive crop yields in the future

Banana and plantain are predicted to be highly vulnerable to the direct effects of climate change due to low temperature and water tolerance. Regarding crop productivity, the analysis of plantain production in Cameroon indicated that yields decreased 43% from 1991 to 2011 and projections indicate that yields will continue to decline, dropping to 47% of 1991 levels by 2030 and 39% by 2080.

The researchers concluded that an adaptation effort is needed to address the climate change impacts on plantain yield by focusing on harnessing the potential of crop breeding programs. A promising approach is genetic improvement

of *Musa* to breed plantain varieties that are tolerant of high temperatures, but this is unlikely to eliminate all these impacts due to the time and the significant financial investment required to carry out crop improvement programs.

With mean annual temperature in Central Africa expected to increase

at least 2 °C by 2080, there is an urgent need and a call to action for climate change mitigation policies to be developed and implemented to forestall the decline in agricultural yields in Central Africa.

The study was conducted as part of a collaboration of researchers from the [Center for Tropical Research, Institute](#)

[of the Environment and Sustainability, University of California, Department of Biology, Drexel University, Graduate School of Education and Information Studies, Department of Biology, University of New Orleans, IITA-Cameroon, and Department of Ecology and Evolutionary Biology, University of California.](#)

Semi-Autotrophic Hydroponic technology works with yam too!

Yam is a staple food crop for over 300 million people in the world with West Africa accounting for 95% of total world production. Seed yam supply is a critical challenge among yam producers due to low multiplication ratio. Seed yam tuber (SYT) scarcity has compelled farmers to neglect seed health, resulting in poor tuber quality, yield loss, and declining production. This has caused many farmers to gradually draw back from venturing into yam production.

Availability and access to clean foundation seeds is another problem that yam farmers face. This subsequently means farmers that have been recycling seeds are the ones still in the business.

Recycling seeds means recycling viruses, pathogens, and diseases.

So what then is the solution? These and many more problems are what the Semi-Autotrophic Hydroponic (SAH) technology aims to solve.

SAH is a licensed technology targeted at mass propagation of virus-free plants of tissue culture origin. It is a low-cost and easy to adapt technique suitable for commercial seed production and enhanced multiplication in breeding programs. This technology has been used for seed production in clonal crops such as potato and cassava and recently, yam. It is a sustainable and cost-effective seed multiplication technique.

The SAH facility for yam started in IITA-Ibadan in April 2017 with the intention of expanding the scope of technologies targeted at overcoming seed yam production challenges. Pelemo Olugboyege, [IITA](#) Ph.D.



Yam plantlets.

candidate working on seed production technologies focused on yam explained the benefit of the SAH technology: "It has the potential to complement other alternative technologies that focus on pre-basic and basic seed production. The SAH facility is highly efficient in terms of set-up cost and it is easy to learn and adapt. This technology produces plants at a fast and efficient rate, sufficient to meet the seed needs of yam growers."

He also added, "Yam, among the clonal crops, is the most challenging because of seed yam cost and the dual purpose (food and propagule) the crop serves when sourcing for planting material. With the SAH technology, it is easy to have rapid production of clean planting materials available for farmers so that seed costs are not on the high side and yam is made available in the market."

At present, about six elite IITA and popular market varieties of yam sourced from the tissue culture laboratory of IITA's Genetic Resources Center (GRC) are being cultured for multiplication to form the starter stock or mother plants of plantlets in the Yam Improvement Program facility. This facility has the potential to significantly contribute to the breeder and foundation seed need along the yam seed value chain.

Ongoing activities which SAH can significantly impact include demand creation strategies and trials, partnership development with IITA GoSeed and projects with varietal and seed development mandate, outscaling the technology to seed companies approved by the [National Agricultural Seeds Council](#) (NASC) and farms with capacity for facility and license.