

## **Climate change mitigation and adaptation potential of conservation farming practices and biochar application under annual cropping systems in Uganda**

### **Background**

Makerere University, Kampala, is the highest-ranked University in Sub-Saharan Africa outside of South Africa. The University is composed of nine colleges and one school, offering programmes for about 36,000 undergraduates and 4,000 postgraduate. The College of Agricultural and Environmental Sciences (CAES) is implementing a six-year project funded by the Norwegian Agency for Development Cooperation (NORAD) through the Norwegian Programme for Capacity Development in Higher Education and Research for Development (NORHED II). The project title is "Climate Smart Agriculture in Sub-Saharan Africa" and has 6 implementing partner Universities including the Norwegian University of Life Sciences (NMBU); Makerere University; Gulu University; Wondo Genet College, Hawassa University; University of Zambia and University of Juba. Other organizations participating in the project include the Norwegian Geotechnical Institute (NGI), ICRISAT Ethiopia, Rural Enterprise Development Solutions (REDS) in Uganda and Conservation Farming Unit (CFU) in Zambia. The main objective of the project is to generate and share new knowledge and to contribute to capacity building with respect to food security and on-farm profitability in Sub-Saharan Africa through innovative and sustainable climate-smart technologies.

We are searching for a candidate to fill one vacant PhD position within the project. The PhD research will fall within the broad field of evaluating the socio-economic aspects and uptake of Climate Smart Agriculture (CSA) technologies. Climate change and its effect on crop production is expected to continue and even worsen in the near future. The common effects of climate change being experienced by farmers are the unreliable and erratic rainfall patterns often causing drought and floods with negative effects on crop yields. The contribution of agriculture to climate change has also been highlighted due to unsustainable farming practices such as conventional farming with its associated increased greenhouse gas emissions. Biophysical scientists have identified conservation farming and biochar as an approach that cannot only help in climate change adaptation but can contribute to climate change mitigation in Sub-Saharan Africa by either enhancing soil C storage or by cutting down greenhouse gas emission from crop fields. These technologies are expected to be promoted to the end users for uptake. In addition, there exists a potential to promote the technologies as alternative agribusiness ventures. This will ensure the technologies are sustained with the resultant benefits accruing to a larger farming population over a wider geographical location.

In this PhD opening, we seek to recruit a Ugandan to evaluate all the climate-smart technologies in terms of acceptance, uptake and upscaling for sustainability. In particular, the candidate will assess the business opportunities associated with the developed CSA technologies, build a business model and prototype it, in addition to establishing the most appropriate uptake pathways for scaling CSA technologies. The candidate will in addition be required to determine how CSA technologies contribute to yield, net farm incomes, food security and poverty reduction

### **Research/study location**

The PhD research project will be implemented at the sites of an ongoing project: the Research Council of Norway funded project – The ClimSmart Project. This ongoing project is being implemented in Alebtong and Mubende districts with several partners including Makerere University, Rural Enterprise Development Solutions (REDS), NMBU, NGI and Menon Economics. The PhD program will be implemented on a sandwich arrangement between Makerere University and NMBU but the PhD

degree will be awarded by NMBU. This implies the candidate will spend time both in Norway and Uganda with the greater share of time spent in Uganda.

### **PhD research topic**

The successful PhD candidate will develop the exact research topic in consultation with the project research team and supervisors from Makerere University and NMBU in line with Work Package 2: Socio-economics of the project (NORHED II) led by Makerere University.

### **Main tasks**

- Conduct baseline and endline surveys on CSA technology studies in Alebtong and Mubende Districts.
- Determine CSA technology contribution to yield, net farm incomes, food security and poverty reduction.
- Conduct cost-benefit analysis of the CSA technologies for the different farming systems in each of the partner countries: Ethiopia, Uganda, South Sudan and Zambia.
- Determine the most appropriate uptake pathways for scaling CSA technologies and limiting attrition rates once adoption takes place.
- Collaborate closely with other students and researchers on the project in all partner countries.

The successful candidate is expected to submit a research proposal - and progress plan for the PhD degree during the first months of the appointment, and a doctorate is expected to be completed within the 4-year PhD scholarship period.

### **Competence**

In order to be considered by the selection team at Makerere University, Kampala, the candidate must meet the requirements for admission to one of the PhD programs at NMBU. A Master's degree of at least 120 credits (ECTS) is required, which is based on a Bachelor's degree of at least 180 credits (ECTS), or integrated Master's degree of at least 300 credits (ECTS). The applicant must have a documented strong academic background from previous studies, and be able to demonstrate good literary skills, both written and oral. For more detailed information on admission criteria, see the PhD Regulations ([https://www.nmbu.no/en/research/phd/regulations\\_guidelines](https://www.nmbu.no/en/research/phd/regulations_guidelines)) and the "supplementary provisions for the PhD programmes" ([https://www.nmbu.no/en/research/phd/regulations\\_guidelines/supplementary-regulations-phd](https://www.nmbu.no/en/research/phd/regulations_guidelines/supplementary-regulations-phd)).

The applicant must demonstrate expertise and interest in the research subject.

### **Required Academic qualifications**

- Master's degree in a relevant field, such as Agricultural Economics, Agricultural and Applied Economics, or Agribusiness Management, preferably obtained within the last 5 years.

### **Other requirements**

- The preferred candidate is one available fulltime during the 4 years of the scholarship.
- The candidate should be 35 years or younger by the time of application.
- Female candidates are particularly encouraged to apply.
- In case of a tie based on technical competency, younger or female candidate shall be considered.

**The following experiences and skills will be advantageous:**

- Familiarity with Ugandan farming systems.
- Scientific publications within climate smart agricultural technologies or related subjects.

#### You need to:

- be solution-oriented and possess the ability for independent work displaying initiative and careful thought.
- have an analytical and academic approach to research questions.
- have good collaborative/social skills.
- have a keen interest in spending prolonged work periods.
- have experience with academic writing.

#### PhD project timeline

Time/Activities	Year 1: 2022/2023				Year 2: 2023/2024				Year 3: 2024/2025				Year 4: 2025/2026			
	Q1 May- Jul 2022	Q2 Aug- Oct 2022	Q3 Nov 2022- Jan 2023	Q4 Feb- Apr 2023	Q1 May- Jul 2023	Q2 Aug- Oct 2023	Q3 Nov 2023- Jan 2024	Q4 Feb- Apr 2023	Q1 May- Jul 2024	Q2 Aug- Oct 2024	Q3 Nov 2024- Jan 2025	Q4 Feb- Apr 2025	Q1 May- Jul 2025	Q2 Aug- Oct 2025	Q3 Nov 2025- Jan 2026	Q4 Feb- Apr 2026
Appointment																
Orientation																
Literature review/identification of research gaps																
Presentation of detailed research proposal/plans																
Attending coursework																
Field data collection / analysis																
Publication																
Thesis writing /PhD defence																
Time in Norway																
Time in Uganda																

#### Application

All applications should be delivered by 15<sup>th</sup>.12.2021 to the following address:

Department of Agribusiness and Natural Resource Economics, College of Agricultural and Environmental Sciences, Makerere University. PO Box 7062, Kampala Uganda or via email to Assoc. Prof. Jackline Bonabana; [jackline.bonabana@mak.ac.ug](mailto:jackline.bonabana@mak.ac.ug) with a copy to Prof. Samuel Kyamanywa at [samuel.kyamanywa@mak.ac.ug](mailto:samuel.kyamanywa@mak.ac.ug).

The following documents must be attached to the application:

Motivation letter

Complete CV

Certified copies of academic certificates and transcripts including a translation if the documents are not in English.

Names and contact details for two references

Applicants invited for an interview are expected to present original certificates and transcripts.