

### FERARI FARMERS

#### FARMER DEMONSTRATION & INTERACTIONS



**FERARI** is taking its interactions with farmers to a higher level through demonstration days. We aim to reach over 2,000 farmers with our 180 on-farm trials of maize, soybean, and rice. Farmers will then discuss our trials with farmers in the adjacent fields. To systematically capture farmers' perceptions, we have conducted brief surveys. The information will allow us to modify our future activities to replicate farmers' practices more closely and to identify factors that determine their agronomic and economics decision-making. ■



▲ Farmer field day in northern Ghana.

▼ On-farm demo field at Wenchi in Bono Region, Ghana.



### FERARI FOCUS

#### STAKEHOLDER ENGAGEMENT IN AGRICULTURAL EDUCATION



▲ FERARI team meets with the Vice-Chancellor and Pro-Vice-Chancellor of UDS, Tamale, Ghana.

The FERARI quest to train the next generation of scientists in the fertilizer sector has continued with a visit to two Ghanaian universities. Meetings with the Vice-Chancellor and Pro-Vice-Chancellor of the University for Development Studies (UDS) as well as the Dean of College of Agriculture have strengthened collaboration between the Ghanaian universities and FERARI. The FERARI team also met with graduate and undergraduate students involved in FERARI research activities. Students presented their work, and the FERARI team explained the philosophy of the transdisciplinary program and the soil chemical and plant physiological background for the fertilizer treatments in the trials. ■



▲ Visit to the Dean of the College of Agriculture, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

## REPORTS & POLICY BRIEFS



*FERARI is currently releasing its initial research reports. Policy briefs of each report are also being developed to reach the non-scientific community.*

The major lessons are already reaching policymakers and the private sector, who are considering our findings. For instance, a study on the relevance of assembling a fertilizer multi-stakeholder platform to enhance the Ghana fertilizer value chain has received overwhelming acceptance by actors in the value chain. This has been communicated to relevant fertilizer regulatory authorities through the policy briefs and is receiving much attention. An examination of fertilizer cost buildup and cost margin differences among value chain actors revealed a skewed distribution of margins on transaction cost. FERARI has been approached by high-level officials to continue supplying evidence-based information to support their policy decision-making.

All of these documents can be downloaded at: <http://bit.ly/FERARIPubs>. ■

## ESTABLISHING THE GHANA FERTILIZER PLATFORM



*FERARI is collaborating with the Government of Ghana, through the **Ghana Fertilizer Expansion Program (GFEP)**, to establish the fertilizer sector multi-stakeholder platform.*

With resounding stakeholder endorsement and enthusiasm revealed in a recent survey, FERARI will support the government in stepping up efforts toward effective realization of the fertilizer platform. Key stakeholders constituting this fertilizer sector-focused multi-stakeholder platform have been identified and will convene at a roundtable in the next quarter.

Stakeholders at this meeting will discuss and prioritize issues and challenges that will engage the platform and form a fertilizer sector and value chain development roadmap. Participants will also formulate and adopt a resolution that will strongly affirm their commitment to the process of realizing a functioning representative and sustainable fertilizer sector multi-stakeholder platform in Ghana. ■

## FERARI AT PRE-HARVEST EXHIBITION & CONFERENCE IN TAMALE

FERARI set up an exhibit at the 10th Annual Pre-Harvest Exhibition and Conference in Tamale, October 7-8, 2020, organized by Agrihouse Foundation. This event attracted over 500 stakeholders, including farmers, private sector (equipment and input companies, aggregators/off-takers, and agro-processing companies), development partners, and policymakers. The attendees provided an arena for FERARI to disseminate the idea of a fertilizer platform in Ghana.

The majority of the approximately 100 visitors to our exhibit, including women smallholder farmers, agro-

processors, outgrower business network actors, and agro-input dealers from the northern regions, hailed the fertilizer platform concept. Notably, these stakeholder groups expressed concern about how they could effectively be represented on such a platform, enabling them to also contribute to fertilizer research and development, effective fertilizer utilization, value chain development, and market access. ■

▼ Northern Ghana Regional and Deputy Agricultural Ministers jointly opened the 10th Annual Pre-Harvest Exhibition and Conference with a ribbon-cutting ceremony.

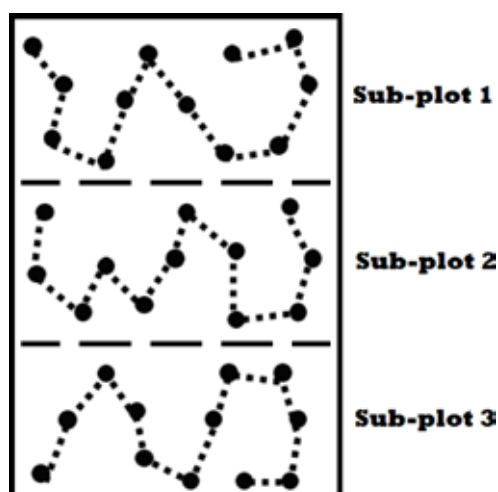


▼ Conference attendees look at materials displayed in the IFDC exhibit at the 10th Annual Pre-Harvest Exhibition and Conference.





## DETERMINING SOIL PHYSICAL PROPERTIES FOR BETTER YIELD RESPONSE



▲ Example of soil sampling pattern of FERARI trial fields. Dots represent sub-sample locations, which are composited for each of the three areas.

*Soil nutrient contents are measured mainly to determine fertilizer recommendations and to link yield responses to these soil nutrient properties. However, rainfall also heavily impacts yields.* Therefore, soil hydro-physical characteristics will help to further detail fertilizer requirements. FERARI is taking soil samples at the sites of the on-station and on-field trials to determine both chemical and hydro-physical properties.

In the few cases in which information on soil physical properties is collected in Ghana, it is usually inadequate and includes only soil texture and bulk density. Yet soil water-holding and transmission capacities, affecting the availability of water and nutrients, are stronger determinants of final yield. Thus, the matric potential, water-holding capacity, saturated hydraulic conductivity, and infiltration rate will also be measured.

The data will support FERARI to more accurately model spatial yield responses from fertilization, thereby accounting for rainfall and water availability as well. ■

## FARM SURVEY OF CROP RESPONSE TO NEW FERTILIZER BLENDS

FERARI, guided by the UDS West African Centre for Water, Irrigation and Sustainable Agriculture (WACWISA), has undertaken field evaluation of the effectiveness of three new fertilizer blends (NFBs):

- ✓ NPK 15-20-20+0.7Zn for cereals.
- ✓ NPK 12-30-17+0.4Zn for legumes.
- ✓ NPK 17-10-10 for cassava.

The NFBs were supplied to farmers in 2019 under the Planting for Food and Jobs (PFJ) program of Ghana's Ministry of Food and Agriculture (MoFA). A survey was conducted in May and June 2020, complying with COVID-19 governmental decrees. The study collected and analyzed farm-level data and farmers' perceptions of the efficacy of the NFBs, as well as the challenges they encountered in the acquisition and use of the NFBs. It covered 1,304 households from 152 communities in 23 municipalities/districts across Upper West, Upper East, North East, Northern, and Bono East regions of Ghana. The draft report has been reviewed, and a validation workshop with university staff and students will follow. ■



▲ The PFJ supplies NFBs to farmers in northern Ghana.

▼ A farmer participates in the survey on NFB efficacy.

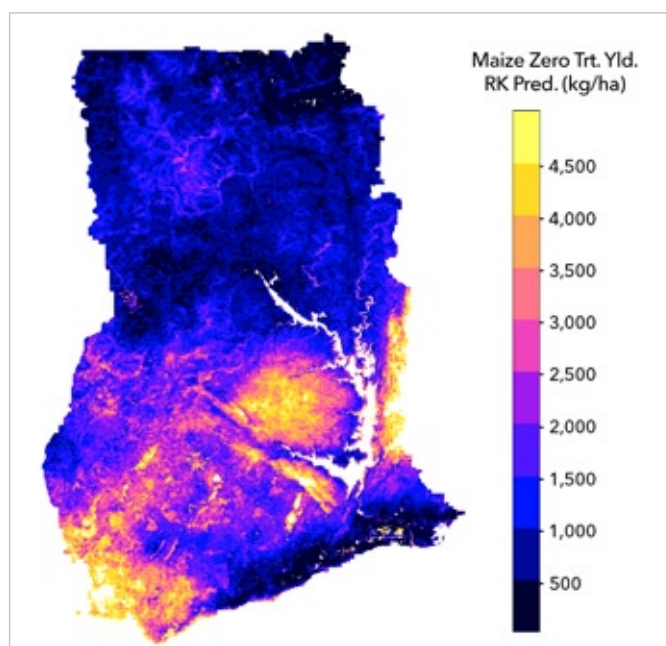
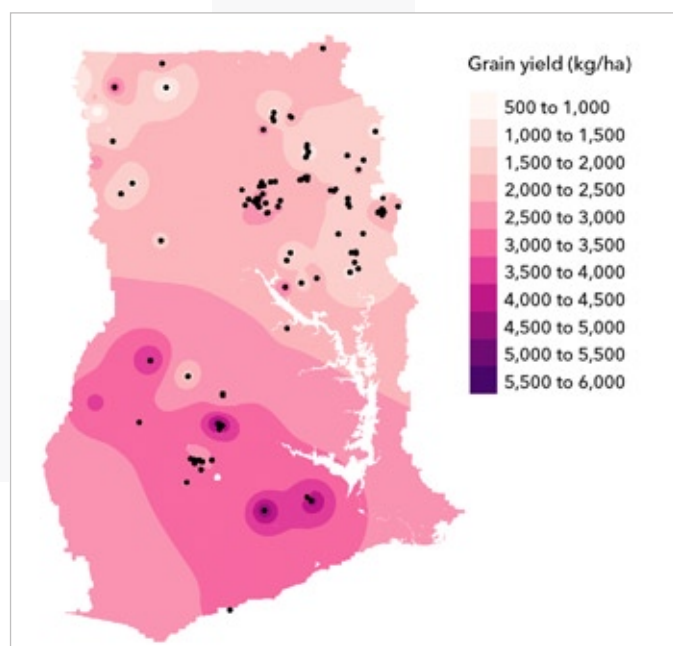


## SPATIAL ANALYSES IDENTIFY YIELD GAPS & ESTIMATE INPUT NEEDS

***Trials provide information about a specific location and have a limited reach due to the huge spatial variability in agroecological conditions, such as soil, landscape, and weather. Farm yields also depend on socio-economic factors that drive decisions about cultivation practices.*** However, policymakers and value chain actors need insight into the spatial reach of the impact of their policy interventions and the marketable volumes of inputs and outputs in specific regions. Spatially explicit recommendations are most important for the

introduction of innovative fertilizer products to transform the fertilizer sector. FERARI, therefore, gathers data in Ghana from its target regions and beyond to develop mapping techniques for quantifying yield responses to fertilization, identifying yield gaps between observed on-farm yields and farmers' yields, and estimating the input requirement of specific fertilizer nutrients and production volumes. These estimates will be expanded to include socio-economic drivers when feasible. ■

- ▼ *Initial mapping of maize yield levels from non-fertilized plots reveals significant spatial yield differences due to large variation in soil conditions and rainfall: Simple linear interpolation for yield mapping (left) can be detailed by incorporating other variables (right) such as soil type and rainfall using the random forest technique (for illustration purposes only).*



## UNDERSTANDING FARMER DECISION-MAKING

Maize, rice, and soybean crops in FERARI's 45 on-station and 180 on-farm trials are performing extremely well. Some delays have occurred in Brong-Ahafo due to late rainfall, but all experiments are currently in place. Sequential harvesting will be performed over the coming months. One of the outcomes of the farm demonstration days was to also take physical yield measurements in the adjacent fields of the collaborating farmers.

At the same time, a more detailed farm survey will be conducted to understand factors in their decision-making. There is a wide diversity in farm decisions, and some farmers have already adopted the trial practices for their own fields, while others continue their common practices. These farm yield measurements may be extended to include a sample from the farmers surveyed in the baseline study and the farmers who have adopted new fertilizer blends. ■

- *Bertha Ansah, extension worker with MoFA in the Sunyani West District of Ghana, documents on-farm trial crops.*





## KNUST COLLABORATES WITH FERARI RESEARCH ON FOLIAR FERTILIZERS



▲ FERARI and KNUST are collaborating to research foliar fertilizers for maize, soybean, and paddy rice.

**The Kwame Nkrumah University of Science and Technology (KNUST), in Kumasi, Ghana, is an educational institution with the strategic mandate to provide higher education, undertake research, disseminate knowledge, and foster relationships.** The KNUST vision is to build on its reputation as the premier science and technology university in Ghana and to be one of the top 10 universities in Africa. The university advances knowledge in science and technology by creating an environment for undertaking relevant research, quality teaching, entrepreneurship training, and community engagement.

The KNUST College of Agriculture and Natural Resources (CANR) is currently collaborating with the FERARI program. As part of its contribution, KNUST is conducting 18 foliar fertilizer field experiments on maize, soybean, and paddy rice. The field experiments include four sulfur omission trials on maize and soybean, in addition to soil sampling and analytical works in both the

Guinea Savanna and the Semi-Deciduous Forest zones of Ghana. Under the field experiments, six postgraduate and undergraduate students are being trained and supported for their theses and dissertations. The core aspect of the foliar fertilizer trials encompasses biofortification of maize, soybean, and rice with micronutrients (zinc, iron, sulfur) to enhance food and nutrition security. This will feed directly into the ongoing Ghana Fertilizer Expansion Programme (GFEP).

The research at KNUST is being led by Dr. Vincent Logah, along with Drs. Andrews Opoku and Henry Oppong Tuffour, of the Department of Crop and Soil Sciences, CANR. ■

FERARI  
FERTILIZER RESEARCH & RESPONSIBLE IMPLEMENTATION

IFDC  
Developing Agriculture from the Ground Up

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