

Factsheet final findings Applied Research Fund Call 1



Farmer-led soil innovations to sustain food production

Summary

Agricultural production in Northern Uganda is constrained by labour shortage and unsustainable soil management regimes. Conservation Agriculture (CA) addresses certain aspects of these constraints. Through minimum tillage, use of herbicides, optimum crop spacing and mulching, weeds are suppressed and soil conservation is improved. By use of legume-cereal crop rotations and judicious fertilizer applications fertility can be maintained. The project involves 106 farmers (75 men and 31 women) from Nebbi, Nwoya and Pader Districts. Participating farmers were identified by their ZOA established rural development groups and the trial plots were developed under the guidance of Makerere University (MU). Farmers spearheaded the selection of test crops, whereas the MU team designed the field trials to test the sustainability and resilience of the CA practices. Promising results from analyses, jointly conducted by MU and Alterra, are being adapted into clear extension messages which include herbicide use, proper crop spacing and soil conservation.

The project started in August 2014 and finished in July 2017. Research has considered; Rhizobia inoculation to harness natural nitrogen, phosphorous fertilisation, consideration of inherent soil fertility gradients based on farmers' indigenous knowledge (across contrasting agro-ecological zones), household data collection, and a comparison of laboratory and "quick-test" soil analyses (to establish the scientific basis of farmers' soil quality indicators).

Research Findings

The project recorded the following observations relating to farmer assessment of field fertility:-
 Poor fertility - Excessive weed infestation, high labour costs (land opening up to four times and weeding up to six times yet, with low yields or total crop failure), soil compaction and stunted vegetation with crops turning 'brownish-yellow' were the key indicators of a poor field.

Moderately fertile fields - moderate soil moisture retention (fields remaining moist for up to two weeks after a rainfall event), patched presence of guinea grass (*Panicum maximum*), *Hyperrhenia* sp., and Congo signal in moderately fertile fields

Fertile fields: - Dense cover of vigorous guinea grass, Napier grass (*Penisetum purpureum*) and *Hyperrhenia* sp. as well as porous soil easy to till and good moisture retention (soil remaining moist for up to four weeks after a rainfall event) as the most important indicators and abundant worm casts as the other major indicator of fertile fields.

Weeds are opportunistic plants with a competitive advantage over crops in stressful environments. Similarly, guinea grass, Napier grass, Congo signal and *Hyperrhenia* sp are very sensitive to soil fertility and immediately lose vigor with the on-set of soil fertility decline. These findings highlight the reliability of local indicators of soil fertility assessment as an important entry point for advancing climate-smart CA practices in northern Uganda and beyond.

Stories of Change

George William (project farmer - pictured above) – *"I am only a farmer and many people come to me asking for advice"*

Evelyn (project farmer) – “I earned more from my farm than my husband does from teaching and payments do not have to wait for delayed payments thanks to the ARF training by ZOA”.

Richard (project farmer) – “Rain is a big problem and CA agriculture is very important in addressing this.”

Project messages to

A) Actors from private sector:

- Businesses should work with farmers, to build on the knowledge they have in order to deal with soil fertility and climate mitigation practices.

B) Civil society and practitioners organizations:

- CA helps to build soil fertility and structure when practiced well in its 3 dimensions of minimal soil disturbance, crop rotation and permanent soil cover.

C) Policy makers:

- Ensure that farmers are knowledgeable about the use and application of farm inputs through extension worker training. Regulate the selling of inputs to ensure farmers can only buy quality inputs.

Knowledge products

- Endline survey, July 2017
- [Project PowerPoint presentation](#), January 2017
- [Project poster](#), September 2015

Knowledge networks

The Food and Business Knowledge Platform and the communication networks of ZOA, Makerere and Alterra.

Co-creation

ZOA, Makerere and Alterra worked very well together and added great synergy within the project implementation. Also the close interaction with local government to ensure project sustainability

Consortium Partners

- [ZOA, Uganda](#)
- [College of Agricultural and Environmental Sciences of Makerere University, Uganda](#)
- [Alterra - Wageningen UR, The Netherlands](#)

Contact person

Bettina Bäsch, ZOA
b.baesch@zoa.ngo

Project website

[F&BKP Research Project page](#)