

FERARI FOCUS

MAIZE YIELD CUT AND THE IMPACT OF TOP-DRESSING FERTILIZER ON MAIZE YIELD



The FERARI program remains unwavering in its commitment to provide more reliable data on the prevailing farming conditions and outcomes. It recognizes the need to do physical yield cuts in addition to farmer recall surveys.

Therefore, in 2021, 187 random maize farmers were contacted to seek permission to harvest their maize at three separate locations on their farm, each measuring 4 square meters. This was accompanied by a recall survey conducted by the FERARI program to gather more detailed information on farmers' production practices and other characteristics.

The challenges in the fertilizer industry, especially high urea prices and its shortage in Ghana, have prompted the government to subsidize the price of ammonium sulfate, allowing farmers to use this type of fertilizer as their top-dressing. The farmers were selected based on the type of fertilizer they used to top-dress their maize farms.

The average yield of the farmers is about 2.7 metric tons per hectare, depending on factors such as region and the source of seed. The overall results show limited impact of the top-dressing on farmers' maize yield, including ammonium sulfate. The data are currently being analyzed for an upcoming FERARI report. ■

FERARI FEATURE

DIGITAL SOIL MAP FOR GHANA

Soil maps are the basis for making site-specific fertilizer recommendations. Using machine learning methodologies, FERARI can make meaningful soil maps that incorporate soil chemical properties and characteristics such as rainfall, temperature, and relief. However, technically producing a soil map is only half the challenge. For a map to be nationally accepted and used, actors in the agricultural value chain must support the development of the map and endorse it.

As such, FERARI has formed a consortium composed of representatives from the Office of the President who are responsible for advising the president on agriculture, the Directorate of Agricultural Extension Services, and the Directorate of Crop Services in Ghana. Other members of the consortium include the International Institute of Tropical Agriculture (IITA), Council of Scientific and Industrial Research (CSIR) Soil Research Institute, and CSIR-Savanna Agricultural Research Institute and, indirectly, the remaining FERARI partners.

A meeting was held at the Tomerik Hotel in Accra, Ghana, to determine the role of each member of the consortium. In the end, the decision was made that map development would be led by the Government of Ghana and that CSIR-Soil Research Institute would assume the role of custodian, responsible for updating the soil database and version release. This doctoral research and implementation activity clearly demonstrated FERARI's transdisciplinary approach. ■

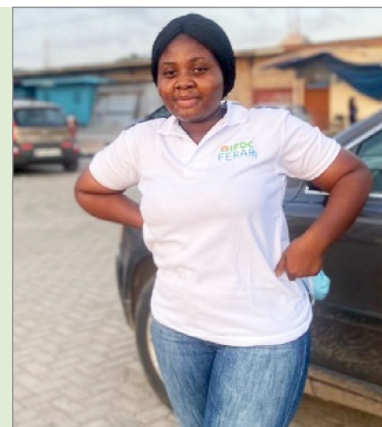


▲ Participants in the soil map meeting in Accra, Ghana.

FERARI TEAM PROFILES

AKUA FORIWAA KWARTENG

Akua has a bachelor's degree in post-harvest technology. She served as an intern with IFDC's New Business Development team before joining FERARI in March 2022 as a Post-Harvest Specialist. Akua adds value to the high-profile, youthful, and energetic FERARI team. She will be assisting the FERARI team to unravel the reasons for post-harvest losses in the operational areas of FERARI and determine how these can be addressed to ensure FERARI's goal of improving food and nutritional security is met. "Joining FERARI was a whole new exciting opportunity for me. I have learned a lot within the few weeks. I have come to understand further the role of fertilizer in crop production," Akua stated. ■



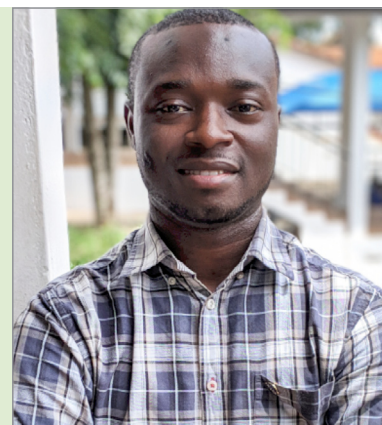
GEOFFREY AMANIAMPONG

Geoffrey joined FERARI as a database consultant in October 2021. He recently assisted in the database management of the FERARI program. Geoffrey also has excellent IT skills, which are beneficial to both FERARI and the entire IFDC office in Ghana. He has been trained in mobile data collection to assist the socioeconomics unit of the program. Geoffrey notes, "Working under FERARI as a database consultant has allowed me to manage and harmonize the data collected from the field. I am also able to program questionnaires onto mobile devices for socioeconomic data collection. I hope my contribution to FERARI will contribute to achievement of the program goals and help smallholder farmers increase their yield and income." ■



ISAAC NEWTON KISSIEDU

I have a Geomatic Engineering background and specialize in Geodata Science. I have worked in a variety of industries including academia, software and agriculture. As the Database Administrator and GIS Specialist on the FERARI program, I support the program with advanced mapping, modelling, spatial analysis and database development. I am currently guiding UM6P interns in the spatial analysis of their research methodologies as well as training them in R Programming. I am also a volunteer Technical Lead at Where Geospatial (www.wheregeospatial.com) which is an outreach community of geospatial professionals whose mission is to identify knowledge and structural gaps in the industry and develop custom solutions for them." ■



▲ A farmer in Northern Ghana answers survey questions from William Adzawla. Interviewing farmers about the factors that determine their maize yields can help researchers develop techniques to reduce post-harvest losses.

POINTS OF VIEW: SOCIOECONOMIC INTERNS FROM THE UNIVERSITY OF GHANA SPEAK ABOUT THEIR EXPERIENCES AND ACHIEVEMENTS WITH THE FERARI PROGRAM



Fred Gyasi is a fertilizer statistics specialist with IFDC's AfricaFertilizer.org initiative. Over the years, he has worked on collecting and processing fertilizer data and statistics for selected countries in sub-Saharan Africa. Fred is currently pursuing his master's degree at the University of Ghana. For his thesis, Fred will analyze the effects of fertilizer use on the commercialization and profitability of maize production in the FERARI operational areas. He is optimistic that the internship with FERARI will enable him to produce an empirically researched scientific evidence on the agribusiness outcomes of fertilizer use by farmers, as this is crucial to the fertilizer decision-making by the farmers. Fred said, "Working with the FERARI team on my academic research work is a great opportunity since it will help develop my capabilities for an improved contribution to IFDC." ■



Dorothy Kormetsoo Tetteh is a Master of Philosophy (MPhil) student in agricultural administration at the University of Ghana Department of Agricultural Economics and Agribusiness. She joined FERARI as an intern to assess the effects of sustainable agricultural practices on soybean production in the Northern Region of Ghana. Her research is needed since soybean has become an important cash crop to smallholder farmers and the increasing challenges in the agricultural sector call for more sustainable practices to boost productivity to meet current demand. "As an intern, I deem it a great privilege to contribute by identifying how sustainable practices together with fertilizer use can improve soybean yields. This will contribute toward achieving food security in the region and boost the productivity of the agricultural sector," she said. ■



Basiru Alhassan is an agribusiness and value chain development expert with over five years of experience in agricultural production systems, technical training, research, and value chain facilitation. He is currently an MPhil student in agribusiness at the University of Ghana. For his internship, Basiru is assessing the agricultural value chain development programs in Ghana and determining lessons these programs can offer the FERARI program. Basiru noted, "It is a privilege to have an internship with the FERARI program. I am guided to produce quality research work, leading to the award of my MPhil degree. I expect to gain more experience from the FERARI team and produce an excellent paper for publication." ■



Boahen Collins Tutu is an MPhil student in agribusiness at the University of Ghana. For his research, Collins seeks to provide evidence on the role of agricultural technology transfer models in fertilizer use and crop yields in the Guinea Savannah, Sudan Savannah, and Transitional agroecological zones of Ghana. This will highlight the optimal ways of communicating technologies to farmers for sustainable adoption and production. According to Collins, "I am very privileged to have been selected as one of the interns under the FERARI project. I believe that I will get the opportunity to learn new skills, methods, techniques, and improve my knowledge for future endeavors." ■



Emmanuel Wendbenedo Rachid Zida "I hold a bachelor's degree in agriculture, with a specialty in agricultural economics, from the University of Ghana. I joined FERARI in February 2022 as a socioeconomic intern and have assisted the socioeconomic unit in the design of survey tools and review of technical reports," Emmanuel explained. "Joining the FERARI team has been a great opportunity towards the development of my career. FERARI provides to me the opportunity to interact with agricultural experts, grow my network and work with positive energy." ■

POINTS OF VIEW: EXPERIENCES OF OUR DOCTORAL STUDENTS AT WAGENINGEN UNIVERSITY & RESEARCH

ERIC ASAMOAH

“Wageningen University & Research offers a lot in terms of its diverse cultural associations and rich educational setting. Being here during my stay, I have really benefited from engaging in scientific

discussions with talented young intellectuals from different backgrounds. I am pleased to say that I think I have improved in communicating and engaging in scientific

discussions through critical thinking. Honestly, that is what I can be proud of during my stay in Wageningen. I have

fallen in love with the natural beauty of the environment, the rich tasty foods, beautiful displays of art in the museums, and the lovely people around. Wageningen is a wonderful place for academic pursuits, and I am very humbled to have studied here.” ■



KASSIM YUSSIF BABA

“Exploring synergies among the various doctoral students from the FERARI program has been one of the fundamental approaches of the project toward understanding the soil fertility puzzle

in northern Ghana.

However, starting the process had always been a challenge because we were never all in one place at the same time.

When we moved to Wageningen University & Research, we were able to hold our first meeting at the insistence of Prem Bindraban, FERARI

program director. The meeting rooms at the university made it possible for a colleague who was not present to join virtually and participate as though he was there with the rest of us. The exciting experience from that meeting led to biweekly recurring meetings in Microsoft Teams. We are currently on course toward developing a Gantt chart that will highlight the interlinkages among the doctoral students from the FERARI program.” ■



▼ Left to right: Eric, Eugene, Kassim and Solomon, doctoral candidates from the FERARI program, dining after the day's brainstorming activities.



SOLOMON AMOABENG NIMAKO

"My time at Wageningen University has been a beautiful experience so far. As a Ph.D. student, the feeling of equal access and opportunity in the chair group is awesome. Most importantly,

I admire the university's emphasis on its core mandate and its efforts to situate activity in that broader goal. The campus also presents a highly multicultural environment with interesting people from many nationalities and backgrounds. It offers a whole beautiful learning experience with the opportunity to get views on similar issues from very different contexts and cultural perspectives. I am really loving the experience." ■



DELA EUGENE SETSOAFIA

"Between October 2021 and April 2022, I stayed at Wageningen University & Research to design and test research approaches to analyze decision-making processes regarding fertilizer

use among smallholder farmers. I attended Ph.D. courses on research methods, skills, competencies and career development, scientific integrity, and ethics.

The interdisciplinary nature of my research offered me the unique opportunity to be hosted by two groups, Crop Systems Analysis under the Plant Sciences group and Knowledge, Technology, and Innovation under the Social Sciences group, receiving supervision and mentorship from Prof. Dr. Ir. Paul Struik and Dr. Ir. Maat Harro, while still interacting with Dr. Comfort Freeman (University of Ghana), Dr. Mohamed El Gharous (UM6P), and Dr. Prem Bindraban (IFDC). Wageningen offered a fantastic opportunity for scientific exposure and interaction. Discussions with students and professors enabled me to explain my research and receive feedback, which shaped my understanding and communication of my ideas and research. Wageningen is located in a beautiful city, cosmopolitan and well-connected with public transit. My favorite ritual once a month was to visit a special fry joint with my good friend and colleague, Yussif, where I tried fried potatoes with different sauces: spicy mayonnaise, peanut butter sauce, five cheeses, and zuurvlees. WUR has rich academic facilities for effective studies, and the pressure to work hard is there, but I maintained some balance. After more fieldwork in Ghana, Wageningen will again host me for the final stage of my research, and I look forward to an even more exciting and productive time." ■



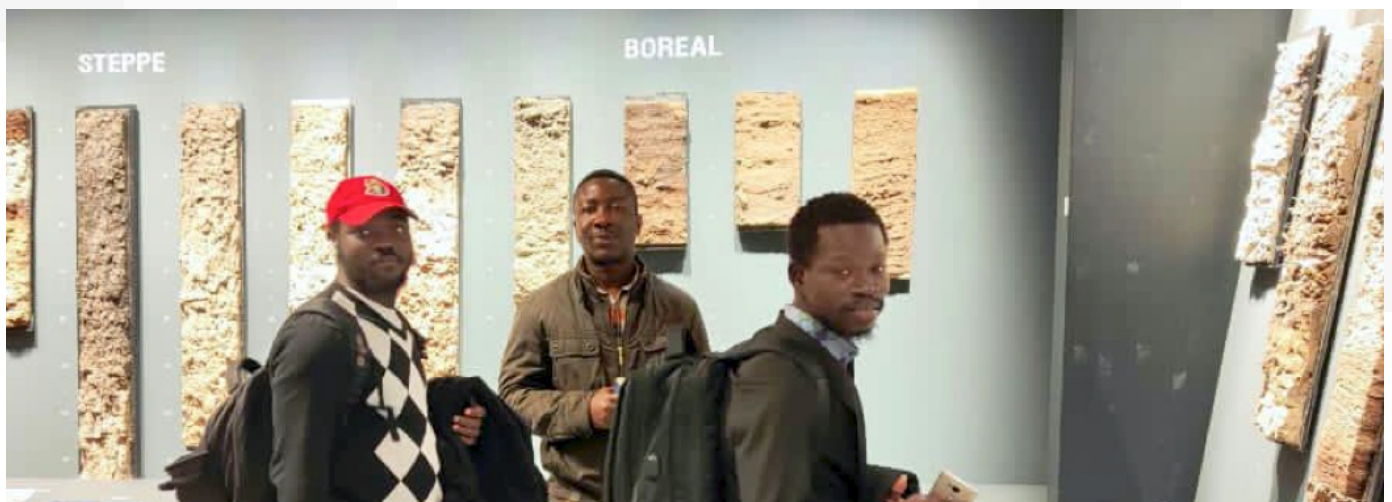
SETH TETTEH

"After receiving my master's degree from Wageningen University & Research and being immersed in the beautiful green and intercultural environment, it was a great joy for

me to join the FERARI Ph.D. program. I have the opportunity to work with Professor Cees Leeuwis, one of the few celebrated scientists in the field of innovation adoption and food systems transformation. Thus far, I have received the necessary intellectual and emotional support from my supervisory team, and I already have the feeling that I am gradually moving toward my goal of becoming an independent scientist." ■



▼ Left to right: Solomon, Eric, and Kassim visit the World Soil Museum in Wageningen.



POINTS OF VIEW: MASTER'S STUDENT INTERNS FROM MOHAMMED VI POLYTECHNIC UNIVERSITY (UM6P) SCHOOL OF AGRICULTURE, FERTILIZER AND ENVIRONMENTAL SCIENCES (ESAFE)

BOUCHRA DARKAOU

"I am a second-year master's student in the Fertilizer Science and Technology program at UM6P. To begin fulfilling my dream, I came to Ghana to work on crop growth and yield

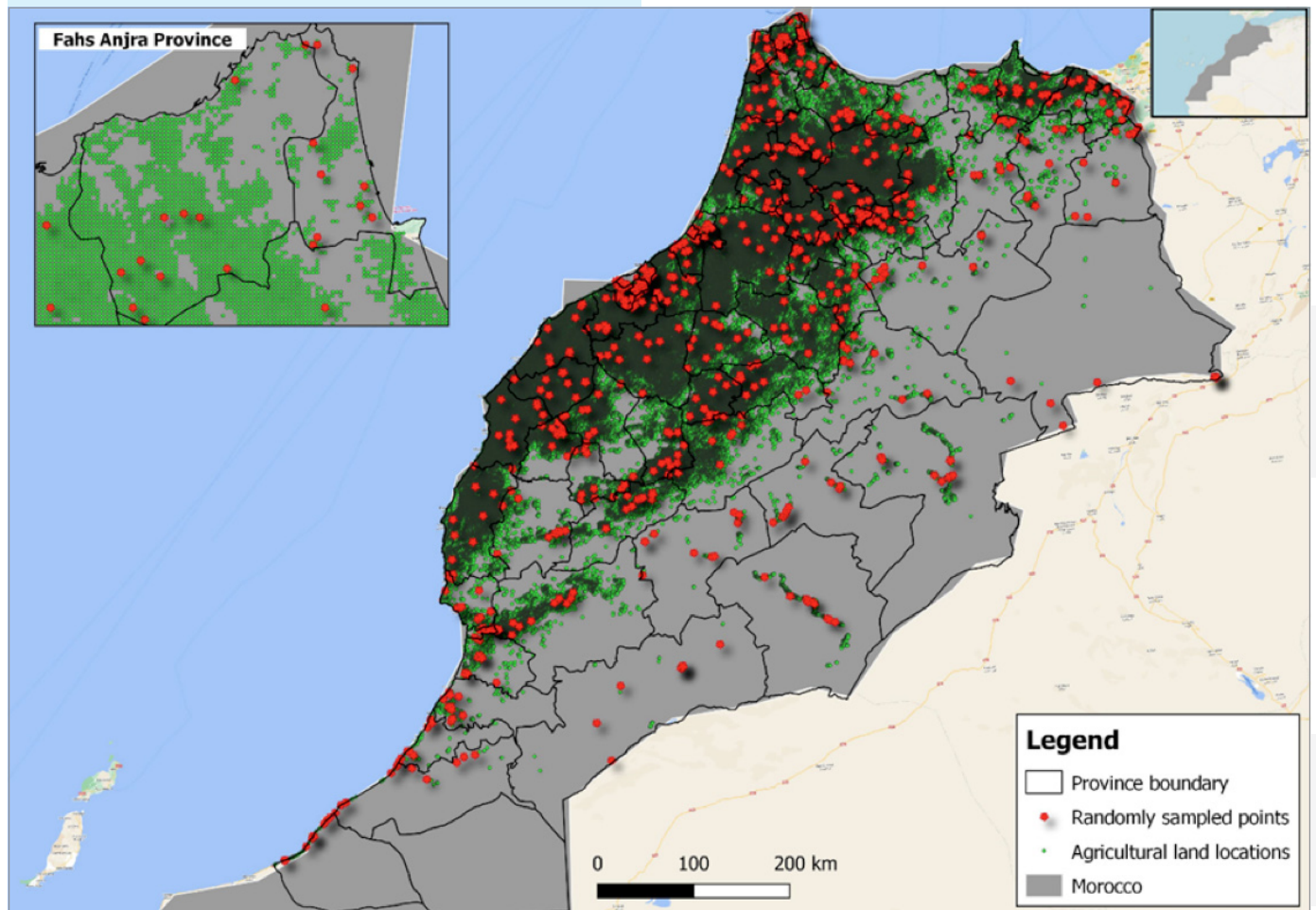
modeling by using Light Interception and Utilizations modeling (LINTUL) at IFDC under the supervision of many experts from the FERARI team. In addition, I am an Ambassador at the Innovation and Entrepreneurship Lab at UM6P. I am employing geographic information system (GIS) techniques to extract environmental data to use as inputs for crop modeling. As part of my workflow, I am following a scientific approach to randomly sample agricultural locations based on land cover maps that define where wheat is grown in Morocco to get the best representation of aggregated wheat production yield in the country. The map shows the study area, with randomly sampled points as red dots and agricultural land locations as green dots." ■



BABA KAYINGA

"I am a Fertilizer Science and Technology student at UM6P in Morocco. I joined IFDC, under the FERARI team, in January 2022 as a crop and fertilizer research intern. For my master's

research thesis, I am working on modeling maize yield response to micronutrient blended fertilizer in the Guinea Savannah and Transitional agroecological zones of Ghana. Doing my thesis research with the FERARI team is the best career experience I have had so far. I am so thrilled to work with an extraordinary and diligent team that is always available to help teach me new skills in crop and fertilizer research. Additionally, working with a research team whose purpose is to solve food insecurity, low yields, and poverty among poor smallholder farmers gives me pride." ■



LAMIA JALLAL



"I am a Moroccan with a bachelor's degree in environmental bioanalysis from Cadi Ayyad University, Morocco, and currently a second-year student in the Fertilizer Science and

Technology master's program at Mohammed VI Polytechnic University.

I was selected by the FERARI team to join the program in January 2022 for my internship, where I am working with statistical models to identify the effects of environmental parameters such as weather conditions, soil physical and chemical properties, and micronutrients on rice and soybean yields. FERARI is providing me with more than just an internship; it is providing me with the opportunity to learn more about myself, to connect with and develop my professional network, and to learn more from experts about agriculture and fertilizer in crop production, which will give me experience for future jobs. Joining FERARI has provided me with a positive energy to work and give more. Thank you, FERARI." ■



MOHAMED BOULLOUZ



"I hold a bachelor's degree in plant science from the University of Moulay Ismail and am currently pursuing a master's in the Fertilizer Science and Technology program at UM6P.

I have been working as an ambassador with the UM6P Sustainable Development (SD) department. I also have a fellowship with the Clinton Global Initiative University to reduce the vulnerability of smallholder farmers and rural communities to climate change. I joined the FERARI team to conduct my internship that aims to implement and test a new methodological approach based on crop-soil modeling to estimate the yield gap of maize and to explain the major determinants of the low yield across Ghana. Working with FERARI has been a great opportunity for me to discover, learn, and implement new technical and professional skills. I am glad that the team gave me the opportunity to discover the state of agriculture in Ghana, which will help me in understanding how I can contribute to its development process." ■



FERARI
FERTILIZER RESEARCH & RESPONSIBLE IMPLEMENTATION

IFDC
Developing Agriculture from the Ground Up

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