



SWEDEN
MAKERERE



**Days of
Excellence**
17th -18th November 2022

**20 years of cooperation: robust foundation
for continued progress.**



Press Statement

16th November 2022

Days of Excellence – 20 years of cooperation: robust foundation for continued progress

Makerere University and the Embassy of Sweden in Uganda will celebrate the essential role of research, science, and innovation in supporting a country’s long-term growth and prosperity at a two-day engagement on 17 and 18 November at Makerere University Central Teaching Facility, Yusuf Lule Auditorium. The engagement marks a new phase in the 20 years long research cooperation between Sweden and Uganda specifically Makerere University.

Prof. Barnabas Nawangwe the Vice Chancellor, Makerere University and Ms. Maria Hakansson, the Ambassador of Sweden will inaugurate this engagement, followed by a keynote address and a panel discussion. A selection of research and innovation outcomes of the cooperation in addition to other outcomes aided by funding from other initiatives like the Government of the Republic of Uganda through Makerere University Research and Innovations Fund and the United Nations Capital Development Fund (UNCDF) will be showcased in an exhibition in a space adjacent to the Auditorium.

The two-day engagement also includes a quiz for Makerere students, a Roundtable Lunch with representatives from government, academia and the private sector and events organized by partner organizations Ericsson and UNCDF.

“In Makerere University, Sweden sees not only a friend but a key player in the efforts to create a more prosperous Uganda. Research, science and innovation are key building blocks for creating economic growth, no matter the current economic status of a country. With this two-day engagement, we wish to celebrate and highlight the importance of research and innovation,”
said Ms. Hakansson.

“Makerere University is grateful for the continued collaboration with the Embassy of Sweden in Uganda and all the other stakeholders. We remain open to such collaborations which are also supporting our efforts towards becoming a research led institution,” said Prof. Nawangwe.

Background

Makerere University and Sweden have been in research cooperation for more than twenty years, creating a special bond between the two entities, which certainly not only merits an acknowledgment but also a celebration of the results achieved and yet to come.

The Swedish research cooperation with Uganda was initiated in 2000 for institutional research capacity strengthening. To date, there have been four consecutive research agreement periods with total support of about SEK 824 M (USD 118 M) running from 2000 to 2022. The main objective of the bilateral research cooperation has been to enhance the capacity of public higher education institutions to conduct and sustain strategic and high-quality research that will contribute to the

development needs of Uganda and beyond through building a critical mass of independent, robust, and dynamic researchers. The programme was built around international research collaboration, principally with Swedish Universities. This programme aimed at supporting Makerere University towards its goal of becoming a vibrant, internationally competitive research university. Later, the programme was expanded to include four other public universities, namely, Kyambogo University, Busitema University, Gulu University and Mbarara University of Science and Technology.

The Swedish support focussed on human resources capacity building, research, library services/ICT; scientific and field laboratories, academic quality assurance, gender mainstreaming, and institutional reform processes. Tremendous achievements have been recorded including creation of a conducive environment to enable scientists conduct high-quality and relevant research through investment in human resource development, ICT, library resources, laboratories, and field site infrastructure. Following the complex and unprecedented challenges brought about by the COVID-19 pandemic, excellence in research and innovation has never been more vital. Makerere University and its partner public Universities are uniquely positioned to play an integral role in the economic and social recovery post-pandemic at a national, regional, and international level, and crucial to this are strengths in research, development, and innovation.

The bilateral research cooperation ended in June 2022. Makerere University organized an international dissemination Conference to take stock of the achievements and milestones reached during the past 22 years of Research collaboration with Sweden. The conference took place at Speke Resort Munyonyo on May 9th and 10th, 2022 where researchers shared their findings to keep the public, researchers, policy makers and implementers informed of current research activities relevant to the realization of the NDP III, Uganda Vision 2040, African Charter 2063, and SDGs 2030. The conference provided researchers and professionals a platform for disseminating their findings, exchanging contemporary knowledge, and building partnerships and collaborations to advance research and innovation, thereby contributing to sustainable development.

Makerere University Research and Innovations Fund (Mak-RIF)

Makerere University received funding from the Government of the Republic of Uganda, earmarked to support high impact Research and Innovations. This unique initiative arose after engagements between the top University Management and the Government of the Republic of Uganda. The fund illustrates the increasing importance that the Government attaches to Research and Innovation as a driver of development and transformation. This can be attributed to the unwavering commitment of the Embassy of Sweden to research at Makerere University which continues to provide a foundation for research and innovations to blossom. The objective of the fund is to increase the local generation of translatable research and scalable innovations that address key gaps required to drive Uganda's development agenda. The fund is aimed at complementing available research funding to address unfunded priorities critical to accelerating development across different sectors of the economy in Uganda. In the last three years, Makerere University has received 90 billion Uganda shillings (equivalent to US\$ 24,300,000) under the Government Research and Innovations Fund (<https://rif.mak.ac.ug/>). The funded research and

innovation projects have continued to engage other stakeholders from several higher institutions of learning, Government Ministries, the Private Sector, and non-Governmental institutions among others. In addition, these projects have generated and continued to generate actionable results and tangible outputs that speak to national priorities. Some of the projects will be showcased during the collaborative engagement.

A Highlight of Achievements from the Swedish support

The programme was implemented by the five partner Ugandan public Universities (PPUs) i.e. Makerere, Kyambogo, Busitema, Gulu and Mbarara under the framework memorandum of understanding. The PPU's continue to collaborate in mutually beneficial ways to share professional experiences and exchange of information on research and teaching methodology, curricula, the training of specialists, and to explore and implement other forms of professional interaction and exchange. The Universities exchanged students and staff for purposes of study or supervision in particular subjects, courses or projects where the relevant expertise is not available in their own institution.

- Capacity building for staff; The program has strengthened capacity building for staff in partner public Universities. A broad range of policies, guidelines and financial/administrative procedures have been formulated making the universities more efficient and effective in their operations. The capacity to train master students has been strengthened at PPU's and PhD training at Makerere University as well as supervision. At the program closure on 30th June, 2022, the bilateral cooperation had performed well on its major target of training human resource in PPU's, where by 773 beneficiaries were supported i.e. 263 masters; 327 PhD graduates, 95 small research grants completed and 85 postdoctoral fellowships.

Table 1: Total Summary of Students and research supported, 2000 - 2022

| Category | Male | Female | Total |
|-----------------------|------------------|------------------|-------------------|
| PhD | 200 | 127 | 327 |
| Master | 152 | 111 | 263 |
| Postdoctoral | 59 | 26 | 85 |
| Small Research Grants | 78 | 20 | 98 |
| TOTAL | 489 (63%) | 284 (37%) | 773 (100%) |

- Improvement of ICT Infrastructure, the ICT project established the MakCloud Data Centre at Makerere University. The Integrated Rack Cloud Infrastructure System with Modular

Data Centre Solution, Server, and Storage with capacities for data repository has fully enabled Data Mobility and Migration Data-at-rest encryption at Makerere University for the Fourth Industrial Revolution. This revolution will bring enormous positive benefits to research, which is a core mandate of Makerere University. The full coverage of the Main Campus of Makerere University with high speed wireless Internet access using an Integrated hotspot solution for selected strategic areas has made tremendous improvements in the use of ICT.

- The University Library has continued subscribing to electronic resources as part of the efforts to support research at Makerere University. A total number of 49 databases are subscribed at the University including the Research4life portals.
- The BRIGHT Project at the Department of Computer Science established the Software Systems Centre (SSC) to strengthen the University-Industry linkages. The SSC innovation named, AirQo (www.airqo.net), that involves design and development of air quality devices and data visualization has contributed to the improvement of air quality in Kampala and other urban areas in Uganda. The innovation is jointly implemented with Kampala Capital City Authority, National Environmental Authority (NEMA), and the United States Embassy in Kampala.
- The Geographical Information Science (GIS) centre project acquired the state-of-the-art, data-rich, well-organized, and high performance geospatial data archived on a server in the GIS laboratory. The GIS centre website is fully developed and functional i.e. (<http://www.cedat.mak.ac.ug/GISCentre>).
- The centre has continued to be consulted for training support to various organisations including the Ministry of Lands, Housing and Urban Development (MoLHUD), Uganda Red Cross Society (URCS), Uganda National Roads Authority (UNRA) and National Planning Authority (NPA).

Spin-offs from the recent research funding by Sida Program

- i. Research teams have been built out of the graduates and researchers from the programme. The model has been picked by Government to fund the Makerere Research Innovations Fund (RIF). Several of these research teams are competing for grants from other agencies such as: the Carnegie Corporation of New York have continued to fund Mak, Bill and Melinda Gates Foundation, the NIH among others.
- ii. Through Joint regional applications for funding, some members of the University staff have won funding for research e.g. in Mathematics and Women and Gender Studies won projects from NORHED (2021-2026) and ISP Research Groups, (2021-2024).

- iii. The Makerere University (Department of Computer Science) through BRIGHT project and MTN Uganda signed an MoU for a practical skills development course on MTN mobile money API use for research and innovations. A joint course was developed for this <https://muele.mak.ac.ug/course/view.php?id=1865>
- iv. The College of ICT established connections with University of Addis Ababa, Ethiopia CMU, University Rwanda, University of Montreal, Canada, University of Cairo, Egypt; organizer of ACM supported Africa and Middle-East conference in Software Engineering, and made joint publication with Ministry of ICT.
- v. The Department of Computer Science with Kampala City Council Authority and National Environmental Management Authority have worked together to develop & deploy low-cost air quality monitors (conducted a joint air quality awareness with US Embassy Kampala in 2018). The project also won New Research Innovations Fund projects between Software Center members and NITA-U and Schools.
- vi. The Makerere University Centre for Population Research (MUCHAP) project has had collaborations with partners both local and international. Notably, is the infrastructural support from Pfizer International that has funded the building of a field-based laboratory as well as Funding from EDCTP, MRC/UK, and Swedish Research Council.
- vii. The Geographical Information Systems Centre has had collaborations with Government ministries and agencies including the Ministry of Lands and Environment.

Profiles of Mak- RIF supported Projects to be exhibited

1. Virtual Reality Technology for Optimizing Safety and Competence in Management of COVID-19 Patients – Principal Investigator – Dr. Daudi Jjingo

Epidemics and pandemics are causing high morbidity and mortality on a still-evolving scale exemplified by the COVID-19 pandemic. Infection prevention and control (IPC) training for frontline health workers is thus essential. However, classroom or hospital ward-based training portends an infection risk due to the in-person interaction of participants. We explored the use of Virtual Reality (VR) simulations for frontline health worker training since it trains participants without exposing them to infections that would arise from in-person training. It does away with the requirement for expensive personal protective equipment (PPE) that has been in acute shortage and improves learning, retention, and recall. This represents the first attempt in deploying VR-based pedagogy in a Ugandan medical education context.

2. Exploring Stingless Bee Products for Nutritional and Medicinal Values in Uganda (bee-nutri-medicine Project) – Principal Investigator – Dr. Moses Chemurot

Although stingless bee products are important for food and medicine, meliponiculture remains less established in African countries because of the limited domestication of stingless bees. In Uganda,

the ongoing domestication of stingless bees under the National Agricultural Research Organisation is an important step towards harnessing benefits from these insects especially through the production of stingless bee products and provision of pollination services. However, data on the nutritional and medicinal values of local stingless bee products are lacking despite it being critical for informed planning of stingless beekeeping promotion. This project will focus on nutritional and medicinal values of stingless bee products. We propose to: i) Determine the nutritional profiles of stingless bee pollen and honey to enhance understanding of their potential benefits; ii) Explore antimicrobial properties of stingless bee honey and propolis; and iii) Investigate the potency of stingless bee honey and propolis as medicines for wounds and skin infections. Building capacity through training of different target groups will not only provide opportunities to learn about nutritional and medicinal values of stingless bee products, but create opportunities to improve in-country technical capacity in meliponiculture besides creating networks of stakeholders.

3. Essential oil crops commercialization for sustainable Public health products development and rational promotion. Principal Investigator- Dr. Savina Asimwe

Essential oil crops are crops grown for their aromatic compounds that form the essential oils. *Cymbopogon citratus* D.C Stapf (Lemon grass), *Ocimum basilicum* (Basil) L. *Salvia rosmarinus* Spenn (Rosemary), *Eucalyptus citriodora* (Lemon eucalyptus) Hook and *Mentha piperata* (Pepper mint) are some of the essential oil crops that have proven to be of economic importance to Uganda's agricultural sector with feasible applications in development of public health products including Herbal teas for management of lifestyle diseases, cosmetics and detergents as therapeutic antibiotic agents and indoor use as air fresheners(car and in-room fresheners) and in development of insect repellents. The national development plan 3 identifies essential oil production as one of the innovations that can possibly create employment and alleviate poverty among the general population. In Uganda lemon grass is being grown in eastern and western Uganda for both the beverage industry, apiary (as bee attractant in new hive), and as an active ingredient in mosquito repellents and herbal topical cream/jelly. This project targets to create a sustainable outgrowers' scheme where farmers will be provided with planting materials, necessary training in production of aromatic crops and linkage to both local and international markets for sustainable income.

4. Development of a recyclable-water hand-washing facility (ECO-WASH). Principal Investigator- Dr. Peter Olupot

Handwashing with soap and clean water is one of the most effective ways to prevent the spread of COVID-19. However, despite its effectiveness in preventing the spread of COVID-19, handwashing still remains limited among some communities in Uganda, due to water scarcity. In fact, about 51 and 82% Ugandans lack access to safe water and improved sanitation facilities, respectively. This scenario disproportionately affects the poor, refugees, and/or displaced persons in crowded settlements, exposing them to high risks of spreading COVID-19, as well as other illnesses. Moreover, with the increased practice of handwashing among the populace, a significant amount of wastewater is generated, which is merely left to go down the drain. With the use of

wastewater treatment technologies, the handwashing wastewater can be treated, and subsequently recycled for similar purposes. We thus propose to develop a low-cost handwashing facility, with a wastewater treatment system for subsequent recirculation. The wastewater treatment system shall be a granular activated carbon (GAC) sandwich slow sand filtration system, consisting of a layer of fine sand at the top, followed by a layer of coarse sand, GAC, fine gravel, and coarse gravel at the bottom. The other system components shall include a wash-basin, water tank, and a solar-powered recirculation system. The wash-basin shall be equipped with solar-powered auto-timed water and/or detergent dispensers. These features shall enable savings on water and soap, making it possible for more users to practice handwashing. Moreover, since auto-timed dispensers ensure hands-free water and soap supply, chances of catching COVID-19 through cross-contamination shall be eliminated, making our system more appealing, even for use in public settings. Essentially, during operation of the handwashing facility, the generated wastewater shall pass through the treatment system, allowing removal of contaminants via physical, chemical, and biological processes. The treated water shall then be pumped to the water tank, where it shall be disinfected prior to recirculation for handwashing purposes. Overall, with the potential for wastewater treatment and recycling, savings of water, as well as elimination of risks of cross-contamination, our proposed handwashing facility shall contribute to solving the problem of water scarcity for handwashing, which would otherwise derail efforts to curb the spread of COVID-19, and other illnesses in Uganda. This proposed concept builds on our ongoing research activities from which activated carbons generated from rice husks, with support from MakRIF Grant RIF/CEDAT/015, shall be employed in the proposed technology.

5. Developing dry season feeding technologies for different cattle production systems in Uganda- Principal Investigator – Dr. Justine Nambi Kasozi

The project is about development of various feeding technologies to address the problem of feed scarcity faced by Ugandan farmers in the dry seasons. Many farmers don't conserve surplus feed to solve the problem of feed shortages especially during the dry season when the forages decline both in quantity and quality. This results into serious reductions in animal body weights, milk production and under extreme conditions, deaths of the animals. Such problems lead to hunger, reduced household incomes and retardation of attainment of some of the nation's sustainable development goals. This project seeks to utilize several crop residues in the development of nutritionally rich feed blocks and pellets to bridge the gap caused by feed scarcity. The feed blocks and pellets will be made using simple technologies that can be adapted by farmers in the different areas of focus. The most abundant crop residue in each respective area will be the major component in the feed blocks and pellets to which other nutrient-rich feeds will be added. Utilization of these nutritionally rich feed blocks will enable improved animal productivity which will lead to food security and improved household incomes.

6. Enhancing The Grain Amaranth Value Chain for Improved Nutrition, Livelihoods and Enterprises Development in Uganda- Principal Investigator – Dr. Dorothy Nakimbugwe

Malnutrition, poverty, un- and under-employment are prevalent in Uganda. Amaranth grain (AG, Doodo, in Luganda) is a potential solution due to superior nutritional characteristics, fast growth and climate resilience. Makerere University, Department of Food Technology & Nutrition (MAK-FTN) and partners have pioneered grain amaranth research and promotion for over ten years, resulting in heightened awareness and interest in the crop. However, the grain amaranth Value Chain is constrained by limited capacity of farmers to produce sufficient quantities and quality of the grain to meet demand. MAK-FTN is partnering with Kirinda Farm, a large-scale grain amaranth farmer and Peak Value Industry (PVI) a food processor, to unlock the potential of the grain amaranth Value chain by: Enhancing the quality and quantity of AG produced by farmers for use as raw material in food products; refining and up-scaling production of a multi-purpose AG-enriched flour for use in nutrient-enhanced snacks and road-side vended foods; piloting an innovative distribution model for the multi-purpose AG-enriched flour and; raising awareness for this flour and its products among consumers in Uganda. The multi-purpose AG-enriched flour shall be used in commonly consumed foods and snacks, especially by under-reached yet nutritionally vulnerable individuals such as children and low-income earners.