



GOVERNMENT OF UGANDA

MAKERERE UNIVERSITY

RESEARCH AND INNOVATIONS FUND (MAK-RIF)

Half Year 2022/2023 Bulletin - Issue 1



MAKERERE UNIVERSITY



‘We Build for the Future’

About Mak-RIF

Makerere University – Research and Innovations Fund (Mak-RIF) is funding from the Government of the Republic of Uganda to support high-impact Research and Innovations that address national development priorities. This fund illustrates the increasing importance that the Government attaches to Research and

Innovation as a driver of national transformation. 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 therefore aimed at complimenting available and other potential research funding (from individuals including alumni and institutions) to address unfunded priorities critical

to accelerating development across different sectors of the economy in Uganda.

Each financial year, Makerere University expects to receive at least 30 billion Uganda shillings (equivalent to US\$ 8,100,000) under the Government Research and Innovations Fund (RIF). To this exciting news of funding from the Government of the Republic of Uganda, the University Man-



Prof. Umar Kakumba, Makerere University Deputy Vice Chancellor In-Charge of Academic Affairs (Far Right) delivering a Thank You Note to Dr. Sabrina Bakeera Kitaka for diligently serving on the Mak-RIF Grants Management Committee (GMC). Other GMC members both in currently still in service and those who served before also received tokens of appreciation. On the far left-hand side is Prof. Fred Masagazi-Masaazi, Chairperson Mak-RIF.

agement responded promptly: A Framework for Management of the Government Research and Innovation funds was developed and is being implemented since 2019. A multi-disciplinary Grants Management Committee was appointed by the University after wide consultations with all the university Colleges. The multi-disciplinary funded research and innovation projects are expect-

ed to generate actionable results that speak to national priorities. Working with internal and external multidisciplinary reviewers, the Grants Management Committee vets, selects, and issues grants to teams that demonstrate a clear link to Government and its implementing partners on key development research gaps.

Over the four financial years,

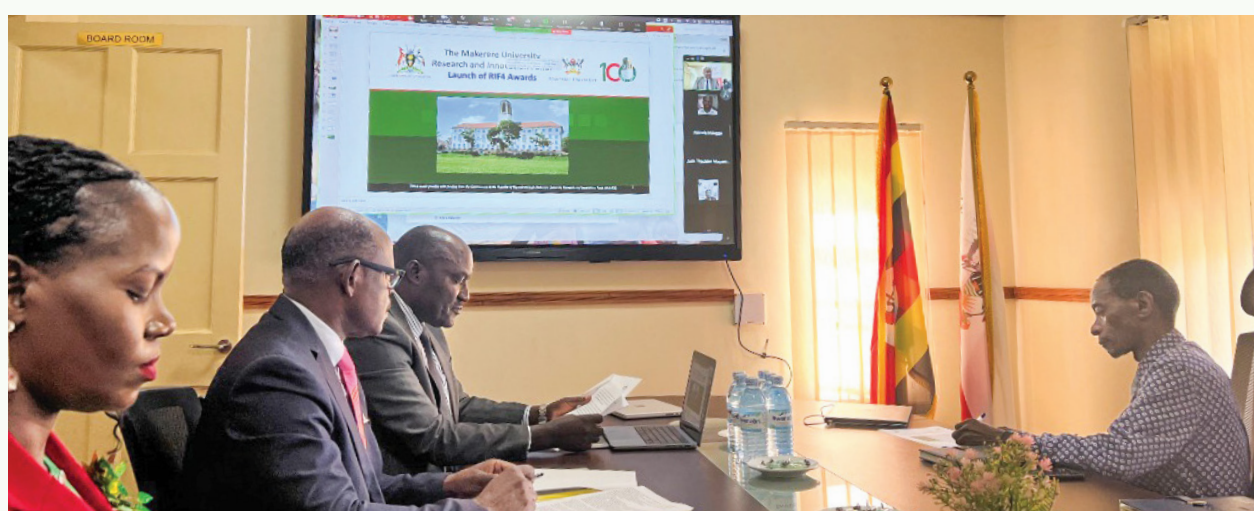
the Funds' Grants Management Committee has issued 6 major grant calls and 4 needs-based solicitations, attributing to **865 awards**. During this financial year (2022/23), the fund has introduced two new grants: one to support scale up and commercialization of research outputs and the other to support PhD research.



Inauguration of the new Grants Management Committee Members 2022

Details of the grant calls over the four financial years are as follows:

Call	No. of applicants	No. of awards
1 Round 1		
RIF round 1 - National priorities	704	224
Special COVID-19 Grants	356	112
RIF round 1 Needs Responsive	-	3
COVID-19 Needs Responsive	-	10
Grant Administration		
2 Round 2		
(RIF round 2 -National Priorities (Resubmission	-	67
RIF round 2 National Priorities	386	160
RIF round 2 Needs Responsive	-	12
Grant Administration		
3 Round 3		
RIF round 3 -National Priorities	482	126
RIF round 3- Needs Responsive	-	14
RIF round 3 -Multi-Year RIF-1	50	50
Grant Administration		
4 Round 4		
RIF round 4 -National Priorities	298	75
RIF round 4- Needs Responsive	-	12
RIF round 4 -Multi-Year RIF-2	-	pending
RIF round 4 –Scaling and commercialization	-	pending
RIF round 4 –PhD Research	125	pending
Grant Administration		
Total	2,401	(36%)865



The Vice Chancellor Prof. Barnabas Nawangwe at the Launch of Mak-RIF 4 Awards and the PhD Call for Proposals, with him is the Mak-RIF GMC Chairperson, Prof. Fred Masagazi-Masaazi, the Mak-RIF Coordinator Dr. Roy William Mayega and Communications Specialist Ms. Harriet Adong.

The fund builds on the capacity to manage grants of such a magnitude that has been gained over several decades through partnerships with major funding entities, notably the Swedish International Development Agency (SIDA) and United States Agency for International Development (USAID). The experience gained through these collaborations prepared Makerere University to be able to coordinate and execute a national research fund of

this magnitude. The Grant principles are: Results and impact, equity and inclusion, multidisciplinary, accountability and utilization. Three main types of projects are funded: Research, Innovation and Capacity building.

Mak- RIF Research Agenda: In order to ensure that Research and Innovations coming out of the Mak-RIF's initiative are focused on actual national needs,

Makerere University conducted a wide stakeholder consultative process (spearheaded by Mak-RIF's Grants Management Committee) which resulted into an instructive Research and Innovations Research Agenda. The agenda is composed of 14 themes that cover key national development priorities. The distribution of Mak-RIF awards by agenda priorities is as follows:

Awards by Research Agenda

	Thematic area	Yr1	Y2	Yr3	Yr4	Total	%age
1	Transforming the agricultural sector	56	44	20	12	132	15.26
2	Sustainable health	162	79	68	31	340	39.31
3	Re-imagining Education	32	21	20	22	95	10.98
4	Water, sanitation and environmental sustainability	16	15	15	3	49	5.66
5	Harnessing the social sector to drive development	13	5	9	2	29	3.35
6	Harnessing tourism, wildlife and heritage to drive development,	9	4	7	3	23	2.66
7	Sustainable Planning, finance and monitoring	1	3	8	5	17	1.97
8	Leveraging public service and local administration for efficient service delivery	11	9	6	2	28	3.24
9	Defense and security: Achieving sustainable peace and stability	4	2	1	1	8	0.92
10	Strengthening law, governance, human rights and international cooperation	3	5	2	1	11	1.27
11	Harnessing Information and Communication Technology to drive development	7	11	5	3	26	3.01
12	Manufacturing, science and technology as tools to accelerate development	9	5	0	0	14	1.62
13	Catalyzing business and enterprise	16	25	11	2	54	6.24
14	Energy and Minerals as drivers of rapid economic development	10	11	10	0	31	3.58
	Total	349	239	190	87	865	100

Outputs and Impact from completed projects: A total of 457 projects formally closed out; 137 of these had developed a tangible product, 292 had made actionable policy recommendations that have been taken up or awaiting to uptake and 28 projects have built capacity for an institution. A highlight of some of the completed Mak-RIF projects with a high potential for transformation by college are shared below.

College of Agriculture and Environmental Sciences (CAES)

- **Design and development of mobile irrigation technology systems for small to medium commercial farmers and pastoralists in the rain constrained areas of Uganda;** This team designed a customized and self-pressure boosting mobile irrigation system currently in use in the areas of Nakaseke and Luwero districts.
- **Improving access to biodiversity data for conservation decision making: A case of the National Biodiversity Data Bank (NBDB), Makerere University, Uganda;** This project team worked on improving access to biodiversity data for conservation decision making through increasing stakeholders' engagement for enhanced biodiversity data sharing with Uganda wildlife Education Center (UWEC), National Environment Management Authority (NEMA) and Uganda Tourism Board (UTB) among others
- **Developing dry season feeding technologies for different cattle production systems in Uganda;** Developed nutritionally balanced feed blocks and pellets to increase intake, utilization and storability of crop residues such as banana peelings for dry season feeding.



Engaging with the Permanent Secretary MAAIF, Maj. Gen. David Kasura Kyomukama during the College of Agriculture and Environmental Sciences at Makerere University

- **Deployment of the new Maksoy soybean varieties for on-farm income enhancement, Food and Nutrition security, Enterprise Development and Job creation in Eastern Uganda;** An improved process of soy flour transformation into a soy powder from MAKSOY varieties has been developed. The soy powder can be fortified so as to yield an instant Soy milk powder. Makerere University has entered an MoU with Soybean Africa Limited to commercialize the MAKSOY soybean varieties.
- **Developing an automatically controlled commercial solar-dryer and efficient resource recovery innovations for sustained market responsive fruit production in Uganda;** Makerere University in collaboration with the Renewable Energy Department of the Ministry of Energy and Mineral Development, and Lutheran World Relief (LWR) are making efforts to scale out the Hybrid solar dryers (HSD) among Arabica coffee farmers.

- **Enhancing Value addition on Potato-Sorghum enterprises for Improved Livelihoods in Uganda (EVaPoSIL);** The project developed a range of high-quality potato-sorghum based products including cookies, biscuits and waffles. By providing another alternative to the potato and sorghum value chain, farmers in the potato growing regions (Kigezi) were motivated to grow more potatoes which they were abandoning before. In addition, some farmers expressed their willingness to invest as entrepreneurs in value addition and commercialization to enhance their incomes.



*Potato and Sorghum cookies ready for consumptions
courtesy of Prof. Johny Mugisha one of the Mak-RIF
Principal Investigators*

College of Computing and Information Sciences (CoCIS)

- **Yo-Waste: a mobile and cloud-based hauler and garbage collection service (“uber for garbage”).** This project team is working to improve municipal solid waste collection service delivery in Kampala and nearby communities using technology. This innovation team has deployed the Yo-Waste app in communities, 200 households use the app to schedule and request waste pickups, over 120 tons of garbage that would rather have ended up in streets or in water channels was collected by 10 waste col-

lectors using the platform, 10 tons of plastic has been collected and diverted from landfills and being used by recyclers & manufacturers to add value.

College of Veterinary Medicine, Animal Resources and Bio-Security (CoVAB)

- **Optimization of the dosage, adjuvant and route for the candidate anti-tick vaccine;** This study determined the appropriate dose of Ra92A (Tick vaccine) that elicits the highest antibody titre. The research team has engaged a commercial producer of animal drugs in Uganda (Alfasan U Ltd) to manufacture the vaccine candidate under Good Manufacturing Practices (GMP) and develop a field site in Ngoma Government farm for a clinical trial with follow-on funding from HE President of Uganda.
- **Development of a Fluorescent Marker Sanitizer;** These innovators formulated a sanitizer which is compounded with a fluorescent dye to visually and quickly ascertain with a naked eye if hands and public spaces have been adequately sanitized.
- **Developing Novel Phyto-Nutraceuticals from wild edible fruits and vegetables for Mitigating Malnutrition among pregnant women and School going children;** This project addressed the problem of malnutrition among pregnant women and school going children by developing value-added phyto nutraceutical cocktails of economic value. These were derived from plants that were blended to contribute to the effective daily nutrient requirements for pregnant women and school going children.

College of Natural Sciences (CoNAS)

- **Bee-nutri-medicine;** Stingless bee products for nutritional and medicinal values in Uganda. This team developed and tested bee propolis real time on wound healing among women who had had cesarean section in hospital. The results show that propolis is faster for wound healing.



Showcasing to Her Excellency Maria Hakansson, Ambassador of Sweden and some Ugandan parliamentarians during the Sweden-Makerere Days of Excellence 2022

- **Value-added Phytogetic Feed Additives to Replace Conventional Antibiotics in Chicken Feeds;** This study team formulated a phytogetic chicken feed that was packed and augmented to replace use of Antibiotic Growth Promoters (AGPs) to prevent antibiotic resistance.

College of Health Sciences (CHS)

- **Transforming Presumptive Age Estimation in Uganda: Methods, Certainty and The Law;** The team provided policy recommendations on age estimation among the juveniles undergoing criminal proceedings. This we believe will eventually contribute to addressing one of the major challenges faced by the Justice, Law and Order Sector, the United Nations High Commissioner for Refugees, and the sports federations.
- **Medical - A Pandemic Assistance Tool in Uganda;** The project produced a single unit of the device able to do all the specifications with additional features of neural network assisted predictive diagnosis and conversational artificial intelligence with emotional structures. Specifically, the unit introduced features for automatic sterilization of the environment and enhanced the ability to dispense basic patients' daily needs. This tool is equipped with the following features: i) intelligent robot-driven, UV disinfectant; ii) pill /water dispensing module; iii) smart camera-enhanced dual-channel video communication module; iv) remote sensing feature for fall detection, and v) a component to

hold food for up to two/three patients.

- **Strengthening Integrated Screening for TB and COVID-19 in Kampala, Uganda;** Results of this study, stimulated a policy change at the Ministry of Health. These guidelines at the ministry were updated to include the mandatory screening of all TB suspects for COVID-19.
- **Product formulation and evaluation of a herbal acaricide containing bioactive extracts of *Albizia coriaria* on acaricide resistant *Rhipicephalus* ticks;** The team is in contact with existing local pharmaceutical manufacturers, government and other relevant stakeholders to undertake large scale production of the herbal acaridae so that it can be used by farmers.

College of Engineering, Design, Art and Technology (CEDAT)

- **Women and Housing;** The team explored why various low-income housing provided under different government schemes have been transformed or abandoned by the would-be users. The study recommends that the government should set the right regulatory framework for low-income housing and provide incremental site and services solutions.
- **Integration of on- and off-grid decentralized renewable energy systems:** Enabling Uganda's largest distributor UMEME to pilot the integration of off-grid decentralized renewable energy systems (DREs) with grid systems to extend electricity access to unserved communities.
- **Low-cost decontamination equipment for N95 and cloth masks;** The team developed a device for biological decontamination of N95 and cloth masks. The device utilizes a combination of humid heat (C at 50%-85% relative humidity) and ultraviolet light (UVC: 200-280nm wavelength): both of which are methods recommended by the Centre for Disease Control (CDC) for N95 decontamination.



The outside and interior of the Low-cost decontamination equipment for N95 and cloth masks

- **Parametric Optimization of Solar Autoclaves for Application in Rural Health Centers in Uganda;** Rural health centers in Uganda use charcoal/firewood to boil water used in an attempt to carry out sterilization for medical equipment which is not effective because the recommended conditions are not met. This study developed a solar autoclave that produces saturated steam at 121 degrees Celsius at a pressure of 1.8bar and takes 30 minutes to raise the water temperature from room temp to boiling temperature with an excellent Microbiological Performance.

Makerere University Business School (MUBS)

- **Developing and Testing Digital Games for Teenage Reproductive and Mental Health Education;** Teenage reproductive and mental health problems have been very high during the time of COVID-19 pandemic. Many school girls conceived during lockdown periods due to lack of knowledge about reproductive health. These

digital games have come in handy to further supplement teenage reproductive and mental health education.

- **Investigating Locational Preferences of Ugandan Market Entrepreneurs;** In Uganda, markets are a channel for agricultural produce and merchandise, thus an essential avenue for income generation and poverty reduction. We sought to clarify why the market entrepreneurs shun or leave the well-constructed government market structures. Findings reveal that government markets impose high market dues compared to the street and private markets, making it expensive for low-income earners with limited capital. This is partly explained by ownership of stalls by non-market vendors, who rent them out to actual vendors at high rates.

College of Education and External Studies (CEES)

- **Promoting Youth Employment by Integrating Employability Skills in Teacher and BTVET Education in Uganda;** After almost 10 years of Skill-ing Uganda, youth unemployment rates seem to be rising. This study established that the teacher/tutor educators: (i) hold a dubious interpretation of the Employability Skills (ES) concept. (ii)lack adequate capacity to prepare ES-savvy teachers/tutors. So, the study designed: (i)an ES taxonomy framework (ii) a transformative framework for embedding ES in teacher/tutor education. The two frameworks will guide and support universities, BTVETs and PTCs to prepare ES-savvy educators; who can ably instill ES in Uganda's learners at all levels of education.
- **Unlocking the Potential for Enhanced Teaching and Learning of the Visually Impaired in Uganda's Public Universities: The role of Assistive Technologies (ATEVIL);** The team developed and facilitated a blended course in the use of assistive technologies for teaching and learning of students with visual impairment. Over 20 academic staff from Makerere and Kyambogo Universities participated in the three-week course held from 29th September to 20th October 2021. They have been able to obtain these technologies through partnership with the Uganda National Association of the Blind.

College of Humanities and Social Sciences (CHUSS)

- **Drug and Substance Abuse (DASA) In Primary and Secondary Schools In Uganda: Baseline Survey Implications For National Sensitization, Curriculum Development And Capacity Building Among Teachers;** Findings from this study have been used by the National Drug Authority for their national sensitization program. Nile Breweries invited the PI to make a presentation on their launching of their “Smart Drinking Campaign”

College of Business and Management Sciences (CoBMS)

- **Determinants of Death Registration Uptake;** The study recommends development of a civil registration and vital statistics policy to guide implementation of death registration in Uganda, automation of death registration, massive sensitization of communities about death registration, decentralization of death registration processes to sub-county level and later to village level and close collaboration amongst all stakeholders. NIRA has since involved the study team in revising their strategy with regards to death registration.

A highlight of Mak-RIF engagements in pictures



Engagement with the European Union for research and innovation support on August 16th 2022. The Mak-RIF delegation included Prof. Fred Masagazi- Masaazi - the Chairperson Mak-RIF GMC who also headed the delegation; Dr. Sabrina B. Kitaka - Vice Chair Mak-RIF GMC; Dr. Roy William Mayega, Mak-RIF Coordinator and Grace Ruto Cherotich- Engagement Officer. Details are shared on <https://rif.mak.ac.ug/mak-rif-seeks-collaboration-with-the-european-union-delegation-in-uganda/>



At Uganda's National Council for Higher Education Exhibition on the September 24th and 25th, 2022. Details are shared on <https://rif.mak.ac.ug/mak-rif-at-the-13th-blended-national-council-higher-education/>



At the National Science Week held between November 6th and 10th, 2022 at the Kololo Ceremonial Grounds. Far left is Prof. Tikodri Togboa of Kiira Motors representing Makerere University's Vice Chancellor during the discussions about the future of research and innovations in Uganda.



Prof. Barnabas Nawangwe, Makerere University Vice Chancellor (First on the left-hand side) was part of the Panel Discussion during the Mak-Sweden Days of Excellence Nov.17 and 18, 2022. This engagement was guided by the Theme: "20 years of cooperation: robust foundation for continued development". Details are shared on <https://rif.mak.ac.ug/sweden-makerere-days-of-excellencenovember-17th-and-18th-2022/>



The Mak-RIF GMC Members with some of the Secretariat members at one of the GMC meetings



Part of the Mak-RIF Secretariat Members with the Mak-RIF GMC members, Grants Administration and Management Support Unit members and Makerere University's Vice Chancellor Prof. Barnabas Nawangwe after one of the meetings



Hon. Janet K. Museveni, Uganda's First Lady and Minister of Education and Sports at the Makerere University College of Education and External Studies Open Day



Mrs. Lorna Magara, Chairperson Council Makerere University (at the centre in an African dress) launching the Mak-RIF Grant Awards cohort 3

Be a part of these efforts, contribute to the research and innovation envelop specifically now as Makerere University leverages 100 years of Excellence in Building a Transformed Society.



Automation of Communal Hand Wash Pumps Project at Makerere University - Research and Innovations Fund (Mak-RIF)



Advancing Tissue and Organ Biobanking in Uganda



Bulamu Ventilator - Low Cost Medical Ventilator is currently undergoing animal tests at Makerere University College of Veterinary Medicine Animal Resources and Bio-security



Engaging stakeholders including Ugandan Parliamentarians for Research and Innovation



Launch of the COVID-19 Rapid Testing Kits on March 17, 2021 at Makerere University



The Touchless Handwashing System for community use

CONTACT US

Makerere University - Research and Innovations Fund (Mak-RIF)
Grants Management Committee (GMC) Secretariat
 Flat 70, Quarry Road, Makerere University
 Telephone: +256 414 673 932/ +256 773 484 120
 Email: info.rif@mak.ac.ug
 Website: rif.mak.ac.ug

By: Harriet Adong, Mak-RIF Communications Officer

CONTRIBUTORS

Gloria Naggayi, Mak-RIF Ag. Monitoring and Evaluation Officer
 Evelyn Nyachwo, Mak-RIF Ag. Deputy Coordinator
 Grace Cherotich Ruto, Mak-RIF Engagement Officer