

## FERARI PARTNERS

### CSIR-SRI PARTNERS WITH THE FERARI PROGRAM



As part of the effort to shift from the use of blanket fertilizer recommendations across all agroecologies of Ghana, the CSIR-Soil Research Institute (CSIR-SRI) has recently started developing crop- and soil-specific fertilizer recommendations for various crops. Some fertilizer blends have been developed and validated for farmers to use, especially for maize, rice, and soybean.

In order to improve balanced nutrition of crops and in a bid to improve the effectiveness of some existing fertilizer blends, the FERARI program is partnering with CSIR-SRI to implement fertilizer trials in the Forest-Savanna Transitional zone of Ghana. As a generous contribution to the program, CSIR-SRI is absorbing about 30% of the total cost of soil and plant tissue analyses.

CSIR-SRI is grateful and delighted to continue to partner with FERARI to share ideas and benefitting from IFDC staff expertise and experience in fertilizer science. FERARI is supporting CSIR-SRI to build its capacity, especially in laboratory analysis and acquisition of important laboratory equipment. Moreover, its young scientists and laboratory staff will have the opportunity to be trained in advanced laboratories on crop yield quality analysis. ■

## FERARI FAMILY

### FERARI WELCOMES DOCTORAL STUDENTS WITH INTRODUCTORY WORKSHOP IN KUMASI

The FERARI family welcomed its five doctoral students during an introductory workshop on March 18-20, 2021, at the Council for Scientific and Industrial Research (CSIR), in Kumasi, Ghana. The workshop was live, with virtual participation by Wageningen University, Mohamed VI Polytechnic University (UM6P), and the University of Liège.

The objective of the workshop was to acquaint the students with the program philosophy and previous and anticipated activities. This helped guide the students in developing their research proposals for generating science-based evidence to support the development of the Ghana fertilizer value chain to support food and nutrition security.

The students will perform in-depth studies to understand agro-technical improvement, effectiveness of novel fertilizers, economic viability of the system, and processes needed to align the activities of multiple stakeholders.

The workshop was opened by the Director of CSIR, Professor Moro Buri, who highlighted the importance of improving the efficiency of fertilizers.



▲ Dr. Willams Atakora moderating the workshop.



**The media captured the essence of the FERARI program, as broadcast on March 21 in Ghana:**

<https://www.ghanaweb.com/GhanaHomePage/business/MOFA-calls-for-establishment-of-fertilizer-plant-in-Ghana-to-meet-sub-region-demand-1212328>

## FERARI STUDENTS ENCOURAGED TO WRITE POLICY BRIEFS TO BETTER COMMUNICATE RESEARCH FINDINGS TO POLICYMAKERS IN GOVERNMENT



▲ *Dr Seth Osei Akoto, Director of Crop Services, Ministry of Food and Agriculture, Ghana.*

Dr. Seth Osei Akoto, Director of Crop Services at the Ministry of Food and Agriculture, gave a passionate speech at the PhD introductory workshop for the first batch of doctoral students studying the fertilizer value chain in Ghana. He said, "As the Director of the Crop Service Directorate, I look forward to your science-based recommendations. In the end, we as policymakers have to decide where we can put our money to have the highest impact and improve the lives of our Ghanaian farmers and to make Ghana prosper. And your knowledge and guidance would be of great support in our decision making."

He continued, "I would like to encourage our universities and research institutions to turn their reports - also of the many students you train - into policy briefs. You will understand that, as policymakers, we cannot read all your complicated reports, but we must be informed about the things you know. Policy briefs of one page giving the essence of the findings will be extremely helpful. It is only a small step for your research to reach policymakers for impact." ■

### KASSIM YUSSIF BABA

*Doctoral candidate in the FERARI program studying the effects of fertilization on the productivity and nutritional quality of crops.*

From the discussions so far at the PhD introductory workshop, FERARI is an ambitious program that intends to boost crop yield and nutrition through a multi-pronged approach of analyzing the fertilizer framework, developing targeted blends, ascertaining crop response to these blends, and determining the resulting socioeconomic effect. Being part of such a multidisciplinary venture that combines research and implementation not only offers me the opportunity to diversify my knowledge base, but also affords me the opportunity to see my research in action through the implementation phase. ■



### ERIC ASAMOAH

*Doctoral candidate in the FERARI program researching the "Analytical Framework for Fertilizer Recommendations."*

My research is to develop a machine-learning model for yield prediction and fertilizer recommendations for maize, rice, and soybean in the Forest Savannah Transitional and Guinea Savannah zones of Ghana. This novel analytical approach should overcome the limitations of current fertilizer recommendation models to help arrive at better crop- and site-specific fertilizer recommendations. The outputs will assist farmers to make informed fertilization decisions, guide the private sector in optimizing their logistical network, and help policymakers decide on imports and exports related to food availability and buffer stocks.

The rich discussions during the workshop identified synergies among our research themes, improving the research questions we seek to investigate. ■



## FERARI WORKSHOP STRENGTHENS COLLABORATION WITH GHANAIAN UNIVERSITIES AND RESEARCH INSTITUTIONS

The collaboration between Ghanaian universities and research institutions and the FERARI program was solidified with the presence of local Ph.D. supervisors, as well as researchers, at the PhD introductory workshop in Kumasi. Their attendance not only bolstered the direct linkage of the FERARI program with local institutions, but it also emphasized the importance of local capacity development. Their participation influenced the initial proposal development of the doctoral candidates to suit local conditions. For instance, local partners advised the candidates to consider feasibility and potential scalability of research findings as key elements in their proposal development. ■



▲ Drs. Comfort Freeman (left) and Dilys McCarthy, Ph.D. supervisors from the University of Ghana, attend the workshop.



▲ Professor Saa Dito, Ph.D. supervisor at the University for Development Studies, contributes to discussions at the workshop.

▶ Dr. Francis Tetteh, researcher at CSIR-Soil Research Institute, participates in the workshop.



### SETH QWAME TETTEH

**Doctoral candidate in the FERARI program working on the research theme "Social Differentiation and Interdependencies in Soil Fertility Systems in Ghana."** My overall motivation for accepting this challenge is to learn

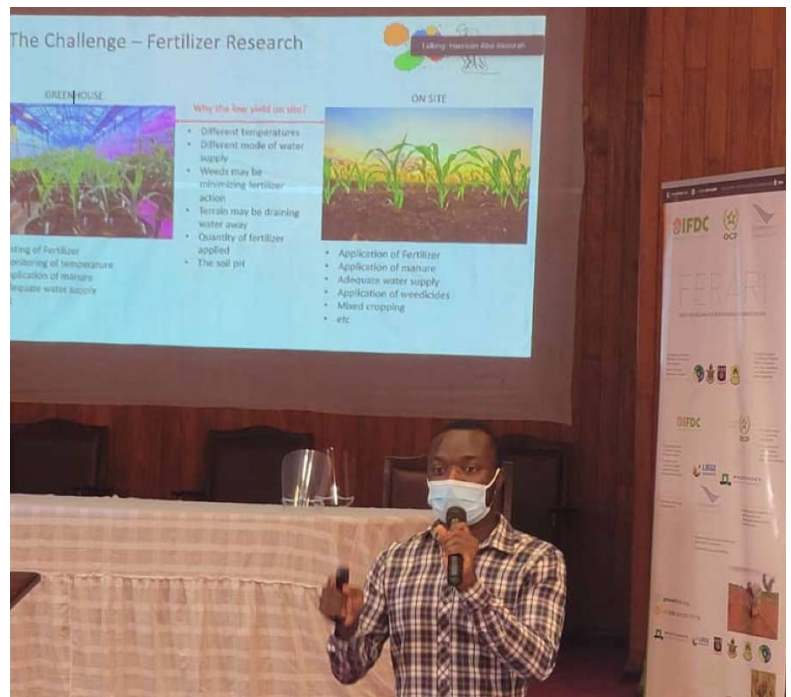
how scaling initiatives in the agriculture sector in Ghana can be made more inclusive and responsible. I plan to do this by engaging a variety of actors and stakeholders, identifying the key bottlenecks and the appropriate innovation support packages relevant to achieving impact at scale. In so doing, I aim to provide empirical insights relevant to the development and scaling of socio-technical soil fertility innovations that meet the diverse needs of different farmers in Ghana which will help make Ghana's food system more productive. ■



## GIS APPLICATIONS ENHANCE FERARI RESEARCH

FERARI considers GIS spatial analyses and mapping one of the main tools to support decision-making and help identify key interventions to intensify research. Field trial data are collected and modeled using spatial analyses. This helps to identify environmental factors and co-variance variability, assess the relationship between farmer practices and researcher-managed practices, and investigate socio-economic factors influencing crop yields. Thus, decision-making in the food value chain is enhanced. FERARI can then develop research relevant to smallholder farmers and fertilizer and food value chain actors. ■

▶ *Isaac Kissiedu demonstrates the use of GIS and spatial mapping in the FERARI program.*



### DELA EUGENE SETSOAFIA

**Doctoral candidate in the FERARI program researching socio-technical fertilizer interventions for farm productivity.** My work will involve the production of farm typology that will contribute

to the development of more efficient and targeted interventions and technology transfer in agricultural production. I will also study farmers' decision making on fertilizer adoption, use, and application. An analysis of how fertilizer use contributes to farm resilience and farm productivity, weed population, and nitrogen fixation will also form part of my studies.

In order to develop demand-driven and effective interventions, farmers' needs will be compared with available products and support services. While we are on a mission to discover knowledge and technology, we are not doing so in isolation as researchers, but

we are working in an inclusive and participatory manner with all stakeholders who will eventually implement and benefit from our evidence-based insights and innovations. That way, we will succeed in developing systems that we collectively own, ensuring sustainability. I am confident that the findings from my research, and that of my colleagues, will provide a useful resource for quality and effective expenditure in agricultural intervention planning, initiation, and execution. ■



### SOLOMON AMOABENG NIMAKO

**Doctoral candidate in the FERARI program focusing on value chain development for sustainable agricultural intensification in northern and middle Ghana.** Business-driven

motivations for the adoption and use of appropriate farm inputs is essential to ensuring sustainability along the agricultural value chain, and this is a tenet of the FERARI program. Market opportunities serve as incentives as well as a means of accessing and using appropriate farm inputs. Smallholders embedded in a complex network with buyers and sellers requires that newly established value chains position themselves as attractive markets for smallholders to adopt required practices and appropriate inputs.

My study theme is to explore and identify emerging markets and develop contractual packages to support sustainable agricultural intensification in northern Ghana. The PhD introductory workshop exposed me and my colleagues to the core philosophy of the FERARI program and activities undertaken thus far toward the realization of its broad goals. While highlighting the transdisciplinary nature of the program, presentations also emphasized the cross-relationships among the research themes and encouraged the students to collaborate to optimize these synergies. ■



## MASTER'S LEVEL INTERNS PARTICIPATE IN FERARI WORKSHOP

Five UM6P master's-level interns in the FERARI program participated in the PhD introductory workshop organized for the doctoral candidates. The Ph.D. students work on multidisciplinary subjects across the fertilizer value chain. These five doctoral candidates are supported by 22 master's level interns to determine recommendations to improve the Ghana fertilizer value chain. Their participation in the workshop gave them a full grasp on innovative institutional structure and dynamics of the FERARI program, including the philosophy and institutional arrangements, and their own roles in contributing to the program.

### IKRAM HARRISANE

*Master's-level intern focusing on the "Framing and Discourse Analysis of Fertilizer Sector Issues in Ghana."*

The importance for sustaining the development of the fertilizer value chain justifies the need for establishing effective communication among its stakeholders because the disconnect between the actors in the agricultural value chain restricts opportunities for smallholder farmers to directly exchange information with these actors. Conversely, the actors have limited information about smallholder farmers' interest and struggle in designing contextual products and services. As a result, the information flow within the value chain is disrupted and the lack of in-depth understanding of the various ways of communicating about fertilizer use and its effect on welfare has the tendency to misguide policymakers.

This study will help examine how stakeholders perceive dominant approaches to fertilizer discourse, their reflections on policy and practices, and what interests them by establishing the approaches of framing, discourse analysis, and effective modes of communication. Through an equity lens of the actors, we can simultaneously understand how the issues of fertilizers are communicated and the existing modes of communication to determine the most effective one to strengthen the relationship between actors in the value chain and improve smallholder livelihoods. ■



▲ *Ikram Harissane, a student at UM6P, makes a presentation at the PhD introductory workshop.*

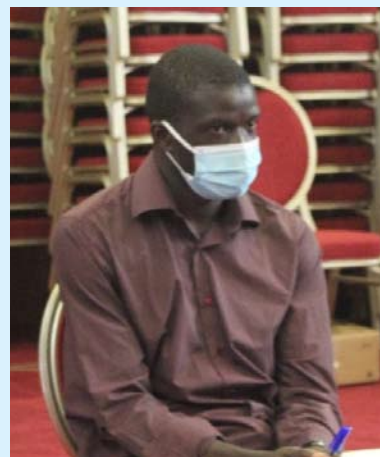
### PIERRE DIENE

*Master's-level intern researching "Impact of (Changing) Power Relations in the Fertilizer Value Chain Development."*

FERARI seeks to develop the fertilizer value chain in Ghana and the adoption of balanced fertilizers by farmers. This research aligns with one of the program's goals to create a fertilizer multi-stakeholder platform. The platform will seek to address the challenges of the sector and its actors. However, stakeholders have different interests that could potentially constrain the effectiveness of the platform. If power relationships are not well managed to avoid domination of the private or public sector, participation and representation could be skewed, leading to an unsustainable platform. Therefore, examining the nature and the scope of platform to address the challenges in the fertilizer value chain will provide evidence-based knowledge about the opportunities to make a positive impact and avoid threats that could negatively affect or delay progress.

In addition, the study of the power relationships among stakeholders will give some insights about who will benefit from the platform, the decision making process, and how these could affect optimizing the chain. This research will arrive at recommendations to leverage the changing power relationships along the value chain.

As FERARI includes research topics within the same area of fertilizer adoption and value chain development, the findings could be useful as literature or serve as inputs for FERARI's doctoral candidates. Meanwhile, FERARI is still conducting other related research and experimentation that are interrelated and complementary. If the results are adopted and applied by policymakers, it could breathe new life into Ghanaian agriculture and build the sector's capacity to decrease unemployment, reduce poverty, and improve food security through a sustainable and resilient agri-food system. ■





## REFLECTIONS – DR. DILYS S. MACCARTHY

The workshop threw more light on the philosophy of FERARI and the enthusiasm particularly from the students is a good sign that we are taking off on the right footing! I would like to note that even though good justification has been given for the crops selection, if we really want to maximize the impact of FERARI on the food security of smallholders in the study region, it will be critical to find ways of including food legumes in addition to soybean, which is like the “New Cocoa” or cash crop re-emerging in Northern Ghana where about 80% of soy bean is produced. Maybe, the PhD student working on the effect of fertilization on the productivity and nutritional value of crops could address this issue. ■



▲ FERARI team and students with Dr. Moro (center, left) and Professor Akoto (center, right) at the PhD introductory workshop.

## MOHAMED EL MOUSSAIDI

*Master’s-level intern studying the assessment of soybean, maize, and rice yield trends in the northern and middle belt of Ghana and the association with Ghana’s fertilizer subsidy*

*program.* The study aims to establish yield trends over the past two decades in these regions and investigate the dynamic effects of the fertilizer subsidy on yield. Despite the large budget of the fertilizer-subsidy program, there is a lack of evidence on its effects. The research should provide evidence to showcase the sustainability of the subsidy program and to provide the necessary information to improve its outcomes. It is also relevant to the studies of my fellow students working with the FERARI program, and our discussions during the program’s PhD introductory workshop highlighted the importance of integrating our work in all respects. ■



## ODURO AGYAPONG ANANE

*Master’s-level intern working on “Assessment of the Productivity and Profitability of the Adoption of New Fertilizer Blends (NFBs) containing Zinc under the Planting for Food and Jobs (PFJ)*

*Program.”* Ascertaining the importance of crop- and site-specific fertilizer in improving crop productivity through their ability to supply tailor-made nutrients for specific crops will be of significance to policymakers and key players within the agriculture sector. Evidence will be provided as to whether government efforts to support NFB fertilizer subsidies result in increased crop yields for farmers. Additionally, identification of challenges experienced by farmers in obtaining NFBs will help inform decision-making on how to address these challenges and influence the distribution and marketing of the fertilizer. ■



## KOUAKOU KAN ANSELME KOUAME

**Master's-level intern examining "Spatial Analysis of Maize-Yield Response and Modelling of Yield Simulation based on the QUEFTS Approach."** Conducted in the context of

precision agriculture and will produce maize yield maps using advanced geostatistical regression tools (Kriging), this research takes into account covariates (rainfall, the physicochemical characteristics of the soil, and agricultural practices) that can influence yield. It aims to enhance our understanding of the effects of abiotic factors on the yield curve. Furthermore, it will be supported by simulations of maize yield based on QUEFTS. This model analyzes the effect of nitrogen, phosphorus, and potassium limitation on maize crop yield in tropical soils of Ghana.

The yield maps provided by this study will be an important decision-making tool in maize crop management, especially in the social, economic, and environmental aspects of nutrient management, as fertilizer application contributes to global food production system an average of 50-60%. ■



## FEMI OGUNSEFUNMI

**Master's-level intern studying crop fertilizer algorithms.** The use of algorithms to estimate

fertilizer use per crop and region in West African countries, particularly Ghana, can help manage databases of fertilizer use by crop and by product in the West Africa region for the AfricaFertilizer.org program.

The algorithm will estimate fertilizer use by product and by crop for agroecological zones over time to help balance demand and supply of fertilizer products and efficiently target fertilizer products to actors in the fertilizer sector.

This will allow FERARI to simulate yield response to fertilizer use by selected crops and fertilizer products using crop-soil models. These results, in turn, will support the spatial extrapolation of crop- and site-specific fertilizer recommendations, allowing fertilizer value chain actors to optimize their logistics and marketing. ■



FERARI  
FERTILIZER RESEARCH & RESPONSIBLE IMPLEMENTATION

IFDC  
Developing Agriculture from the Ground Up

### CONTACT

**Dr. Prem Bindraban** [pbindraban@ifdc.org](mailto:pbindraban@ifdc.org)

**Dr. Williams Atakora** [watakora@ifdc.org](mailto:watakora@ifdc.org)

### IFDC Ghana

No. 113A Mbabane Avenue, East Legon Residential Area  
PMB CT 284 Cantonments, Accra | +233 (0) 560 027 917/8

[www.ifdc.org](http://www.ifdc.org)