



Improving soil fertility and plant nutrition in African farming systems

Editor Janet Kanters spoke with APNI Director General/Dr. Kaushik Majumdar.

The African Plant Nutrition Institute (APNI) is a not-for-profit research and development organization founded in 2019 and based in Benguéir, Morocco. After two years, New AG International wanted to learn about the organization and how it has fared. Editor Janet Kanters spoke with APNI Director General Dr. Kaushik Majumdar.

How was APNI formed and why?

The African Plant Nutrition Institute (APNI) was established in 2019 as a not-for-profit research and development organization through its founding support from the OCP Foundation and University Mohammed VI Polytechnic (UM6P), who recognized the overwhelming need to improve soil fertility and plant nutrition research and outreach in Africa.

Despite being a new organization, APNI carries an established reputation through the expertise of its staff and the historical relationship with its predecessor organization, the International Plant Nutrition Institute (IPNI), which operated programs in Africa and throughout the world for many years up until the end of 2018. Many of IPNI's researchers and educators have come together to lead APNI.

"Our group sees improved soil fertility and plant nutrition in African farming systems as an essential component to increase the availability of nutritious food in Africa as well as improving the livelihoods of African farmers and rural communities," explains Dr. Kaushik Majumdar.

Dr. Samuel Njoroge, APNI Program Manager, assesses improvements in maize growth and performance following application of 4R-based crop and nutrient management practices in on-farm 4R learning sites.



What are some project highlights?

The past year has seen unprecedented global challenges yet APNI has marked progress in several projects across the continent.

The 4R Solutions project, implemented in partnership with Fertilizer Canada, Cooperatives Development Foundation of Canada and local partners in Ethiopia and Ghana, was officially launched. APNI led the establishment of diagnostic trials in Ethiopia and Ghana that will be used as the basis for developing site-specific nutrient management practices guided by the principles of the 4R Nutrient Stewardship.

“Our team assessed production constraints in key cereal cropping systems in Northern Ghana and in the Amhara region of Ethiopia based on a detailed agronomic survey data,” notes Majumdar. “On-farm nutrient omission trials were established for rice, maize and groundnut in

Northern Ghana, and for wheat and teff in the Amhara, which will guide the development of site-specific fertilizer recommendations.”

In a partnership with the Alliance for Green Revolution in Africa (AGRA), APNI is directing efforts to improve fertilizer recommendations in Kenya. Enhanced use of multi-nutrient fertilizers is providing an improved balance compared to current practice of applying fertilizers that supply only nitrogen and phosphorus.

“The project implemented more than 100 fertilizer response trials for validating new fertilizer formulations and field demonstrations were established in 400 Kenyan villages,” says Majumdar. “Our outreach efforts extended to 60,000 farmers who were trained on best nutrient management and agronomic practices;

**Dr. James Mutegi,
APNI Senior Program Manager,
explaining improved nutrient
management strategies to
Kenyan extension staff.**



600 government extension workers trained to enhance their capacity for dissemination of information on balanced nutrient management; 1,000 private extension agents trained to provide last-mile agronomic services to compliment the Kenya government and mainstream extension; and 400 policy makers trained on the economic, environmental and social benefits linked to improved nutrient management.”

Support continued for the fifth year of the Africa Cassava Agronomy Initiative (ACAI project). This project has been instrumental in increasing the availability of appropriate and affordable technologies to sustainably improve cassava productivity in the short- and long-term.

“The cloud-based AKILIMO (from two Swahili words: Akili, meaning

smart/intelligent and Kilimo meaning agriculture) system used to deliver agronomic advice for cassava production was upgraded and field validation work continued for site-specific fertilizer recommendations in Nigeria and Tanzania,” says Majumdar. “The project is also engaging the fertilizer industry to supply fertilizer blends for cassava production in Nigeria and Tanzania, and is working with national agricultural extension service providers to support and integrate AKILIMO into their extension programs.”

APNI’s cross regional research and development initiative funded by the OCP Group supported the establishment of pilot research trials that are generating key datasets for guiding site-specific fertilizer for several crops including: maize and rice (East Africa), maize (West Africa), and wheat, rice, lentils, olives,

Farmer training sessions built a network of extension agents who will apply the technology and teach their peers to expand the reach and uptake of the AKILIMO advice tools in Tanzania and Nigeria.



data palm and citrus (North Africa). In 2020, the combined cross regional projects were successful in disseminating knowledge on improved nutrient management practices to more than 5,000 farmers.

“The project was instrumental in the development of the Nutrient Expert decision support system for wheat in Morocco, which is currently being used to deliver farm-specific nutrient management recommendations to smallholder and large-scale farms,” notes Majumdar. “Much of the research activities and delivery of research, extension and farmer training programs for wheat, lentils, olives and date palm are based on 4R Nutrient Stewardship (the science-based concept for best nutrient management practices).”

What challenges have you faced?

Putting the profound challenges of the pandemic aside, the African continent continues to be confronted by food security and economic development challenges underpinned by poor agricultural performance. Concerted research and development investments over many years have yielded limited impact against the backdrop of complex socio-economic, policy and biophysical constraints. There is growing urgency for innovative and transformative solutions that are better designed to spur and fast-track the growth of agricultural sector and fully harness its potential.

“Innovation in nutrient management research and development within the continent’s diverse set of cropping systems will be a key catalyst for unlocking Africa’s potential,” says Majumdar.

Participatory field visits with farmers, researchers and extension workers, observing nitrogen deficiency symptoms for maize in the Savannah Zone in Togo during 2020.



What are some of your planned projects going forward?

APNI is excited about the enhanced prospects for research projects in 2021 as it explores new opportunities and rolls out new initiatives supporting its fresh research strategy. APNI recently developed its institutional strategy that will set its course for the years ahead. The resulting research program offers an innovative and business unusual approach – the strategy delivers effective, practical and actionable interventions for improving nutrient management for the much-needed sustainable transformation of agricultural landscapes in Africa.

“Moving forward, APNI research programs are guided by three thematic areas that respond to the continent’s greatest challenges and opportunities for sustainable nutrient management,” says

Majumdar. “Theme One (Climate and Weather-Smart Plant Nutrition) will work to generate farmer-centric plant nutrition strategies for changing weather and climate conditions; Theme Two (Soil Health for Improved Livelihoods) explores the link between plant nutrients and healthy agricultural systems and landscapes; and the overarching Theme Three (Precision Nutrient Management) supports its partners and farmers with evidence and information-management tools that can improve plant nutrient management.”

APNI’s research program has a core focus on working with stakeholders to generate farmer-centric and applied research methodologies to capture and analyze nutrient and agronomic information and translate that knowledge into actionable and scalable practices that are applicable to a wide range of

Moroccan agronomists from OCP Group attending a short course organized by APNI on 4R nutrient management.



cropping systems. The program focuses on cereal and tree-based cropping systems. The design and implementation of APNI's research is guided by a cropping systems framework that aims to identify relevant systems-level plant nutrition interventions with high prospects for impact.

Majumdar explained that APNI will embed methods and tools for monitoring critical performance parameters that reflect sustainability over time. "APNI's research processes enables the incorporation of farmer knowledge, addresses issues of spatial and temporal variation of cropping patterns, the multiple functions of crop production systems, as well as climate, value chain and socio-economic drivers of change," he notes. "The institute is integrating socio-economic research into its programs to enable the assessment

of the social, economic and policy constraints that curtail fertilizer use and how systematic changes can be made to improve the adoption of effective nutrient, soil and crop management interventions."

As APNI unrolls its strategy in 2021, the organization will continue to engage in new partnerships. It's team of plant nutritionists and agricultural systems experts are optimistic about the potential to unlock the potential of crop nutrition in Africa.

APNI pursues a vision of "Prosperous African farmers sustainably managing crop nutrition to provide consumers with a secure supply of nutritious foods at a reasonable price" with the help of its mission that strives to support "Enhanced plant nutrition for a resilient and food-secure Africa."

The continental reach of APNI is delivered through its headquarters in Benguéir, Morocco, and its regional offices in Nairobi, Kenya; Yamoussoukro, Ivory Coast; and Settat, Morocco. ●

Photos: APNI