

## Factsheet final findings Applied Research Fund Call 2



### Enhancing Rice Markets in Uganda through Smart Micronutrient Fertilization (ENRICH)

#### Summary

Rice is an important food staple and a major source of income among smallholder farmers in Uganda. However, yields are very low, averaging 2.5t/ha. This project therefore aimed to increase food, nutrition and income security of smallholder lowland rice farmers in Uganda through testing and recommending best micro- and macronutrient (NPK) fertilization strategies for optimum yields and nutritional quality. Objectives were to evaluate and identify appropriate composition and mode of application of micronutrients (SmartFert) for optimum yields of lowland rice, and integrate and out-scale SmartFert into current farmers' production practices for improved rice productivity. Field experiments were conducted in two different agro-ecologies with the participation of Farmers' Research Groups (FRGs) to assess the effects of combined application of micro- and macronutrient fertilizers on yield and grain nutritional quality of lowland rice. An omission trial of different micro- and macronutrient fertilizer combinations and application methods (soil or foliar) was done during two different growing seasons in the two agro-ecologies, using a randomized complete block design.

On-farm trials are still on-going to demonstrate to farmers the advantages of good crop management practices and only macronutrient (NPK) fertilization, as feasible steps towards intensification of the Ugandan lowland rice systems, since micronutrient fertilization did not significantly improve yields.

#### Research findings

Mean grain yield increase due to NPK application over 1<sup>st</sup> and 2<sup>nd</sup> season, respectively, was 33% and 92%, with 7% and 26% additional yield when micronutrients were applied together with NPK. Due to variability, effects of micronutrients were not statistically significant but their addition to NPK can provide \$100 additional net profit. Analysis of on-farm trials reveal that good agricultural practices (GAPs) are key in improving rice yields under current soil conditions. On-farm trials results showed that farmers realize 7% yield gain over control when they use GAPs, but no yield increase when farmers used selected management practices and apply some nitrogen fertilizer. Use of GAPs + NPK resulted in 25% yield increase over control. Grain zinc concentration of white rice was increased on average by 23.3% and 10.5%, during the 1<sup>st</sup> and 2<sup>nd</sup> seasons, respectively, due to micronutrient fertilization but this increase was not different from the unfertilized (control) and only NPK treated plots. Good crop management practices seem a feasible first step towards improving lowland rice yields under current Ugandan soil conditions.

#### Outcomes achieved

The involvement of farmers in trial monitoring and evaluation has resulted into farmers showing high interests to adopt the innovations demonstrated, as they feel they are part of the new innovations developed.

- Some farmers, especially the Farmers' Research Group (FRG) members, are applying the gained knowledge from trainings and participation in conducting the trials. Positive results have been reported by the FRG members: "I applied NPK in my garden following the best practices that we have been taught through the ENRICH project, and I was able to get

1.8t/acre yet I used to get only 1.2t/ha” says Mzee Danson Haperi. Mrs. Efrance Kabasa another FRG member also noted, “I used the same knowledge acquired from ENRICH project participation in my maize garden and I was able to get double yields from what I used to get”.

- Line transplanting of rice is one of the good crop management practices that was demonstrated for higher yields. Many farmers have adopted the line transplanting instead of random transplanting.

#### Project messages to

##### A) Actors from private sector:

- There is a great business opportunity in investing in mechanisation services for farmers to help in timely and efficient land preparation as there are reported labour shortages during peak season, resulting in delayed land preparation.
- For genuine fertilizer supply, fertilizer shops need to be established near farmers so they can easily, timely and affordably access them.

##### B) Civil society and practitioners organizations:

- There is a need to work closely with farmers through trainings and participation during the design, development and dissemination of new technologies. This helps change farmers’ mind-set so that they move away from their traditional ways of farming to improved modern methods that improve productivity.

##### C) Policy makers:

- Policy makers need to formulate and effectively implement policies geared towards enhancing farmers’ access to quality agro-inputs. They should also protect farmers from unscrupulous business people; as farmers see no yield advantage of using fertilizers purchased from retail shops or mobile agro-input dealers, this makes them lose trust in the quality and usefulness of fertilizers.

#### Knowledge products

- Using [social media](#) to communicate project research work and outputs has increased the project impact.
- Through the [Africa Innovations Institute website](#) the ENRICH project activities have been shared.
- [Scientists train rice farmers on fertilizer use](#). News item on Radio Simba.
- [Women reaps over 50 million shillings annually from growing rice](#). News item on NBS TV Uganda, 2016.
- Project brochure; printed and distributed for different stakeholders (hard copies).

#### Knowledge networks

Through the Africa Innovations Institute the project is sharing valuable information, like activities and output, for stakeholders in the rice value chain, making it a key knowledge sharing platform. This interaction has generated a lot of positive feedbacks from different stakeholders in the rice value chain that have a great interest on fertilizer innovations that can be recommended for the farmers to take up for improved grain yield, improved food security, and increased income.

#### Knowledge co-creation

All key stakeholders including researchers, local and central government leaders and extension personnel, NGOs, farmers, rice millers and traders, agro-input dealers, credit and financial institutions and development partners working with farmers, were engaged from the start of the project through a stakeholders’ planning workshop. Here research design and protocol were developed. Stakes and role(s) of each stakeholder in the project, details of project activities, implementation plans and the way forward for a successful project implementation were discussed. A Farmers’ Research Group (FRG) was set-up and trained at the beginning of the field trials to monitor and evaluate the different fertilizer combinations and select the best combinations that can be incorporated into their current production practices.

Current on-going participatory on-farm trials are being implemented with full participation of farmers within the areas where the trials are being conducted.

#### Consortium Partners

- [Africa Innovations Institute \(AfrII\)](#)
- [Wageningen University, Centre for Crop Systems Analysis](#)
- [Africa Rice Centre, Madagascar](#)
- [FICA Seeds](#)
- [ISRIC – World Soil Information](#)
- [VFRC-IFDC – Virtual Fertilizer Research Centre of the International Fertilizer Development Center](#)
- [WindWood Millers](#)

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#### Project website

[F&BKP Research Project page](#)