Call for application for PhD candidates in Agricultural Sciences at the University of Rwanda, College of Agriculture, Animal Sciences, and Veterinary Medicine (UR-CAVM)

1. Background

The University of Rwanda, College of Agriculture, Animal Sciences and Veterinary Medicine (CAVM) in collaboration with the Swedish University of Agricultural Sciences (SLU), Sweden through the Research Training Partnership Programme, Rwanda (2019/24) has received funding from the Swedish International Development Agency (SIDA), Sweden, to implement two research and training programmes including the Integrated Agriculture *(Toward Integrated and Sustainable Agriculture Production Systems (IA))* and the ENSTRUST *(Engendering Rural Transformation for Sustainable Development)* subprograms. Both programs will foster the development of supervision capacity for CAVM staff, will enhance the culture of publication, scientific exchange, collaboration with farmers, and will promote a vibrant and internationally competitive research environment by training a critical mass of researchers that can generate and disseminate new knowledge that assist decision-makers, the private sector, and farmers to transit from subsistence to commercial agriculture.

The Overall objective of the project Integrated Agriculture subprogram is to promote sustainable, nutritious and healthy agriculture productions systems and food and nutrition security. IA integrates three broad thematic areas: 1/ Integrated farming systems, 2/ Climate smart agriculture production systems; and 3/ Healthy and nutritious agriculture production systems. Equally important, agriculture production has to be achieved in an equitable and environment friendly fashion that promotes adaptation and resilience to climate change, engages and empowers women and youth, and identifies and reduces losses, wastages, inequalities, and inefficiencies in the production, transformation and commercialisation of agriculture inputs and products. In the long-term, this capacity building project will contribute to making Rwandan agriculture a sector that supplies rural and urban populations of Rwanda with healthy, abundant, diverse, affordable food, and in return will lift farmers and rural populations out of poverty and enable them to actively participate in the creation of, and benefit from, global prosperity.

2. PhD in Agricultural Sciences (AS) call for application

UR-CAVM calls for interested candidates to apply to 3 PhD positions for training in the PhD AS programme (see following section 3). The 3 local PhD candidates will register at the University of Rwanda, and their training will be delivered by UR-CAVM in full collaboration with SLU for teaching and joint supervision.

The three PhD positions for training in the PhD AS programme are offered respectively under the **"Toward Integrated and Sustainable Agriculture Production"** (i.e., research positions 1-3) subprogramme.

Under PhD in AS, coursework covers 60 credits, whereas field/research work covers 300 credits. The programme will be based in Rwanda. However, some works for a particular reason might be organised at SLU, Sweden. In that case the programme shall take in charge all costs related to required movements. The student will be jointly supervised by professors and senior researchers from both SLU and UR. Tuition fees will be waived only for UR staff.

3. **Local PhD research projects**

I. Livestock nutrition and high-quality low-cost animal feed in Integrated Agriculture-Aquaculture system

- UR-Sweden programme: Integrated Agriculture subprogramme
- Available Positions: 1 Position
- Specific eligible criteria: MSc in Aquaculture, MSc in animal productions, MSc in Animal Nutrition, MSc in Livestock production.

To meet the increased demand of high-quality food protein by an increasing population there is need for improving our knowledge on how to increase the production plant and animal-based protein in a sustainable way. In livestock and aquaculture production, feed is not only a key factor in determining the productivity of the system, but it also accounts for the higher proportion of the production costs. Because of the competition for finite land and resources, high-quality protein of animal origin should be produced attending the principles of sustainability and circular economy focusing on positive society-wide benefits (e.g., land-use change and environmental impact). In this context, an efficient management of nutrition - which would result in increased productivity, health and welfare- should exclude or minimize the use of human-edible food resources (Gill et al. 2010). Fish and ruminants are species capable to produce high-quality food proteins –meat or milk- on diets with none, or minimal, inclusion of human-edible food. Our proposal aims at working on integrated fish-livestock farming systems (Little and Edwards, 2003) based on locally available resources.

The project will focus in vivo studies on different ration formulations based on locally available feed resources (grasses, legumes, and by-products); Grow black soldier fly (BSF) larvae, and/or earth worms, as a source of high-quality protein for fish and poultry, to study different substrates based on organic waste, ruminant manure, and by-products (Devic et al., 2013); Fish and poultry: in vivo studies on different ration formulations based on BSF larvae, earthworms, and other locally available feeds by-products.

Expected results: Feed and feeding practices to increase the supply of high-quality protein of animal origin based on locally available feed/by-products resources avoiding the competition for human edible food.

II. Impact of current agricultural land and water management systems in Rwanda on greenhouse gases emissions: Assessment and mitigation strategies (Integrated Agriculture)

- UR-Sweden programme: Integrated Agriculture subprogramme
- Available Positions: 1 Position
- Specific eligible criteria: Master of Sciences in Environment, or Soil and Water Engineering, or Soil Sciences, or equivalent Master

The marshlands generate substantial benefits including flood alleviation, ground water storage and recharge, retention of pollutants and food web support. Actions are needed to further develop the land and water management systems in order to utilize the full agricultural production potential and minimize environmental side effects (PSTA II, 2009). Agricultural land can act as a source of greenhouse gases when not proper managed (IPCC, 2014). Optimized water management strategies can result in large decreases of GHG emissions (Feng et al., 2013). In Rwanda, agricultural land is used for different crop production without taking into consideration of GHG emissions into atmosphere. In order to support the world-wide efforts of reducing the emission of GHGs into atmosphere, it is essential to study the amount of GHGs emitted from different land management systems of Rwanda. The focus will be on the marshlands but other land types will also be considered.
The first main focus of this project is to set up a baseline of GHG emissions from currently used major land and water management systems. The second focus is to evaluate the impact of different land and water management systems on the emission of GHGs from agricultural lands. A third focus is to test the applicability of different measures and their potential to reduce GHG emission while maintaining or increasing yields (Jain et al., 2014; Lampayan et al., 2015). The fourth action will include simulations of different management options with predicted future climate changes in order to estimate the potential increase in GHG emission under current land use and with implemented measures evaluated under action three. The fifth action will be to establish a basic GHG emission monitoring program in order to generate validation data for the model calculations but also for assess in the future the effectiveness of control measures and to relate GHG emission changes to land and water management changes in the catchment.

Expected results: 1) Identify critical source areas for GHG emissions; 2) Quantify the GHG emission from different land and water management systems; 3) Propose some measures for direct reducing GHG emission from agricultural land; 4) Estimate the rate of GHG emission when using different management systems in future climate; 5) Establish a monitoring system for GHG emissions.

III. Assessing irrigation water productivity in Rwanda and defining potential strategies for improvement

- UR-Sweden programme: Integrated Agriculture subprogramme
- Available Positions: 1 Position
- Specific eligible criteria: Master in Soil and Water Engineering, or Master in Soil and Water Management, or Master in Agricultural Hydrology, or equivalent Master

Several studies in Rwanda are addressing the importance of in increasing the area of irrigated agriculture as a pathway for increased agriculture production and food security (i.e., PSTA II, 2009, MINIRENA, 2009; MINAGRI, 2018). Still, the same studies highlighting the need of increasing irrigation efficiencies and reduce environmental impact. Therefore, the main focus of this project will be to develop strategies for improving water productivity (more crop per unit water at a reasonable cost) and reduced environmental impact (such as less pressure on existing water resources and less impact on water quality). The focus are the marshlands but other landscape types will also be considered.
The first focus of this project is to set up a model for representing the irrigation baseline for some representative irrigation schemes. This will include water distribution and irrigation operations at the scale of farm fields (i.e., Brauman et al., 2013; Bekchanov, et al., 2010). The second focus will be to assess the existing irrigation operation at farmer fields and the efficiency of the water distribution infrastructure (water losses, costs, net return and respond to farmer's need). The third focus will be to quantify how different strategies at farm level could potentially improve water productivity and water quality. This includes irrigation and fertilization scheduling, irrigation methods and crop selection. The fourth focus will be to define some strategies for water distribution that are harmonized with the irrigation scheduling at the farmer's field. The fifth focus will assess the impact of climate change on irrigation demand.

Expected results are: 1) Quantify the efficiencies of water distribution infrastructures; 2) Quantify the water productivity at the farmer's field for some major crops; 3). Propose some strategies for improvement in water distribution that consider the irrigation need at farmers' fields; 4) propose appropriated irrigation scheduling that consider climate, soils, crop needs and environment; 5) quantify the impact of climate change on irrigation demand for some major crops.

4. Funding

INTEGRATED AGRICULTURE: The present fellowship provides funding for only research work of the three PhD positions and the workstations' facilitation. The tuition fees will be waived only for UR staff. Candidates from other public institutions will only be supported financially for their research field work expenses but they will have to pay all other related study fees. In case there is need to complete one or another work in the partner university, (SLU Sweden), the fellowship will support the students' travel to Sweden and living allowance while in Sweden.

5. Admission

Potential PhD Candidates are expected to express their motivation and interest to undertake the PhD programme in the area of integrated agriculture production for a maximum period of four years from date of registration. Applicants must qualify and meet the admission criteria and conditions both at UR

6. General eligibility criteria

PhD applicants must qualify and meet the admission criteria and conditions as per the UR guideline. The following are key eligibility criteria:

i. Be a permanent staff of the University of Rwanda, or any other public institution of Rwanda.
ii. Be a Rwandan citizen.
iii. Hold a master's degree in agriculture and allied sciences delivered by an accredited university with specialization in Agriculture Engineering, soil and water engineering, Animal productions, Veterinary sciences, Forestry and Agroforestry, Agroforestry and soil management, Landscape restoration, Horticulture, Crop sciences, Food safety, Food processing, Agricultural waste management (see specific eligibility criteria indicated for each position).
iv. Present a clear PhD research proposal about one of the three proposed areas of interest,
v. Be fluent in English, both orally and in writing (Proof of English proficiency (i.e., TOEFL or equivalent).
vi. Readiness to adhere to UR capacity building policies and regulations.
vii. Ready to continue working at the University of Rwanda after completion of the PhD studies.
viii. In line with UR's gender policy and UR's commitment to bridge the gender gap in research and teaching at UR, female candidates will be given a priority; all things being equal, female candidate shall be preferred.
ix. Successful candidates should be prepared to work full time on the project and not be in possession of another fellowship for PhD studies. For those in teaching positions, the *teaching load will be reduced to a maximum of 20%.* Other side activities, assignments, consultancies or employment are strongly discouraged.

7. Key documents to support the application

The following documents are required to support your application:

- Application letter addressed to the Ag. Director of the Centre of Postgraduate Studies of the University of Rwanda [Max: 1 page];
- Certified copy of your Masters' degree relevant to this PhD programme;
- A cover or motivation letter stating your interest in this programme and the gap to bridge after your PhD research and education [Max: 2 pages];
- Curriculum Vitae demonstrating your previous experience relevant to this PhD program plus the publication or academic experience [Max: 3 pages]

- Indicative PhD Project proposal. This should comprise (1) the background, (2) the problem statement demonstrating the research gap and the current art of science in the area of research of interest among the three thematic areas; (3) the methodology and anticipated sources of data to be used, (4) how you intend to make this project successful and what you see as future challenges in undertaking this research, (5) five to ten key references well documented likely to inform this study, (6) other relevant additional statements. [Max 5 pages].
- Three recommendation letters: one from the current employer, one from your previous supervisor, and the other from any other reference person (former employer or professor).
- Applicants from a College at UR need to inform the Principal about applying for this position; and attach a confirmatory letter from the Principal.
- Copy of the valid identification card or passport

8. How to apply

Application and support documents should be done electronically via email to ur-cpgscholarship@ur.ac.rw and copiesto simon.rt@gmail.com or s.rukeratabaro@ur.ac.rw. More information and further clarifications can be obtained from, Dr Rukera-Tabaro Simon, Deputy Team leader of the Integrated Agriculture subprogram, and to UR-CPGS Scholarship officer Mrs Gashayija Umulisa Gloriose to the E-mail: ur-cpgscholarship@ur.ac.rw

9. Details of the Recruitment process

- The hard copy application files shall be submitted to the office of the Ag. Director of the UR-CPGS at the UR Headquarters (UR-Gikondo Campus, KK737st, P.O Box 4285 Kigali, RWANDA).
- A soft copy of the application shall be sent to Mrs. Gloriose Umulisa Gashayija, Scholarships Officer at UR-CPGS (ur-cpgscholarship@ur.ac.rw) with Cc to the Subprogramme Deputy Team-leaders (Dr Simon Rukera-Tabaro, email: simon.rt@gmail.com or s.rukeratabaro@ur.ac.rw, tel: +250 (0) 788 450 031.
- The recruitment team includes senior academic staff from both UR and Swedish University of Agriculture Sciences. Successful candidates will be notified a couple of days after the interviews and are expected to start in July2022.
- All applicants will be notified of the first selection outcome, and Eligible applicants will be invited for an interview for the final selection of the candidate.
- **The interview process will include checking the candidate's English proficiency.**

10. Contact details for more information

For more information, please contact Dr. RUKERA-TABARO Simon, the Deputy Team leader for Integrated Agriculture subprogram/UR-Sweden Program, email: simon.rt@gmail.com s.rukeratabaro@ur.ac.rw, tel: +250 (0) 788 450 031.

11. Important dates for the application process

- **Submission deadline: 22th April 2022 at 23h59'**

Done at Kigali, March 30th, 2022

Prof. Nosa O. Egiebor
Deputy Vice Chancellor Academic Affairs and Research
University of Rwanda