FERARI
FERTILIZER RESEARCH & RESPONSIBLE IMPLEMENTATION

IFDC
Developing Agriculture from the Ground Up

12TH QUARTER – JANUARY 2023

QUARTERLY newsletter

FERARI FOCUS

EXPECTATIONS OF THE EVOLVING FERTILIZER PLATFORM GHANA

FERARI, in collaboration with key partners, has indeed established the Fertilizer Platform Ghana (FPG) to play a major role in fostering an all-inclusive sustainable fertilizer sector in the country and beyond. The FPG is one of the biggest achievements of the FERARI program so far, thanks to fruitful cooperation among private and public sector stakeholders in Ghana.

At the **FERARI Coordination Conference in October 2022**, stakeholders expressed important suggestions and expectations of the platform. They stated that the FPG should play a major part in getting the Government of Ghana to make better use of the platform for fertilizer sector sustainability, through mobilization of private sector support to stimulate research and development and generate evidence-based interventions, including relevant extension service between farmers and researchers.

With the FPG now fully established, led by its Co-Chairs, Executive Committee, and sub-committees, FERARI and stakeholders are eagerly looking forward to the platform effectively delivering on its mandate. Accordingly, they feel the FPG should forge ahead to function as the independent, financially and institutionally sustainable fertilizer platform it was envisioned to be.

Thus, these first FPG leaders are expected to decisively pursue this agenda. ■

FERARI FEATURE

INITIAL FERARI COORDINATION CONFERENCE HELD IN OCTOBER 2022

▲ *Conference attendees listen to a presentation on nano-fertilizer technology given by Professor Gilles from the University of Liège.*

FERARI successfully organized its maiden in-person Coordination Conference in October 2022. The conference had been delayed due to the COVID-19 pandemic, which coincided with the rollout of the FERARI program. More than 80 international and local participants were convened, representing OCP, Mohammed VI Polytechnic University (UM6P), Wageningen University and Research, Liège University, Connecticut Agricultural Experiment Station, Indian Agricultural Research Institute, Ministry of Food and Agriculture (MoFA), Soil Research Institute, Savanna Agricultural Research Institute, and Ghana's public universities. The conference consisted of two parts.

The first segment was held in Accra, with high-level representation from MoFA, to discuss global fertilizer challenges and implications for Ghana and Africa as a whole. Mitigation strategies to circumvent the fertilizer

challenges were also discussed, including the role of the FERARI program.

The second part of the conference, held in Tamale, allowed attendees to reflect on FERARI's experimental and survey findings over the past two years, identify options for improvement, and consider the research activities of the five FERARI doctoral students. The participants also took the opportunity to visit Mole National Park. The conference has undoubtedly raised many key issues and demonstrated an appreciation for the simultaneity in research and implementation by the project. Participants overwhelmingly called for an extension of the duration of the FERARI program in order to achieve greater and sustainable impacts. ■

▲ *Prof. Mohammed El-Gharou (left) of UM6P looks at the effect of fertilization on soybean nodulation together with Baba Kasim (right), a FERARI Ph.D student.*

▼ *FERARI Ph.D and MSc. students along with UM6P and Ghanaian partners (university staff and researchers) visit a FERARI on-farm trial in the Northern Region of Ghana.*

UPDATES ON FERARI INTERNS

FERARI continues to provide financial and technical support to Ghanaian master's-level students. This is having a significant impact on how research is framed and executed among local students and staff. Five socioeconomic students have recently received approval for their research by their universities, and this is being sent for external examination. Support from the FERARI program has actually helped the students to finish their thesis on time and with a high quality. Their research provided evidence on a number of key topics toward improving Ghanaian agriculture and the livelihoods of farmers in the country. Assessments were carried out on agricultural development programs, fertilizer use, sustainable crop production and farming systems, and approaches for effective agricultural technology transfer. High praise for the research outcomes has been given by the professors of the universities, particularly the University of Ghana. The research will soon be developed into FERARI reports, policy briefs, and research articles for reaching a wider audience. ■

SETH TETTEH: REFLECTIONS ON VISITING UM6P

"My two-month stay at UM6P in Morocco was a memorable one," said Seth Tetteh, FERARI doctoral student. "I am full of appreciation for the wonderful arrangements made for my colleague Eric and my travel and stay, with pickup at the airport and help with settling in at UM6P."

The visit included true local cuisine, he recalled. "I have fond memories of when we first went to the university restaurant with Soukaina from HRM. She took time to guide us to pick what was required and also provided moral support to try the typical Moroccan dish that was being served at that time. I soon fell in love with that local Moroccan delicacy and was sad that I couldn't have it one last time before our departure."

On the academic side, it was a privilege to experience the conducive academic atmosphere that UM6P offers to its students. I was particularly impressed by how UM6P has successfully succeeded in incorporating transparency and academic accountability into the fabric of UM6P culture through the orientation and design of the academic program. I had the opportunity to give some presentations to my supervisor and the FERARI team at UM6P, which helped generate a lot of feedback for further streamlining the upcoming paper on subsidies in Ghana. ■

ERIC ASAMOAH: UM6P IS A REMARKABLE INSTITUTION

"UM6P is a remarkable institution that provides an outstanding research experience, making it an ideal place for anyone looking to further their knowledge in a specific field," explained Eric Asamoah, one of FERARI's doctoral students. "My colleague Seth and I had a truly enriching experience when visiting the university from November to December 2022."

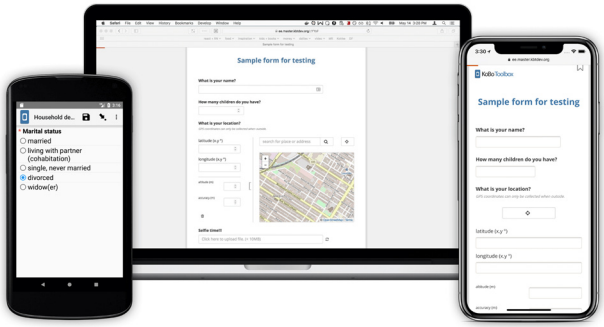
"One of the most notable aspects of UM6P is its state-of-the-art facilities. From well-equipped laboratories to libraries, the university has everything that one would need to carry out research. The facilities are designed to support the academic and research pursuits of students and faculty members alike. This has allowed it to attract some of the best minds in the academic world." Eric continued, "UM6P is also home to a vibrant community of students, faculty, and staff members. This community is highly collaborative, supportive, and always willing to lend a hand to anyone who needs it."

"While short, the experience was incredible." He concluded, "I was able to complete a machine learning model that determines nutrient (NPK) requirements for locations in the Ghanaian context, which will be tested in field trials this year." ■

▼ *Seth Tetteh (middle left) and Eric Asamoah (right) attending the graduation ceremony of two previous FERARI interns, Lamia Jallal (left) and Bouchra Darkaoui (middle right)..*

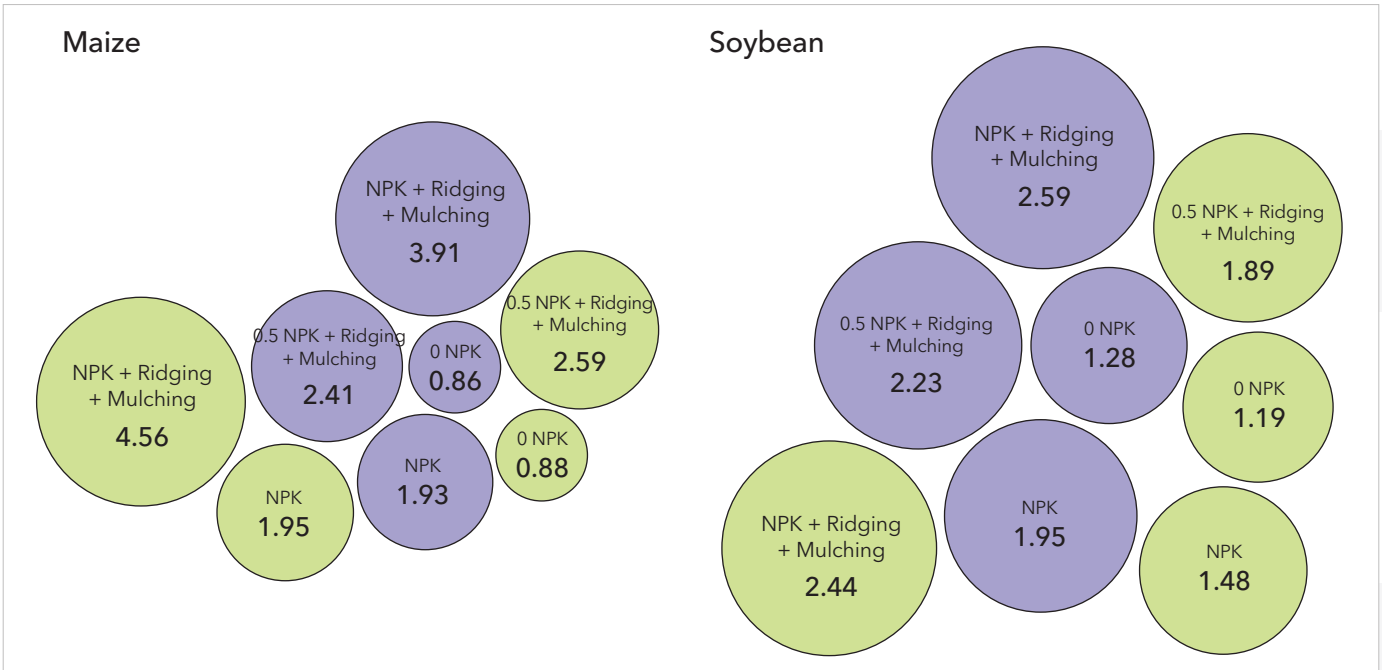
KOBOTOOLBOX ASSISTANCE

FERARI relies on a computerized data collection system to ensure the high quality and efficiency of its socioeconomic surveys. An open data kit (ODK) is a suite of open-source tools that help to collect and manage data, transforming the data collection process from paperwork to forms that can be used online or offline. An ODK permits the inclusion of graphics and pictures, automatic formula calculations, and the generation of GPS locations. With the ODK, real-time data can undergo verification, cleaning, and analysis. FERARI's economists and Ph.D. students rely on technical staff for designing and managing the data collection process. Studies involving data collection have included "Farmer Preferences for Innovative Market Arrangements for Sustainable Agricultural Intensification" by Solomon Amoabeng and "Profiling Farmers for On-Farm Farmer-Managed Trial on Fertilizer Use and Soil Fertility Management" by Eugene Setsoafia. FERARI's technical consultant specializing in mobile data collection, Geoffrey Amaniampong, says using the KoboToolbox is an asset to the program, its staff, and IFDC to professionalize data collection and significantly cut costs. Geoffrey has improved his technical skills in the design of the computerized data collection system, which is good for the project and his personal development. ■



FERARI TRIALS SHOW COMPLEMENTING NPK FERTILIZER APPLICATION WITH RIDGING AND MULCHING IMPROVE MAIZE AND SOYBEAN YIELDS

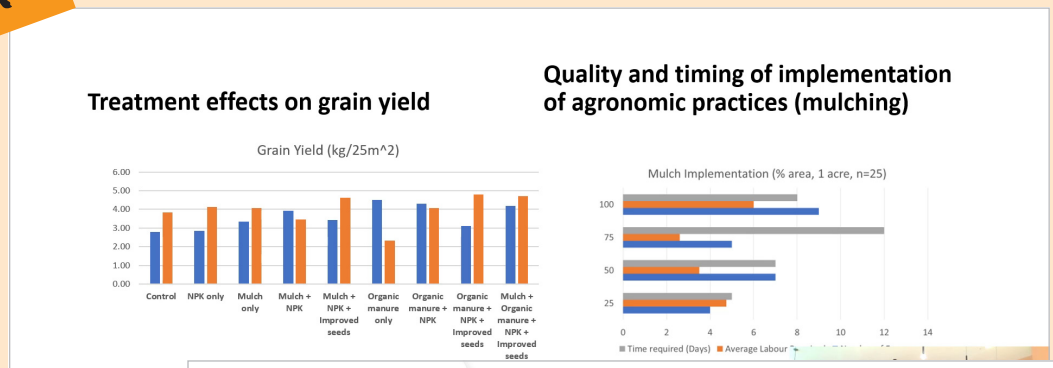
The erratic and sometimes insufficient rainfall in northern Ghana, along with the low water-holding capacity of the soils, causes low and variable available soil moisture, leading to a low yield increase per kilogram of nutrients applied. Therefore, it was hypothesized that ridging and mulching could enhance the agronomic nutrient use efficiency of N, P, and K. Field experiments revealed that implementation of ridging and mulching of NPK-fertilized plots significantly increased both maize and soybean grain yields, irrespective of the variety tested. Applying half of the recommended NPK rate together with ridging and mulching largely resulted in statistically similar yields as compared to the sole application of the full recommended NPK rate. Clearly, multiple years of experimenting and testing in farmer-managed experiments would be needed to determine the true effectiveness of the treatments. ■



▲ ***Figure 1.*** *Graphical representation of maize and soybean yield response to N, P, and K as affected by ridging and mulching. Purple = Variety 1 (CSIR-Sanzal Sima [maize]; CSIR-Favour [soybean]), Green = Variety 2 (Obatanpa [maize]; Jenguma [soybean]). Numbers in the circles indicate yield in metric tons per hectare. Within crop comparisons were made.*

FERARI MEDIA: SOIL FERTILITY PRACTICES AMONG SMALLHOLDER FARMERS (VIDEO)

PhD student Eugene Setsoafia elaborates about his field work in a video message: https://youtu.be/2Zdtmm4H3eU



FERARI DATA QUALITY: KWESIE BENJAMIN AND GEOSPATIAL EXPERTISE

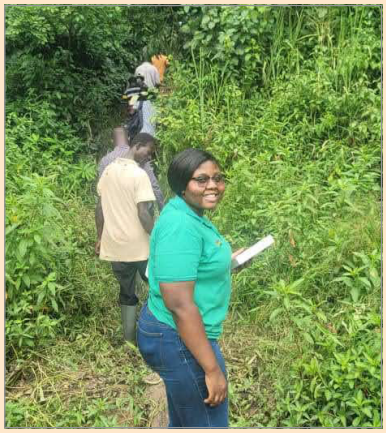
Kwesie Benjamin has advanced knowledge in remote sensing and GIS using QGIS, multivariate and spatial analysis using R and Python, and spatial database design and management using PostgreSQL with the PostGIS extension. He also possesses extensive practical field mapping experience and recently joined the FERARI program as the management database, modeling, and mapping specialist.

Kwesie explains, "I support the cleaning, analyzing, mapping, and modeling of geospatial data. In my day-to-day responsibilities, I also write code in Python and JavaScript to automate the download and extraction of climate data needed to complement in-situ field data for geostatistical analysis and spatial modeling. I prepare maps that allow for an intuitive visual understanding of the various spatial analyses that are being conducted by the FERARI research team."

"I believe in what FERARI as research program is doing; that is a problem-driven approach to research and finding scientific ways to answer the 'Whys?' As part of the team, it is my utmost joy to contribute my knowledge and technical skills in finding scientific ways to improve crop yield through fertilizer application and better understanding of soil organic matter, soil depth, pH, and slope as drivers of yield response to fertilization." ■

FERARI DATA QUALITY: AKUA FORIWAA KWARTENG

One of FERARI's core aims is to deliver recommendations that are evidence-based and take quality assurance of data seriously, and FERARI intern Akua Foriwaa Kwarteng assists the team with data quality control. The 2020 and 2021 data that were collected by FERARI researchers were carefully examined and compared with the field data notepads.



Akua explained that data quality control, in simple terms, means the application of methods or processes that determine whether the data meet overall quality goals and defined quality criteria for individual values.

The FERARI team took an extra step by visiting the researchers for further explanation and an understanding from their point of view. Afterward, the group took time to recalculate the data received, she said. All agreed that human error could have occurred in the data entry, so all the spreadsheets received from the various institutions were reviewed. In order to track all the corrections, two unique colours were used to indicate where a correction was made and those figures that were the same as received. These steps have helped in the design of new plans for 2022 data collection, Akua reports. ■

FERARI DATA QUALITY: ANGELA NANA AMA FREMA ANOKYE

Angela Nana Ama Frema Anokye joined FERARI in November 2022 as an intern. She currently holds a bachelor's degree in agriculture, with a specialty in soil science, from the University of Ghana. Angela joined FERARI at an important time, when program data were being cleaned for analysis. She has been meticulous, effective, and efficient with the data collection and cleaning. In her words, "Being a member of the team has been a thrilling opportunity for me because it has allowed me to expand my knowledge and skills. I have learned a lot within the past few months, and I anticipate learning even more in the future. I am confident that my contribution will help FERARI achieve its goals and objectives." Since joining, Angela has contributed positively toward improving the working environment, even relationships among existing staff. With her commitment and dedication, she will be a great asset to the FERARI program and IFDC as a whole. ■

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