



MAKERERE UNIVERSITY

**College of Agricultural and Environmental Sciences (CAES)**

**CALL FOR APPLICATIONS FOR PhD SCHOLARSHIPS UNDER THE PROJECT TITLED:  
“Robusta coffee agroforestry to adapt and mitigate climate change in Uganda-  
ROBUSTA”**

**Date: 13/05/2022**

**Background**

The European Union through its Programme known as “Development Smart Innovation through Research in Agriculture”- DESIRA is supporting a consortium of 8 International and National research organisations which include:- The French Agricultural Research Centre for International Development (CIRAD), The International Centre of Insect Physiology and Ecology (ICIPE)-Kenya, The Institute of Research For Development (IRD)-France, Makerere University (MaK)-Uganda, The National Coffee Research Institute (NaCORI)-of the National Agricultural Research Organisation Uganda (NARO), The National Forestry Resources Research Institute (NaFORRI) of NARO, Strand Life Sciences Private Limited (Strand)-India, and The Uganda Coffee Farmers Alliance Limited (UCFA) to implement a research project in Uganda titled “*Robusta coffee agroforestry to adapt and mitigate climate change in Uganda*” with CIRAD as lead institution.

The overall project objective is to support sustainable economic development of Uganda by promoting and improving the Robusta coffee agroforestry farming system. The specific objectives: (i) To design improved Robusta-coffee-based agroforestry systems for enhanced adaptation, mitigation and resilience capacity to buffer climate change impact. To be achieved through international scientific collaboration and participative approach, and (ii) Through partnership with local producers and multi-stakeholders’ interactions, to foster the adoption at all levels, from farm to development strategy designers, of C-Af as a means to counter climate change impact.

As part of the capacity building endeavour, the consortium is searching for qualified candidates to fill fourteen vacant PhD positions within the project. The PhD research will fall within the broad field of evaluating, designing and promoting coffee agroforestry systems for adapting and mitigating climate change effects. In particular PhD research will cover among others (i) **Soil and plant health studies seeking to improve the soil and climatic resilience of coffee small-holder farms and examine ways for taking advantage of Microbiota-mediated soil and plant health interaction in ecological intensification (diversification) of C-Af systems.** (ii)

**Selection and breeding for drought and heat resistance (ii) Pest and diseases (P&D) control in coffee agro-forestry systems (C-Af)**, The activity concentrates on major coffee pests and diseases in Uganda.

### **PhD research topic/areas**

Applications are required for each of the specified research topics below:-

- a. PhD 1: Coffee genetic diversity ‘Native diversity** in relationship with the biotic and abiotic environment’. Survey for new coffee collections from natural forests of Uganda and characterize them using molecular tools. This work to be supervised by **NaCORI and CIRAD**

#### **Qualification:**

- i. Possession of an MSc degree in Crop Science or any closely related Masters’ degree in the broad field of crop science.
- ii. Evidence of ability to conduct quality research from concept development to publication.
- iii. Possession of an admission letter for a PhD degree in either plant breeding, genetics, plant biotechnology or related discipline in a University in Uganda is added advantage

- b. PhD 2: Reproductive Biology and Bionomics of BCTB and CBB:** The PhD will study the influence of coffee nutrition on BCTB and their natural enemies (tritrophic interaction). In addition, the PhD study will cover reproductive biology of BCTB on coffee. The key questions to be addressed are (i) can the impact of the natural enemies on BCTB be increased through manipulation of the coffee nutrition (tritrophic interaction), and (ii) how does soil nutrition and coffee agroforestry systems influence reproductive biology of BCTB. This work will be supervised by **Makerere University, Padova University and CIRAD**

#### **Qualification:**

- i. Possession of an MSc degree in Crop Science (Pest management or any closely related Masters’ degree in the broad field of crop science.
- ii. Evidence of ability to conduct quality research from concept development to publication.
- iii. Possession of an admission letter for a PhD degree in either crop science or entomology university in Uganda is an added advantage

- c. PhD 3: Epidemiology of key coffee pests on the grid** The **Ph.D.** will determine the ecological factors affecting distribution and damage dynamics of key coffee pests, namely the Coffee Twig Borer (BCTB); Coffee Berry Borer (CBB) White Stem Borer (WSB) and Coffee Mealy Bugs. This work will focus on a grid covering the robusta production area in Uganda to capture the effect of the landscape diversity on pest distribution. Additionally, the work will cover the effect of coffee field microclimates

on key coffee pests/ plant health and coffee productivity. The Work will be supervised by **NaCORI, CIRAD and Makerere University**

***Qualification:***

- i. Possession of MSc in Crop Science or any closely related Masters' degree qualification biased to crop entomology.
- ii. Evidence of ability to conduct quality research from concept development to publication.
- iii. Possession of an admission letter for a PhD degree in entomology or closely related discipline will be an added advantage

- d. PhD 5: The aim is to establish (i) the pedo-climatic patterns of coffee socio-ecosystems in Uganda and (ii) its vulnerability to changes in climate and land use, in order to (iii) co-develop a climate resilient coffee socioeco-system in Uganda.** Such sub-basin and landscape-level assessment of the interaction between climate, land use and soil variables will be used to understand how C-Af system can adapt to climate change and variability. The research will monitor hydro- and pedo-climatic patterns and gradients, pedoclimatic patterns (physical signature, spatial imagery, hydrological assessment), biogeochemical (e.g. carbon and main nutrients) budgets, uptake and impact over Coffee-Agroforestry at national and regional scales will be assessed. A PhD student working with scientist from NaFORRI and IRD will develop tools and methods for collecting and analysing the data. The work will be supervised by **NaFORRI and IRD**

***Qualification:***

- i. Possession of MSc degree in either geosciences, agronomy, or biochemistry
- ii. Evidence of ability to conduct quality research from concept development to publication.
- iii. Possession of an admission letter for a PhD degree geosciences, agronomy, biochemistry or closely related discipline from a university in Uganda will be an added advantage

- e. PhD 8: The PhD will evaluate Agronomic performance of C-Af systems. With the aim of diversifying options that farmers can use to improve productivity of the tree-coffee systems. The work will examine water and nutrient dynamics and their influence on below-ground C sequestration potential of Coffee-Agroforestry systems. The work will be supervised by , NaFORRI**

***Qualification:***

- i. Possession of MSc in Soil Science with skills in plant soil physics and soil-water-nutrient relations
- ii. Evidence of ability to conduct quality research from concept development to publication.

- iii. Possession of an admission letter for a PhD degree in Soil Science or closely related discipline from a university in Uganda will be an added advantage

**f. PhD 10: The work will assess potential mechanisms for improving coffee disease resistance by plant-mediated soil microbiota in tree-coffee systems.** Molecular-based rhizosphere microbiota assessment will be done at the molecular lab in Montpellier, France. The work will be supervised, **NaFORRI and CIRAD**

***Qualification:***

- i. Possession of MSc in Soil Science, Agronomy with experience in Microbiology
- ii. Evidence of ability to conduct quality research from concept development to publication.
- iii. Possession of an admission letter for a PhD degree in Soil Science or closely related

**g. PhD 12: The work will assess microbial (mainly mycorrhiza) traits and their role in plant nutrient cycling and carbon sequestration;** with the aim of improve understanding of the role of tree roots in microbiota-mediated soil health in C-Af systems. The work will be supervised by, **NaFORRI,**

***Qualification:***

- i. Possession of MSc in Soil Science, Environmental science with a background in microbiology
- ii. Evidence of ability to conduct quality research from concept development to publication.
- iii. Possession of an admission letter for a PhD degree in Soil Science or closely related

**h. PhD 13: Epidemiology of key coffee diseases on the grid.** This Ph.D. will study the epidemiology of the major coffee diseases with emphasis on how the ecological factors influence the distribution, incidence and severity of these diseases. The study will mainly focus on Coffee Wilt Disease (CWD), Coffee Leaf Rust (CLR) and Red Blister Disease (RBD). This work will focus on a grid covering the robusta production area in Uganda to capture the effect of the landscape diversity on pest distribution. Additionally, the work will cover the effect of coffee field microclimates on key coffee diseases. The work will be supervised by **NaCORI and CIRAD**

***Qualification:***

- i. Possession of MSc in Crop Science or any closely related Masters' degree qualification biased to plant pathology.
- ii. Evidence of ability to conduct quality research from concept development to publication.

- iii. Possession of an admission letter for a PhD degree in plant pathology or closely related discipline will be an added advantage
- i. **PhD 14: Will concentrate on Phenotyping ‘Identification and characterization of Robusta clones from Uganda better adapted for AFS and climate change**, to be used as “elites” clones for mass-propagation and as parents of GWAS-based breeding program’. A subset of 200-300 accessions from 300-500 core collection being phenotyped on-station will then be genotyped using GBS approach for genome-wide association (GWAS) analysis. Work to be supervised by **NaCORI and CIRAD**

***Qualifications:***

- i. Possession of MSc in Crop Science or any closely related Masters’ degree qualification in the broad field of crop science.
- ii. Evidence of ability to conduct quality research from concept development to publication.
- iii. Possession of an admission letter for a PhD degree in either plant breeding, genetics, plant biotechnology or related discipline is added advantage.

The successful PhD candidates will develop the exact research topic in consultation with the project research team and supervisors from Makerere University in line with Work Package of the ROBUSTA project.

**.Required Academic qualifications**

- Master’s degree as specified for each research topic above. 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.

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

- Familiarity with Ugandan farming systems.
- Scientific publications within climate smart agricultural technologies or related subjects.
- Have an analytical and academic approach to research questions.
- Have good collaborative/social skills.
- Have a keen interest in spending prolonged work periods.

**Application**

- All applications should be delivered by 24<sup>th</sup>.05.2022 to the following address:
- Department of Agricultural Production, College of Agricultural and Environmental Sciences, Makerere University. PO Box 7062, Kampala Uganda or via email to Prof. Samuel Kyamanywa ; [skyamanywa@gmail.com](mailto:skyamanywa@gmail.com) with a copy to Ms Ruthie Mutyaba, [ruthiemutyaba@gmail.com](mailto:ruthiemutyaba@gmail.com),

- Additional information may be obtained from Prof. Samuel Kyamanywa using the same address; Phone +256772220000.

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.