



MaRCCI
Makerere University Regional
Centre for Crop Improvement



World Vegetable Center



Building Opportunity for Lesser-known Diversity in Edible Resources (BOLDER) of the Crop Trust

Opportunity Crop Scholarships

Call for applications for four PhD positions

**Makerere University Regional Centre for Crop Improvement (MaRCCI),
Makerere University & The Norwegian University of Life Sciences**

1st December 2024

Background

One of the 17 Sustainable Development Goals is to attain zero hunger by 2030, but whether most of African countries are on track towards this ideal is questionable¹, While the continent is projected to be the most populous one by the year 2100, a critical mass of its population is already food-insecure², a situation that is being exacerbated by climate change and environmental degradations.

Coping with these complex issues require adopting an integrated approach of disrupting overreliance on major commodities such as rice, maize, and wheat over the opportunity crops also called neglected and underutilized species (NUS). These species are nutrient-dense, hold the ability to help diversify both the agricultural and the food system and constitute a security net that filters pest and disease-caused damages³. However, the current organizational architecture of these species suggests they cannot compete with the so-called major crops because of several limitations including: the paucity of established data (e.g., production statistics, nutritional data), the poorly organized value chains (when they exist), and the low flow of knowledge, technology and products among the value chains actors, among others.

¹Atukunda, P., Eide, W. B., Kardel, K. R., Iversen, P. O., & Westerberg, A. C. (2021). Unlocking the potential for achievement of the UN Sustainable Development Goal 2–'Zero Hunger'–in Africa: targets, strategies, synergies and challenges. *Food & nutrition research*, 65.

²FAO, IFAD, UNICEF, WFP and WHO (2022) *The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets more affordable*. Rome, FAO.

³Imathiu, S. (2021). Neglected and underutilized cultivated crops with respect to indigenous African leafy vegetables for food and nutrition security. *Journal of Food Security*, 9(3), 115-125.



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The 'Building Opportunities for Lesser-known Diversity in Edible Resources' (BOLDER) project, an extended work package of the larger 'Biodiversity for Opportunity, Livelihoods and Development' (BOLD) initiative is designed to promote opportunity crops in West African countries (Benin and Ghana) and East African countries (Uganda and Tanzania). BOLDER is a three-phase project dedicated to improving nutritional security in West and East Africa through the increased use and value of nutritious but currently underutilized, climate-resilient and environmentally friendly crops.

BOLDER will work towards exhibiting the potential for four opportunity crops in each of the four target countries and operates through three pillars namely: i) increasing the availability of the target opportunity crops diversity; ii) improving the production, marketing, and/or consumption of these opportunity crops, and iii) enhancing the capacity of researchers, practitioners, and food system actors to improve use and value of opportunity crops. Under this third pillar, a total of eight PhDs students (four in East Africa and four in West Africa) will be trained in Plant Sciences, Food Systems and Value Chain R4D. The PhD training in East Africa will be coordinated by MaRCCI, Makerere University, in collaboration with The Norwegian University of Life Sciences (NMBU).

Objectives of this call

This call for applications is open to citizens of **Uganda** and **Tanzania** to fill four PhD positions: two in Plant Sciences and two in Food Systems.

All four PhD candidates will register at Makerere University and will be supervised by a panel of scientists from MaRCCI, Department of Agricultural Production (DAP), Department of Plant Sciences, Microbiology and Biotechnology (PMB), and Department of Agribusiness & Natural Resource Economics (DANRE), The Norwegian University of Life Sciences (NMBU), The Alliance of Bioversity International and CIAT (ABC) and the World Vegetable Center (World Veg). Decisions about supervisory arrangements will be made based on research proposals of successful applicants.

Expectations from the recruited PhD candidates

The two Plant Science PhD candidates through their research will contribute to the BOLDER project output of characterizing opportunity crops' diversity and participatory evaluations using the TRICOT approach, while the other two students will contribute to the BOLDER Output of deepening our understanding of opportunity crops food systems and value chains and pursuing opportunities for greater contributions to livelihoods and diets.



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Plant Science Applicants

The two Plant Science PhD student research projects will focus on the genetic and low-cost phenotypic characterization of farmer collection/landraces, genebank, and breeding materials for opportunity crops (stakeholder selected opportunity crops for Uganda i.e. cowpea, pumpkin, and amaranth, while for Tanzania the pre-selected crops are Bambara groundnuts and sweet potato). The aim is to generate key information on the adaptive traits of opportunity crops, their nutritional value, and their suitability for different uses, such as food, feed, and fiber. The research will further identify unique genotypes and suitable breeding strategies for improving desirable traits.

Another aspect of the PhD research will involve conducting a performance evaluation of opportunity crops traits using the citizen science approach known as triadic comparisons of technology options (tricot). This approach applies to an incomplete block design to assign randomized incomplete blocks of three technologies (out of larger number) to many farmers from different gender and socioeconomic groups for on-farm assessment in diverse agro-ecologies. Combining this approach with digital tools makes it possible to obtain insights for both local adaptation and a scale of reach compared to earlier participatory plant breeding/variety selection approaches. This approach has shown promising results recently and it is on the scale in East Africa. The planned PhD research and training will be critical in building local capacity for demand-led breeding and evaluation of opportunity crops using data science at a low cost in East Africa. The goal is to improve the identification and selection of opportunity crops varieties with desirable traits, ultimately leading to the mainstreaming of NUS in sustainable food systems in Africa.

In summary, the PhD projects will combine genomics research and on-farm tricot experiments and provide evidence on how this approach can lead to a demand-driven breeding of different NUS, accelerate trait discovery for climate adaptation, strengthen seed systems, increase use of NUS, and create links to the value chain.

We invite PhD research concept note focusing on one of the pre-selected crops in one of the countries.

Food Systems Applicants

The two PhD research projects in Food Systems will focus on two main areas, also in relation to the selected species for the two countries. The first area will be value chains of the focal crops. Specifically, this aspect of the research will characterize the current state of value chains and explore bottlenecks, inefficiencies, and opportunities, including related to production, processing, distribution, marketing and consumption.



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The research will also analyze the demand for opportunity crop products, the preferences and behaviors of consumers (including consumer preference trials using the tricot approach), and the most effective interventions for promoting opportunity crops in food systems.

The second area of focus in Food Systems will be the nexus between traditional knowledge on the cultivation and consumption of NUS (local food culture) and the broader political and economic factors affecting the development and promotion of opportunity crops in inclusive and equitable food systems. This project will examine the interconnection between the cultural practices of local communities regarding the cultivation and consumption of opportunity crops and the wider economic and political systems that shape the food systems in which these communities operate. On the one hand, local food cultures have evolved over generations and reflect the specific ecological, social, and cultural contexts in which they are situated. This traditional knowledge often includes cultivation practices, processing methods, and culinary traditions associated with opportunity crops. Such traditional knowledge is important for understanding opportunity crops nutritional, cultural, and economic significance and how they can be integrated into sustainable food systems. On the other hand, development and promotion of opportunity crops in inclusive and equitable food systems is shaped by broader political and economic factors, including government policies, global trade agreements, corporate influence, and consumer preferences. These factors can create barriers to the promotion and development of opportunity crops, which can impact the livelihoods of smallholder farmers and the availability of diverse and nutritious foods for local communities. By understanding these factors, the research will aim to identify opportunities to promote the development and promotion of opportunity crops in inclusive and equitable food systems in Africa.

We invite PhD research concept note that addresses one of the two food system areas outlined above. The proposal can focus on or several of the pre-selected crops in one or both of the countries.

Scholarship: financial support and duration

The scholarship includes subsistence allowances, contribution to research costs, insurance cost, contribution to conference attendance cost and cost related to the participation in BOLDER-organized training relevant to the various PhD topics. The PhD candidate will also benefit from a three-month mobility (once) to conduct parts of his/her research at NBMU.



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- a) The PhD duration is 48 months.
- b) PhD students will receive a monthly stipend of \$600 for Ugandans and \$700 for Tanzania Nationals (when in Uganda) and 1,500 Euros when in Norway. This amount includes settling allowance.
- c) Additional benefits are available on a case-by-case basis.

Eligibility

Applicants should meet the following criteria at the time of their scholarship application:

- a) be a citizen of Uganda or Tanzania.
- b) be proficient in written and spoken English.
- c) not be currently enrolled or have a running scholarship in another PhD program.

For Plant Science Students:

- d) hold a MSc degree in agronomy, plant breeding, genetics, biotechnology, crop protection or another relevant discipline.
- e) demonstrate knowledge of or prior experience with tricot methodology and genomics research.

For Food Systems Students:

- f) hold a MSc degree in Agricultural and Applied economics, Agribusiness, Agricultural economics, or another relevant discipline.
- g) demonstrate experience of prior research on value chains, consumer behavior, or political economy of food systems.

Applicants who have working experience on the listed NUS crops will have an added advantage.



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Submission

The Scholarship application file is to be submitted as PDF attachment by the deadline to the emails indicated in section, and should include the following:

- a) Cover or motivation letter.
- b) Student research concept note that clearly indicates the topic to which the candidate applies (3 pages maximum).
- c) National ID or Copy of Passport Bio Data page.
- d) Certificate of previous degree(s) /or a Proof that the degree(s) has been completed;
- e) All transcripts/academic records.
- f) A support letter from home Higher Education Institution (from the MSc supervisor);
- g) Two recommendation letters.
- h) Curriculum Vitae.
- i) Any other supporting documents (e.g., first page of publications).

Deadline

Applications should be submitted to **Ms. Candia Alice** on e-mail cndlc95@gmail.com and copy in **Dr. Ozimati Alfred Adebo:** ozimatiafred@gmail.com and **Dr. Dramadri Isaac Onziga** onzigaisaac@gmail.com not later than **December 20th, 2024**. All applications received will be acknowledged, however only shortlisted candidates will be contacted and invited for an interview.