

FERARI FOCUS

RAISING FERARI'S PROFILE FOR INTERNATIONAL RECOGNITION



Following the wide acknowledgment of FERARI in Ghana, the program is now raising its profile abroad. At the AGRF in September 2022 in Kigali, FERARI made an agreement with the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) to generate support for student internships, scholarships for M.Sc. education, and the development of a master's-level course in Fertilizer Science and Soil Health in Ghana. FERARI also participated in the Forum for Agricultural Research in Africa (FARA) Stakeholder Consultation meeting in September 2022 for developing the Soil Initiative for Africa (SIA). In addition, the FERARI approach was highlighted by the directors of the Soil Research Institute (SRI), with the ultimate aim of introducing the program FERARI as an important case in the Africa Fertilizer and Soil Health Action Plan to be endorsed by the African Union at the anticipated Summit in June 2023.

FERARI presented its approach and results at a dialogue event in the Hague, the Netherlands, that reached civil servants of the Ministries of Agriculture and of Development Cooperation and was highly regarded.

<https://www.foodfirst.eu/2022/09/05/shocks-and-structural-issues-for-african-food-production-how-to-continue/>

Next, FERARI will be presented at the leadership event of the West and Central African Council for Agricultural Research and Development (CORAF) in October. ■

FERARI FEATURE

OFFICIAL LAUNCH OF FERTILIZER PLATFORM GHANA

The Fertilizer Platform Ghana (FPG) is a public-private multi-stakeholder, membership-based dialogue platform for addressing fertilizer sector issues in Ghana. In the FPG, fertilizer stakeholders seek to identify and resolve policy issues and constraints facing the fertilizer sector through collaboration and partnerships. The FPG was formed as a result of a series of stakeholder mobilization and consultation activities organized by the FERARI program, in collaboration with Ghanaian Government through its Ministry of Food and Agriculture (MoFA) and Ghana Fertilizer Expansion Programme (GFEP), over the past two years. Since the third Fertilizer Stakeholder Roundtable meeting in November 2021, the FPG has established a formal organizational structure with its leadership (executive and sub-committees) and registered membership.

As a result of cooperation among the platform leadership and fertilizer stakeholder partners, the FPG was officially launched on September 28, 2022, at the Science and Technology Policy Research Institute (STEPRI) Conference Room in Accra. Undoubtedly, this was a remarkable event in Ghana's fertilizer sector and agricultural development program. This event witnessed over 100 registered attendees from MoFA, industry, farmer groups, and knowledge and development partner organizations.



▲ Guests at the FPG launch (L-R): Olive M'Bahia (IFDC), Dr. Asseta Diallo (AGRA), Dr. Gyan Ansah (MoFA), and Nana Serwah (NFC).



▲ Attendees of the FPG launch.

Key fertilizer stakeholder representatives at the event took turns delivering messages of solidarity in support of FPG's establishment and its timeliness in sustainable development of the sector.

Nana Serwah Amoako, Chairperson of Ghana's National Fertilizer Council (NFC) and Director of the Ghana Fertilizer Expansion Programme (GFEP), expressed the council's joy in finding a dependable partner and mutual collaborator in the FPG. Accordingly, she outlined a number of activities the NFC intends to undertake with support from the FPG, including a first-ever National Fertilizer Conference.

In the keynote address, Dr. Solomon Gyan Ansah, the acting Director of Crop Services and representative of the Honorable Minister of Food and Agriculture, performed the official launching of FPG and reiterated MoFA's readiness to support and promote the FPG and its activities.

A panel discussion with Dr. Charles Nyaaba (PFAG), Dennis Kofi Annan (Omnifert), Dr. Asseta Diallo (AGRA), and Dr. Emmanuel Amoakwah (CSIR-SRI) on the current fertilizer challenges and opportunities and how they impact stakeholders was moderated by Michael Owusu of the MoFA Directorate of Crop Services.



▲ Discussion panelists (L-R): Dr. E. Amoakwah (SRI), Dr. A. Diallo (AGRA), Dennis K. Annan (Omnifert), and Dr. C. Nyaaba (PFAG).

Dr. Edward Yeboah, Director of CSIR-SRI, and Dr. Prem Bindraban, Director of the FERARI program, presented the need for a digital soil map of Ghana as a basis for developing soil- and crop-specific fertilizers for Ghana with the involvement of the stakeholders of the fertilizer sector.

Moving forward, the FPG expects that members, stakeholders, and collaborators will join forces to improve the platform's visibility and energize it in the delivery of its mandate as a sustainable and relevant fertilizer sector dialogue system in Ghana. ■



▲ Dr. Prem Bindraban (FERARI) presenting on soil mapping and modeling.



▲ Dr. Edward Yeboah (CSIR-SRI) presenting an overview of soils and fertility mapping in Ghana.



FERARI STUDENT INTERN RESEARCH AND DATA GATHERING

FERARI MEETS ALL STUDENT INTERNS IN GHANA

The FERARI team organized a workshop in Kumasi September 14-16, 2022, to discuss issues related to the program's student training. All FERARI student interns from the University of Ghana, Akyem Appiah-Menka University of Skills Training and Entrepreneurial Development (AAMUSTED), University of Energy and Renewable Resources (UENR), University for Development Studies (UDS), and Kwame Nkrumah University of Science and Technology (KNUST) presented their research. Their university supervisors were also in attendance.

The workshop sought to stimulate the students to finalize their thesis and facilitated the quality control of current data to complement the previous two years of field data to improve their analysis. The meeting provided an avenue to teach the students how to collect their data and learn from previous mistakes. The workshop also provided a platform for students from various universities in Ghana to network. It was the first of its kind in the Ghanaian higher educational system with respect to student thesis development. ■

▼ FERARI student interns in Ghana meet to facilitate thesis development.





FERARI STUDENT INTERN RESEARCH AND DATA GATHERING

FERARI STAFF WORK WITH STUDENTS TO ENSURE QUALITY RAW DATA COLLECTION AND VERIFICATION

Three FERARI staff members, Mohamed Boullouz, Lamia Jallal, and Akua Foriwa Kwarteng, visited three public institutes in Ashanti and Bono regions that partnered with the program to conduct various trials on the yield response of the three major crops in Ghana (maize, rice, and soybean) to fertilizers. The purpose of the exercise was to get the students' and researchers' perspective on how the experiments were conducted and verify the raw data. This exercise was useful in drawing lessons and experiences for FERARI to maximize the effectiveness of future research. It also helped build the capacity of staff and students to work in the field and engage in a collaborative approach to understanding the problem of low yield response to fertilizers in Ghana. ■



▲ Akua, Lamia, Mohammed, and Joshua at the data quality verification at KNUST, Kumasi.



FERARI STUDENT INTERN RESEARCH AND DATA GATHERING

VISITING MOROCCO FOR DATA COLLECTION



▲ INRA Tadla, Morocco.

Bouchra Darkaoui explains, "As a Moroccan intern of the FERARI program in Ghana working on wheat production, I had the opportunity to go back to my country and collect data for my research topic. I visited the National Institute of Agronomic Research (INRA) regional center in Tadla, where I obtained data on wheat production during the 2014/15 season. I also had a discussion with Mohamed Domar, the Regional Director of Agricultural Advice of Beni Mellal about my research topic and obtained a Monograph for the 2019/20 season. I visited the Agronomic and Veterinary Institute Hassan II (IAV), where I found several interesting works that were done in different regions across the agricultural areas. The information will be helpful in transforming my thesis into a journal article." ■



▲ Research papers from IAV, INRA Tadla.



FERARI STUDENT INTERN RESEARCH AND DATA GATHERING

DRONE TRAINING FOR AGRICULTURAL DATA COLLECTION

Two FERARI staff, Kouame Anselme and Geoffrey Amaniampong, attended a tailored course on the use of drones and image processing at the University of Cape Coast (UCC) August 9-17, 2022. These unmanned aerial vehicles are a valuable tool for understanding the spatial variability of yield in farmers' fields, and FERARI included the use of drones in its agricultural data collection. This advanced technology could help improve crop yields for Ghanaian farmers, as agronomists are able to get an overview of their fields and collect data much faster and more efficiently than with traditional methods.

The multi-spectral camera installed on the aircraft is equipped with sensors that take images of the visible, infrared, and near-infrared spectrums. These images allow the monitoring of certain important agronomic growth parameters, such as chlorophyll content and plant height. The results can show any irregularities with germination, the health of the plants, any deficiency in water or nutrients, and pest activity for preventive actions. ■



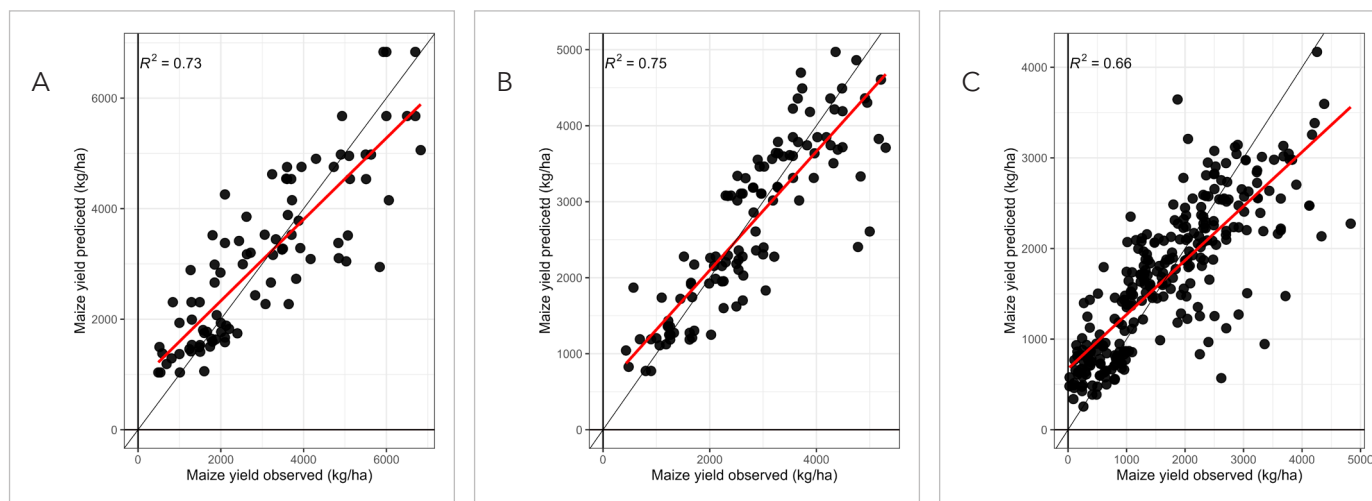
▲▼ Kouame (above) and Geoffrey (below) attend a drone training course for effective data collection.



▼ Drone pilot training session at the University of Cape Coast.



FERARI PUBLISHED PAPERS AND ARTICLES



▲ **Figure 1.** Relationship between observed yield (test data, representing 50% of the total data) and grain yield of maize predicted by the RFR model. (A) = Semi-Deciduous Forest, (B) = Transitional zone and (C) = Guinea Savanna

A paper written by **FERARI staff** on the “Economic Viability of Smallholder Agriculture in the Savannah and Transitional Zones of Ghana: Implications of Farm Output Commercialization and Farm Diversification” has been published in a special issue of the journal *Sustainability* (<https://www.mdpi.com/2071-1050/14/18/11548>). Smallholder agriculture remains the backbone of Ghana’s agriculture transformation, as these farmers provide nearly all the food requirements of the country and play an important role in Ghana’s rural economy. This research highlighted the impact of the scale of production on the livelihoods of farmers. Although small-scale farmers are not necessarily doomed, farmers’ livelihoods do depend on farm scale, while diversification and commercialization can independently impact the livelihood of the small- and larger- scale farmers. Overall, the study concluded that policymakers should consider the heterogeneity among smallholder farmers in their policy design.

FERARI intern **Mohamed Boullouz** has successfully transcribed his master’s thesis on crop modeling and geospatial analysis conducted at IFDC for six months into a peer-reviewed paper to be published in *Frontiers in Soil Science*. The paper addresses the problem of low information on Ghana’s current yield gap as well as



potential yield. It explains the maize yield gap in Ghana based on soil characteristics, climatic conditions, and fertilizer use. The paper is expected to be a valuable source of knowledge for determining the entry point to close the yield gap in Ghana.

Kouame Anselme has drafted a paper on “Identifying Factors of Maize Yield Variability in Ghana: Increasing Maize Productivity is Essential for Food Security,” which has been accepted for publication in *Agricultural Systems*. The determinants of maize yield were assessed using historical data through meta-analysis with the Quantitative Evaluation of Fertility of Tropical Soils (QUEFTS) model and advanced statistical methods - Mixed Model Regression (MMR) and Random Forest Regression (RFR). The QUEFTS model showed that 30% of the variability in yield in the Guinea Savannah agroecological zone was explained by fertilizer and soil chemical properties. Advanced analyses revealed that soil chemistry was the main fixed effect factor explaining maize yield variability, followed by environmental factors such as rainfall and temperature, then fertilizer (N, P, and K) applied, crop variety, and finally soil physical properties. ■

FERARI
FERTILIZER RESEARCH & RESPONSIBLE IMPLEMENTATION

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Developing Agriculture from the Ground Up

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