

# MAKERERE UNIVERSITY

## RESEARCH AND INNOVATIONS FUND (MAK-RIF)

### BI-ANNUAL BULLETIN



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THE REPUBLIC OF UGANDA






MAKERERE UNIVERSITY

# ABOUT MAK-RIF

With funding from the Government of Uganda, Makerere University Research and Innovations Fund (Mak-RIF) is supporting cutting-edge research and innovations solutions that contribute to Uganda's development. The initiative was established in 2019 and has to date funded 1,337 multidisciplinary research and innovation projects focusing on priority issues of national importance jointly identified with policymakers.

Mak-RIF is governed by a multi-sectoral Grants Management Committee (GMC) which guides the implementation of all the Mak-RIF activities. The GMC is appointed by Makerere University's Vice Chancellor after wide consultations with all the University Colleges.

**6 years of Mak-RIF, 235 PhDs supported with funding, 1,457 projects funded, 100+ publications in peer reviewed journals**

MANDATE	GOAL	OBJECTIVES
		
To support high impact research and innovations that inform national development priorities.	To increase the local generation of translatable research and scalable innovations to drive Uganda's development agenda.	<ol style="list-style-type: none"> <li>1. To develop and fund a robust research agenda based on National development priorities identified by academia, government, implementing partners, and industries.</li> <li>2. To support the dissemination of high-quality research and innovations in a way that influences development policies and programs.</li> <li>3. To support the growth of research leadership capacity in the university.</li> </ol>



# FOREWORD

*Prof. Fred Masagazi-Masaazi*

**Chairperson, Mak-RIF Grants  
Management Committee**

Welcome to this comprehensive reflection on the remarkable milestones achieved by the Makerere University Research and Innovations Fund (Mak-RIF) throughout the second half of the 2024/2025 financial year. This dynamic period was marked by various achievements, strategic collaborations, and a steadfast commitment to advancing knowledge for national development.

From capacity-building initiatives such as equipping PhD students with vital skills in crafting policy and issue briefs to supporting several project dissemination activities, Mak-RIF further demonstrated its dedication to fostering panoramic and impactful research.

The pinnacle of the period was the vibrant Research and Innovations Week, officiated by His Excellency, President

Yoweri K. Museveni. During this landmark event, our researchers showcased the tangible impact of Government investment in research through Mak-RIF, and Makerere's innovative strides and research excellence.

Beyond this event, the period saw meaningful benchmarking visits from the Ministry of Public Service and Lira University, deepening inter-institutional collaboration in research management and knowledge translation. We were also privileged to host Prof. Christine Suniti Bhat from Ohio University, exploring partnerships in mental health, psychosocial support, and capacity building.

“ *In the second half of the financial year, Mak-RIF also launched its 6th round of grants award and inducted the RIF6 grantees, marking yet another chapter of impactful research ahead.* ”

I extend my heartfelt appreciation to the Government of Uganda and the University Management for their support towards Mak-RIF. I further appreciate researchers, the Mak-RIF Grants Management Committee and the Secretariat whose hardwork and dedication continue to elevate Uganda's research and innovation ecosystem. Together, we continue to position Makerere University as a beacon of research-led national development.



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## ENDOZO: PRESIDENT MUSEVENI LAUNCHES MAKERERE UNIVERSITY RESEARCH AND INNOVATIONS WEEK, COMMITS TO MORE FUNDING



*Moments before his key note address and launch of the research and innovations week, President Museveni (L) inspected the projects displayed at the Makerere University Freedom Square.*

On 8th April 2025, H.E President Yoweri Kaguta Museveni launched the three-day Research and Innovations Week at Makerere University. The event, which was held at the University's Freedom Square and Main Administration Building, offered a dynamic exploration of research breakthroughs and innovative projects in fields such as health care, critical infrastructure, behavioral science research and emerging technologies among others.

While inspecting the projects displayed, President Museveni was joined by Hon. Dr. Joyce Moriku Kaducu who was representing the Minister for Education and Sports, Hon. Dr. Monica Musenero, Minister for Science, Technology and Innovation, Hon. Dr. Chrispus Kiyonga, Chancellor, Makerere University, Mrs. Lorna Magara, Chairperson Makerere University Council, Prof. Barnabas Nawangwe, Vice Chancellor Makerere University, Prof. Fred Masagazi-Masaazi, Chairperson Mak-RIF Grants Management Committee, and other dignitaries.

In his key note address, the President congratulated Makerere on achieving such a milestone, praising the University community for the impressive innovations showcased. Expressing his satisfaction with the multidisciplinary research and innovations displayed, President Museveni thanked the university administration for responding to societal needs and noted,

“The money we are allocating for research and innovations is merely ‘endozo’ (a sip, a taste); we shall provide more in the future.”

The President commended Makerere University and its innovators for what he described as signs of waking up from the inherited inferiority complex. He recalled seeing young people engaged in innovative work, such as experimenting with ways to slow down banana ripening—a form of indigenous technology that had been long neglected.



*Hon. Dr. Joyce Moriku Kaducu delivering remarks by the First Lady and Minister for Education and Sports, Hon. Janet Kataaha Museveni on 8th April 2025.*

While delivering remarks by the First Lady and Minister for Education and Sports, Hon. Janet Kataaha Museveni, Hon. Dr. Kaducu highlighted the establishment Mak-RIF as a testament to the government’s commitment to research and innovations, adding that since 2019, the Fund has supported over 1,400 projects and has contributed immensely to industrial growth and livelihood improvement by fostering homegrown solutions across sectors such as agriculture, health, technology, and governance. She lauded the projects that are currently ready for commercialization and the policy recommendations generated, urging greater engagement from the private sector to leverage these outputs.



*Hon. Dr. Monica Musenero Masanza addressing the audience at the launch of the Research and Innovations Week.*

In her remarks, Hon. Dr. Musenero celebrated Makerere’s achievements in commercialization, notably citing Kiira Motors, which has begun producing market-ready electric vehicles. She also called for a policy shift to prioritize procurement of domestically developed innovations, recommending that all government bodies—including Parliament—lead by example. Her suggestions included issuing vehicle vouchers for Kiira Motors and restricting smart meter purchases to local manufacturers.

Hon. Musenero also expressed profound appreciation for the visionary leadership of the President, particularly recognizing his steadfast commitment to advancing science and technology in Uganda.





*Hon. Dr. Chrispus Kiyonga, the Chancellor of Makerere University, addressing the audience at the launch of the Research and Innovations Week.*

Hon. Dr. Kiyonga expressed deep gratitude for the President's continued dedication to supporting research and innovation at the university and across the country. The Chancellor emphasized that the event marked a significant milestone in the realization of the National Resistance Movement's original Ten-Point Programme, specifically referencing Point Five, which calls for the creation of an integrated and self-sustaining economy. He noted that the research and innovations showcased at the exhibition were clear demonstrations of progress towards this goal—developing homegrown solutions to address community needs and strengthening national self-reliance. In closing, Hon. Dr. Kiyonga commended the university community for their contribution to national development through research and innovation.



*In her remarks, Mrs. Lorna Magara, Chairperson of the Makerere University Council reiterated Makerere's resolve to foster sustainable, inclusive progress through deeper partnerships with government and industry, positioning the university as a key driver of national transformation.*

Mrs. Magara emphasized that impactful research outcomes arise from strong collaboration between government, academia, and industry, particularly when addressing Uganda's critical challenges in sectors like health, agriculture, tourism, and mineral development. She noted that past research was often misaligned with national needs due to donor priorities, but highlighted the transformative role of Mak-RIF, which since its launch in 2019, has enabled the university to refocus its research agenda to align with Uganda's socio-economic goals.



*Prof. Barnabas Nawangwe, Makerere's Vice Chancellor addressing the audience during the Research and Innovations Week. He thanked the President for his consistent, constructive feedback during his visits and remarked that Makerere's research has reached a world-class standard.*

In his remarks, Prof. Nawangwe emphasized that Makerere is deeply committed to conducting research that addresses national development challenges. He highlighted the University's strong engagement with communities and its global impact, citing the Infectious Diseases Institute (IDI) as an example that provides care to a large number of people living with HIV.

The Vice Chancellor also acknowledged the support of the United Nations Development Programme (UNDP), especially in establishing a board that promotes youth employment through innovation. He noted that more impactful initiatives were in the pipeline, and expressed his heartfelt appreciation to the Government of Uganda, the University Council, the Ministry of Education and Sports, and the researchers for their outstanding dedication and contribution to the advancement of knowledge and innovation.



President Museveni also officially launched the Makerere University Research Agenda, which has been described as a cornerstone of Makerere's commitment to advancing knowledge, fostering innovation, and driving societal transformation. Following the launch, the Chairperson of the Makerere University Council, Mrs. Lorna Magara, delivered a vote of thanks to the President, expressing deep appreciation for his continued support towards research and innovations. She also presented a gift to the President on behalf of Makerere University.

## PROF. NAWANGWE LAUNCHES PROJECT TO REVITALIZE MAKERERE'S FOOD TECHNOLOGY AND BUSINESS INCUBATION CENTER



*Makerere University's Vice Chancellor, Prof. Barnabas Nawangwe inspects Mr. Bean, one of the products from the Food Technology and Business Incubation Center during the project launch on 10th July 2025.*

Makerere University's Vice Chancellor, Prof. Barnabas Nawangwe, has launched a project titled "Revitalizing the Food Technology and Business Incubation Center (FTBIC) to Unlock Innovation and Entrepreneurship Potential among Makerere University Graduates." The project, which is funded by the Government of Uganda through the Makerere University Research and Innovations Fund (Mak-RIF), aims to transform the FTBIC into a more vibrant and effective hub for student innovation, entrepreneurship, and industry development.

While launching the project, Prof. Nawangwe noted that the FTBIC is one of the most



important centers in the University and it is expected to be churning out ideas, businesses, and innovations. He acknowledged that the funding from Mak-RIF will support the center to achieve its objectives. He also pledged support from the University management.

The Chairperson of the Mak-RIF Grants Management Committee, Prof. Fred Masagazi-Masaazi was represented by Ms. Evelyn Nyachwo. Ms. Nyachwo urged the project team to engage with relevant stakeholders including Uganda Revenue Authority (URA) and Uganda National Bureau of Standards (UNBS). She also added that to maximize project impact, there is a need to integrate what is taught in classrooms with the industrial practice outside the university.

Other dignitaries present were Prof. Robert Wamala, the Director, DRGT, Ms. Leontina Nayiga, the Supervisor Food Research and Development at Uganda Industrial Research Institute (UIRI), Ms. Margaret Nagwovuma, the Deputy Manager at the Makerere University Innovation Pod, and others.

## ABOUT FTBIC



In 2010, the Food Technology and Business Incubation Center was born. It aimed to strengthen skills training and contribute to the development of the agro-processing sector in Uganda by creating a conducive entrepreneurial environment for graduates, students and Small to Medium Enterprises (SMEs) in the agro processing sector.

The vision for the Centre was to act as a hub where academia, community and students would co-develop viable value-addition solutions for the food industry in addition to providing business potential and skills required to boost employment at the small and medium term scale level.

However, the FTBIC continued to support minimal skills training for students; it majorly supports incubatees from outside the University to develop their businesses. With support from Mak-RIF, the capacity of the FTBIC will be enhanced to support students and graduates to convert their innovations into viable enterprises and competitive products.

The project will renovate, refurbish, and revitalize the current FTBIC to support more innovations and startups will focuss on technology integration leveraging the advances in AI tools, blockchain tech, robotics, and other ICT innovations.

## PROJECT IMPROVES INCLUSIVE EDUCATION AT MAKERERE, KYAMBOGO

*By New Vision, March 13, 2025*



*The project team led by Dr. Leah Sikoyo (2nd R), the project's Principal Investigator, during a dissemination workshop at Esella Country Hotel on 12th March 2025.*

A total of 180 learners and staff from the Universities of Makerere and Kyambogo have benefitted from the five year Unlocking the Potential of Enhanced Teaching and Learning with Visual Impairment in Uganda's Public Universities: The Role of Assistive Technologies (ATEVIL) project.

The multi-year project was implemented by Makerere University in partnership with Kyambogo, National Council for Higher Education (NCHE), and the Uganda National Association of the Blind (UNAB).

Funded by the Government of Uganda through the Makerere University Research and Innovations Fund (Mak-RIF), the project, according to implementers, has seen the enrollment of students with visual impairment at universities increase as a result of the country's response to achieving inclusive education.

Speaking during the final stakeholders' dissemination workshop held at Esella Country Hotel in Kampala on March 12, 2025, Dr. Zahara Nampewo, a representative of the Mak-RIF Grants Management Committee, emphasized the significance of assistive technologies in enhancing teaching and learning for visually impaired students in Uganda's public universities.

Dr. Nampewo lauded the project team on their innovative approach, which she said not only positively influences government development policies and programs, but also individual lives, hopes, and dreams.

Latif Lugudo, one of the beneficiaries, praised the project, which he said has enabled him to navigate learning using technological assisted devices. "We received training on using software such as jaws access with speech, talk bag, among others," Lugudo said.

Dr. Leah Sikoyo, the project's Principal Investigator and a lecturer at Makerere University, commended the Government of Uganda for having supported visually impaired learners to achieve their dreams.

## UPE SCHOOLS SITTING ON UNTAPPED RESOURCES, EXPERTS SAY

*By Daily Monitor, March 21, 2025*



*Participants of the ELIUPES assessment workshop at Makerere University on 20th March 2025. Photo by Vincent Lusambya / Daily Monitor.*

Universal Primary Education (UPE) schools in Uganda are sitting on a goldmine of untapped resources including land, buildings and human capital. According to education experts, these resources could be leveraged to improve the quality of education and transform millions of learners.

Ronald Bisaso, the Deputy Principal of Makerere University's College of Education and External Studies (CEES), believes that failure to harness these resources is largely due to a mindset problem among school leaders.

To address this challenge, CEES has launched an innovative project titled, "Entrepreneurial Leadership Initiative for Universal Primary Education Schools (ELIUPES)," which aims to train school leaders and teachers in entrepreneurial skills.

According to Prof. Christopher Mugimu, the Project's Principal Investigator, the project will focus on action oriented and competency based approaches with the ultimate goal of improving learning outcomes. "We want to empower them to become entrepreneurial characters in their schools, so that everybody can make a difference in the educational experiences of learners," he said.

The project, funded by the Government of Uganda through Mak-RIF, also seeks to address the perennial challenge of low learning outcomes in UPE schools.

Dr. Kuluthum Nabunnya, Officer Education Services at Kampala Capital City Authority (KCCA), commended the project, saying it will add value to learners in line with the competence based curriculum at the secondary levels.

The initiative is expected to have a ripple effect on the entire education system, with benefits extending beyond the schools to the broader community. "By promoting entrepreneurial thinking and self reliance amongst UPE teachers, we hope to create a new generation of educators and learners who are equipped to drive innovation and progress in the entire education sector," said Bisaso.

Mr. Mugimu added, "With this project, we are confident that UPE schools can overcome the challenges that have held them back for so long and unlock a brighter future for their learners."



## MAKCONAS PROMOTES SCIENCE EDUCATION IN SCHOOLS THROUGH ASTRONOMY

By Hasifa Kabejja



The Government of Uganda has increasingly recognized the critical role of science education in driving the nation's economic development. As such, it has put in place deliberate policies aimed at popularizing science education in schools. The introduction of astronomy and space science as part of the curriculum supports this vision, offering students the tools to explore scientific concepts that will drive future innovation.

In an initiative geared towards bolstering science education in Uganda, Makerere University Department of Physics is leveraging the wonders of astronomy and space science to ignite curiosity and enthusiasm among learners. The project, led by Prof. Florence Mutonyi D'ujanga from the Department of Physics has reached 10 schools in Kampala, Luwero, and Mukono districts, using the vast universe to inspire the next generation of scientists, engineers, and mathematicians. The astronomy outreach activities have impacted numerous schools across different regions in Uganda.

On 21st March 2025, the project team hosted a dissemination event at Makerere University to present and share their research findings. The event was presided over by Prof. Winston Tumps Ireeta, the Principal of the College of Natural Sciences (CoNAS) and Acting Deputy Vice Chancellor in charge of Finance and Administration at Makerere University. The event was attended by students, school administrators, as well as representatives from Mak-RIF and the Ministry of Science, Technology, and Innovation.

In her address, the Project Principal Investigator (PI), Prof. Florence D'ujanga, emphasized the importance of sparking curiosity in students to encourage them to pursue scientific studies. "By making astronomy and space science more accessible and engaging, this project seeks to inspire greater interest in science education, ultimately benefiting Uganda's long-term development in critical fields such as technology, engineering, and mathematics," she explained.

On behalf of the Chairperson of the Mak-RIF Grants Management Committee, Dr. Mercy Rebekah Amiyo expressed appreciation to the research team for their invaluable initiative in promoting the study of science through astronomy. Dr. Amiyo praised the team's dedication to making complex scientific concepts more engaging. She called upon the project team to secure property rights and take proactive steps toward the commercialization of the project.

In his remarks, the Guest of Honour, Prof. Winston Tumps Ireeta emphasized the importance of nurturing scientists who understand principles rather than simply memorizing frameworks. He emphasized the importance of early exposure for children to develop an appreciation for science. He expressed gratitude to the Government of Uganda for its continued support towards research activities at Makerere University.

## ENHANCING SCHOOL RETENTION THROUGH COMMUNITY SOCIAL LABS AND PROBLEM-BASED FIELD WORK



*Assoc. Prof. Janestic Twikirize, the Principal Investigator of the project titled, Enhancing school retention through Community Social Labs and problem-based field work, disseminating project findings during the International Social Work and Social Development Conference held at Makerere University from 16th to 18th June 2025.*

Researchers at the Makerere University Department of Social Work and Social Administration have successfully implemented a one year pilot project on; 'Enhancing school retention through Community Social Labs and problem-based field work'. The project, funded by the Government of Uganda through the Makerere University Research and Innovations Fund (Mak-RIF) sought to contribute towards the enrolment and retention of children in school through community engagement.

On 18th June 2025, during the International Social Work and Social Development Conference, the project's results and lessons were disseminated, showing promising progress made in the implementation communities in the three districts of Gulu, Luuka and Kanungu. The project dissemination also demonstrated potential contribution of professional social work interventions towards achieving educational outcomes for children at the grassroots.

In her presentation, Assoc. Prof. Janestic Twikirize, the project's Principal Investigator, noted that the project harnessed an innovative methodology where community social labs were developed as sites for social innovation through which school retention is enhanced. "Community social labs utilize community as sites for social innovation which includes community driven research and learning, indigenous knowledge generation, and problem solving," said Prof. Twikirize. She added that in the project, community social labs were used to build long term engagement between universities as a scientific community and the grassroots communities for innovation and problem solving.

During the project implementation, 60 university students were deployed in 32 parishes in Gulu, Luuka, and Kanungu districts. While in the communities, the students used approaches such as community profiling, participatory problem identification and assessments, solution focused planning and priority setting, linkages and referrals, and documentation. As a result, the project increased retention of children in school in the target communities, enhanced problem solving models in the communities, and increased visibility of Makerere University in local community development.

“In Nakawompe Primary School in Luuka district, enrolment and retention of pupils increased from 76 to 230 in 2025 and from 600 to 746 in Nawampiti Primary School,

said Prof. Twikirize. She added that schools also reported reduced absenteeism, increased confidence and discipline among learners, and improved pupil hygiene.

***The project made the following policy recommendations.***

1. Leverage student internships to build stronger and continuous university-community engagement to promote school retention and other educational outcomes.
2. Consider introducing a community-school social work role at the sub county level.
3. Education and community-based services departments should consider strengthening joint initiatives to promote school retention and protect children from abuse.
4. Strengthen mechanisms to harness local community wisdom and collective resources to address children's schooling challenges.
5. Strengthen the capacity of parish chiefs and volunteers to utilize effective community-led approaches to address common school retention challenges
6. Mandate community level field placements for practice-based University programmes
7. such as social work.

## MAKERERE RESEARCHERS TASK GOVERNMENT TO STRENGTHEN SURVEILLANCE FOR HEAVY METAL CONTAMINATION AROUND DUMPSITES



Mr. Abdullah Ali Halage, the project's Principal Investigator, speaking during a dissemination workshop at the School of Public Health in Mulago on 26th June 2025.

Researchers at the Makerere University School of Public Health have tasked the Ministry of Health and the District health teams to strengthen Environmental Health surveillance for heavy metal contamination around dumpsites. Researchers have also asked the Government to integrate information about heavy metals and other health effects into routine community health education sessions.

These recommendations were made on 26th June 2025 during a dissemination workshop for a project titled, “Knowledge, Perceptions, and Practices towards Heavy Metal



## Contamination and Associated Health Risks among Community Residents Living in the Vicinity of Municipal Solid Waste Dumpsites in Kampala Metropolitan Area, Uganda.”

Funded by the Government of Uganda through the Makerere University Research and Innovations Fund (Mak-RIF), the project assessed the knowledge, perceptions, and practices towards heavy metal contamination and associated health risks among community members living in the vicinity of municipal solid waste dumpsites in Kampala Metropolitan area in order to inform targeted interventions.

Speaking at the dissemination workshop, Mr. Abdullah Ali Halage, the project’s Principal Investigator noted that the study focused on one of the neglected areas in Uganda and in the region. Mr. Tom Okade, one of the project’s team members also noted key findings of the study.

“We studied gazetted dumpsites in Kampala metropolitan area including Katikolo in Mukono, Nkumba in Entebbe, and Kiteezi in Kampala and found that these communities have inadequate knowledge on and negative perceptions towards heavy metal contamination.”

Said Mr. Okade. He also noted that children and women bear the heavy burden of heavy metal exposure associated with acute and chronic health effects.

Other recommendations made by the researchers include the need for local authorities to sensitize communities about buffer zones and their benefits in reducing heavy metal exposure and risks, and the implementation of land use regulations prohibiting crop cultivation and animal grazing in dumpsites among other recommendations.

## RESEARCHERS DEVELOP TECHNOLOGY TO REDUCE POST-HARVEST LOSSES



*Participants during the dissemination of a project which developed a monitoring system for tracking and controlling post harvest handling of cereals in Uganda. The dissemination workshop took place on 25th July 2025 in Ziobwe Town Council, Luwero district.*

In 2023, the World Bank Group reported that food insecurity is a significant challenge, aggravated by substantial post harvest losses. Uganda experiences crop harvest losses of up to 22% due to inadequate and poor storage facilities, transportation challenges, and poor post harvest handling practices which contribute to 62% food insecurity in Uganda.

Against this background, researchers at the School of Computing and Informatics Technology, College of Computing and Information Sciences at Makerere University implemented a project to bridge the food security gap. The researchers, led by Dr. Hawa Nyende, designed an Internet of Things (IoT) enabled monitoring system for tracking and controlling post harvest handling of cereals in Uganda. The IoT-based monitoring system tracks key environmental parameters including temperature, humidity, carbon dioxide, and dust levels within cereal storage facilities in the districts of Lira and Luwero.

Speaking at the project's dissemination workshop on 25th July 2025 in Ziobwe Town Council, Luwero district, Dr. Nyende, the Principal Investigator noted that, "the real time data generated by the system supports farmers, extension workers, and traders to make informed decisions to enhance storage practices, reduce post harvest losses, and ultimately contribute to improved food security. The District Production Officer for Luwero District, Dr. Andrew Kidda Makubuya, thanked the project team for choosing Ziobwe as one of the project implementation areas and added that one of the key aspects of food security is the safety of the food.

During the project implementation, researchers found that over 94% of traders and over 85% of farmers store cereal in bags and in sacks respectively and that only 34% of farmers and traders are aware of storage technology. Researchers called for the promotion of IoT system adoption and training of farmers on IoT usage. They argued that in return, this will reduce post harvest losses, stabilize market supply, encourage evidence based storage practices, and improve inventory management.

"The integration of IoT technology into cereal storage facilities presents a practical and transformative opportunity for farmers, traders, and extension workers in Uganda. By adopting IoT real time monitoring systems, communities can significantly reduce post harvest losses, ensure consistent grain quality, and enhance food security," said Dr. Nyende.

## NOTABLE PROJECTS

**Enough! Vulnerability, Perseverance And Resistance In The 21st Century: A Docu-Drama Film About The Lived Experiences Of Survivors Of Gender-Based Violence In Uganda**

*Principal Investigator: Dr. Viola Karungi*



*One of the project's investigators interviewing a survivor of Gender Based Violence*

The main product of this project is a documentary film titled 'ENOUGH!'. The film presents a character of a resilient woman who said 'enough' to an abusive relationship. The film highlights protective factors against violence, including having a supportive family, a certain level of education, and a stable source of livelihood. These and other factors empower women to exercise their agency and make the right decisions that enhance their safety and well-being. They can question socio-cultural norms and belief systems that endanger their lives and eventually resist the same.

The project found that women suffer Gender Based Violence (GBV) due to several factors, especially culture, religion, fear, and ignorance. It is for the same reasons that the same women tend to remain silent about their suffering to the extent that they rarely report to their immediate family members and the police. The study also found that, however much elite women can be abused, they have far more chances for survival because they can walk out and sustain their lives without the fear of self-reliance, a fear that less educated women tend to have.

**Development of a Solar PV-Biogas Hybrid Microgrid Reference Design for Rural communities in Uganda**

*Principal Investigator: Dr. Emmanuel Wokulira Miyingo*



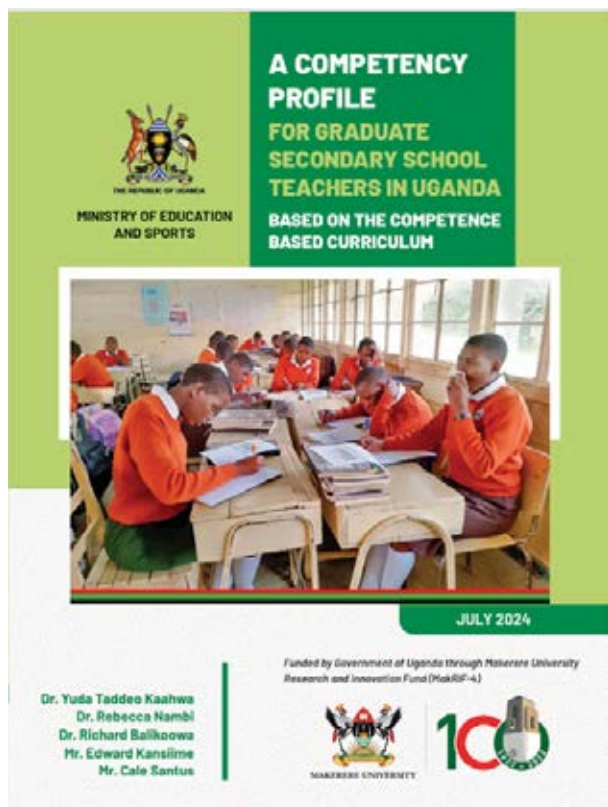
This project developed a reference design for a solar PV-biogas hybrid microgrid that can satisfy the energy needs of a typical rural off-grid community. The hybrid microgrid was installed at the pilot site and has been in operation since April 2024, during which data was collected on Key Performance Indicators (KPIs), revenue, expenses, energy generation and consumption, faults, downtime, and user feedback. Overall, the project, through the financial model, suggests that a hybrid solar PV and biogas microgrid is a more viable option compared to solar PV with a matching battery bank or solar PV backed up by a diesel genset given access to sufficient feedstock and adequate management of costs such as labour, maintenance and other utilities as well as monetization of the bio-slurry by-product.

Feedback from the users so far suggests that such energy systems have enormous potential to alleviate energy poverty among off-grid communities. It ensures access to a modern energy supply by utilizing locally available renewable energy sources, eliminating the need for expensive national grid extensions. The idea of hybrid energy systems guarantees that the various energy sources complement each other at different periods of energy requirement, e.g., solar PV whenever available and biogas when the sun is unavailable.



## Developing a Competency Profile for Graduate Teacher Trainees in Universities in Uganda

*Principal Investigator: Dr. Kaahwa Yuda Taddeo*



The key product from this project is a competency profile for graduate teachers in Uganda. This competence profile serves as a tool for program review in universities, aligning teacher training with the current demands of the Competence Based Curriculum (CBC). The Competence Profile Handbook outlines the competences required of a 21st-century teacher to effectively implement the CBC in secondary schools. These competences are grouped into;

1. **Cross-cutting Competencies:** These are to be embedded in Foundations, Curriculum, and Psychology course units
2. **Competences of a teacher of language**
3. **Competences of a humanities teacher**
4. **Competences of a science teacher**
5. **Occupational/Management competences**

The project has paved the way for improving the quality of teacher training in Uganda, aligning with the vision of the National Teacher Policy (2019) and the Competence-Based Secondary School Curriculum, which demands highly competent teachers to develop competencies in learners.

## Standard Reference Cardiothoracic Ratio (CTR) in a Ugandan population, relationship with Body Parameters and CTR automatic prediction: A Patient's Health Indicator for Clinical Application

*Principal Investigator: Rebecca Nakatudde*

The study investigated the relationship between cardiothoracic ratio (CTR) and clinical indications, as well as CTR in relation to body parameters, such as body mass index (BMI), body surface area (BSA), and body surface index (BSI), to identify a suitable correlation that can be used to estimate CTR without the need for imaging or the conventional X-ray; a possibly cheaper option in low-resource facilities.

An App software that is installable on both phones and computers was developed. The algorithm in the app was designed based on the equation derived from the relationship between CTR and BSA, combined with patient age. The app can predict CTR after inserting the user's sex, age, height, and weight. The App is likely to be improved by feature researchers if a similar study were conducted in the general population with more diverse characteristics.

## Removing barriers to the planting of multi-purpose tree species of Uganda

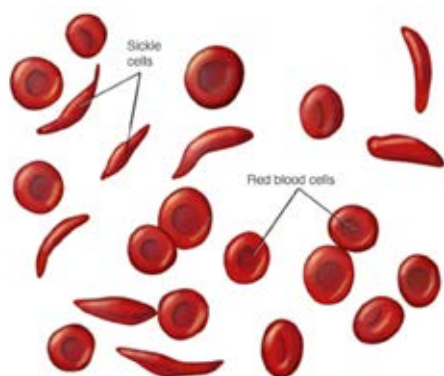
*Principal Investigator: Samuel Ojejel*

The study generated vital information in bridging the existing gaps in the planting of multi-purpose trees and shrubs (MPTS) in eastern and northern Uganda. The study compiled lists of 64 and 37 indigenous MPTS species in the east (Amuria and Kapelebyong districts) and north (Kitgum and Lamwo districts). This was achieved by engaging targeted community members who regularly interface with the environment through the collection of various plant materials in selected communities (villages). These represent custodians of knowledge of the multi-purpose tree species.

The information generated lays the foundation for any restoration programme to be undertaken in the study districts. The reference MPTS lists in the two study sites guide the site-species matching for any party interested in restoring tree cover in the two areas. Results from this study also highlight the government's low input in supporting MPTS planting. Ordinarily, government and civil society should lead the promotion of these species because they are slow-growing and therefore slow to provide dividends. This is a key finding from the study, which should inform the planning and implementation of tree planting in the two regions.

## The Role of Prolonged Exposure to Malaria Parasitemia in the High morbidity and Mortality in Children with Sickle Cell Anaemia in Uganda

*Principal Investigator: Dr. Ruth Namazzi*



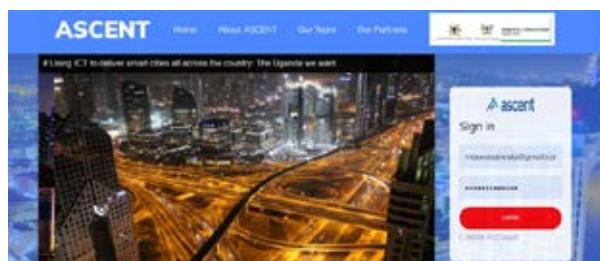
This study aimed to determine whether children with Sick Cell Anaemia (SCA) experience delayed parasite clearance after treatment with artemisinins for clinical malaria and to understand the clinical consequences of prolonged exposure to malaria parasitemia in this population. This study was conducted at the Nalufenya Children's Ward of Jinja Regional Referral Hospital in Jinja, Eastern Uganda. Patients enrolled in this study were admitted for treatment and study-related sampling and monitoring during the index malarial infection. Patients enrolled in the study were followed for six months, and peripheral blood smears and dried blood spots were collected on days 14 and 28 after admission and treatment. Patients were also evaluated at six months.

Findings from this study suggest ART-tolerant parasites have sufficient evolutionary fitness to persist in stable transmission settings and cause severe disease. In addition to attenuated artemisinin activity, data also indicate a decrease in lumefantrine efficacy. In all, the results portray a challenging picture for the treatment of severe malaria and continued control of *Plasmodium falciparum* in Uganda. In conclusion, the efficacy of artemisinin is likely waning in stable transmission settings, as well as in unstable settings where resistant lineages typically evolve, emerge, and spread, marking a significant milestone for malaria control in the East African region.

The study investigators recommend that additional studies be conducted on the activity of both artemisinin and lumefantrine in both severe and uncomplicated malaria, as both drugs appear to have markedly reduced activity in patients living in stable transmission settings, including those with severe malaria. Alternative treatment regimens may now be necessary in Uganda.

## Towards Smart Cities in Uganda: A Formative E-Governance Assessment Tool (ASCENT)

*Principal Investigator: Dr. Ian Senkatuka*



*The ASCENT web page*

This project developed a prototype, ASCENT, a shareable smart city assessment tool based on the smart city framework, to guide the development of new cities in transitioning to smart city status. Indicators were identified from other assessment tools developed elsewhere and customized to suit Uganda's context. ASCENT is an online tool that includes a website and an application, which stakeholders can use to assess cities annually to identify areas that need to be strengthened.

The ASCENT tool, being an open-source project, will form a strong foundation on which new cities may assess their e-readiness, enjoying the innovative features that come with this solution. There is anticipation for collaboration between the ASCENT project and the senior players in the smart cities ecosystem of constrained cities, such as those in Sub-Saharan Africa. The ASCENT project is not specific to Uganda and thus has the potential to be exported to other African countries with similar contexts.

## Biomethane and Biofertilizer Production from Biomass-Matooke Peels for Sustainable Energy and Agricultural Applications

*Principal Investigator: Patrick Ssebugere*



*A fixed dome bio-digester prototype at Nyakabirizi Village, Bushenyi District*

The project has achieved several milestones, including the development of a prototype fixed dome biomethane digester and a biofertilizer that can enhance the agricultural sector by promoting sustainable land use and soil management in line with NDP III. The engagement of farmers yields promising outcomes aimed at improving household incomes as the county strives to achieve middle-income status.



*Biofertilizer from Matooke waste peels*

In addition, farmers recruited for training were equipped with hands-on skills on how to construct and maintain biogas digesters, and to produce biogas not only from banana peels but also from other agricultural wastes, since the technical procedure is the same. The biogas contributes to green energy technology that helps alleviate the negative effects of hazardous emissions arising from traditional cooking habits, in line with SDG 3 (Good health and well-being) and SDG 7 (Affordable and clean energy).

The biogas, if scaled up, could be utilized in various applications, including industry, transportation, and marine systems. Interdisciplinary team and networking were at the core of the project implementation phase, which facilitated knowledge transfer among stakeholders, academia research centers, and industries in Uganda and the region.

## EMPOWERING RESEARCH EXCELLENCE: BUILDING CAPACITY AND DRIVING IMPACT AT MAK-RIF

Mak-RIF's core objective is to increase the local generation of translatable research and scalable innovations to drive Uganda's development agenda. The research processes go beyond writing and winning grants for our researchers: Very instrumental is the component of research management capacity building for researchers which Mak-RIF has taken to heart. Following a needs assessment conducted among the researchers, Mak-RIF identified the need to train its researchers and their teams on Research Knowledge Translation. This topical issue goes a long way in getting that "scientific finding" out there to the right audience, at the right time, through the right channel and most appropriate wording.

In the second half of the 2024/2025 Financial Year, Mak-RIF trained 70 of its beneficiaries from the RIF 4 and RIF 5 cohorts as well as the PhD students in those cohorts. Each researcher selected to participate in the training had collected and analysed data and had their results ready for dissemination. Each participant was thus required to develop one Knowledge Translation (KT) output. The training sessions successfully engaged eight colleges at Makerere University, namely CEES, CHUSS, SOL, COCIS, CONAS, COVAB, MUBS, and COBAMS. The remaining four colleges; CHS, SPH, CAES, and CEDAT are scheduled to be included in the upcoming training sessions during the 2025/2026 Financial Year.

The knowledge translation training led researchers to better understand concepts of dissemination of research findings that can complement the traditional academic journal publications and dissemination workshops. With topics like, how to engage the media/ journalists, speaking to policy makers, community engagement and communication, making an elevator pitch for your project, Mak-RIF is more confident that its researchers will be able to communicate their findings better and reach a wider network of potential beneficiaries from their work. The training also covered other key areas including writing policy briefs, issue briefs, infographics, conference presentations, technical briefs, and practice briefs among others.



## Research knowledge translation meets impact at Mak-RIF



*Mak-RIF PhD awardees of cohorts RIF 4 & 5 during the training*

Knowledge translation is the process of taking research findings and making them understandable, accessible, and usable for non-academic audiences such as policymakers, practitioners, industry, and communities. KT ensures that useful valuable research is not ‘rotting’ on the office shelves, laptops or lying idle in journals but it is informing decisions, policies and practices which ideally marks the genesis of impact.

Knowledge Translation also highlights the relevance and usability of the research findings when it is translated into practical tools like issue briefs, policy, and practice briefs. This facilitates the possibilities of research influencing real change in the communities. With the appropriate use of KT, researchers can achieve clear and measurable forms of impact through evidence-informed policies, programs and social change. Very important to note is the contribution of KT to promoting stakeholder engagement. It drives the researchers to bring the stakeholders on board right from the conception of the project, through its implementation and the dissemination phase.

## A snapshot of the Mak-RIF research capacity building trainings



*A summary of the Mak-RIF trainings on research knowledge translation*

KT comes a long way in facilitating the uptake of findings and maximizing the impact in systems and societies. Finally, in the era of the sustainable development goals, it contributes immensely to the need to achieve long-term societal and environmental impact. Therefore, as Mak-RIF ends its implementation of year 6, it is taking the concept of knowledge translation to another level to ensure that our research can start to impact the lives of our communities and inform the policy makers.

## FORGING STRATEGIC PARTNERSHIPS FOR A RESEARCH-INFORMED FUTURE

In recent months, the Makerere University Research and Innovations Fund (Mak-RIF) has served as a nexus for thought leadership, mutual learning, and visionary collaboration across Uganda's public institutions and beyond. Through a series of high-level engagements, Mak-RIF has amplified its role in strengthening the national research and innovation ecosystem—one strategic partnership at a time.

### Bridging Academia and Public Service: A Benchmarking Visit from the Ministry of Public Service



On a pivotal day still marked with enthusiasm, Mak-RIF welcomed a distinguished delegation from the Ministry of Public Service. The purpose of the visit was both symbolic and strategic—a benchmarking engagement designed to support the Ministry in establishing its own Research Management Committee. The Mak-RIF Secretariat opened its doors with presentations on governance structures, funding mechanisms, and impactful innovations that have redefined Uganda's research landscape.

Discussions were robust, tackling topics from research prioritization to knowledge translation and stakeholder engagement. The visiting team departed not just with technical insights, but with renewed energy to anchor evidence-based approaches within the public sector. This collaboration reaffirmed the synergy between academia and government in shaping a modern, responsive civil service.

### Peer Learning in Action: Lira University Visits Mak-RIF



June 12, 2025, marked another memorable occasion as Mak-RIF played host to a delegation from Lira University. Held in the vibrant Mak-RIF boardroom, the visit was a model of institutional solidarity and peer learning. The focus was clear—to learn from Mak-RIF's systems in order to strengthen Lira University's internal research support structures.

From grants management and M&E strategies to the “one-stop centre” model that has streamlined operations at Makerere, the exchange was rich and practical. The team from Lira University was particularly inspired by the potential to replicate such systems at home. Their reflections spoke volumes about the importance of national capacity-building through homegrown collaboration.

## Transforming Cities Through Research: Engagement with Kampala Capital City Authority (KCCA)v



In a bold step toward urban transformation, Mak-RIF and KCCA convened for a strategic meeting focused on aligning research outputs with the realities of city governance. Representing the Grants Management Committee, Prof. Eddy Walakira highlighted over 30 Mak-RIF-funded projects with relevance to urban development.

The meeting led to productive deliberations on formalizing the partnership. KCCA, appreciating the urgency of implementation, proposed a leaner and more agile mechanism to operationalize collaborations. Key research needs emerged, including behaviour change for household waste sorting, plastic recycling models, maggot-based bio-recycling, and strategies for inclusive urban infrastructure.

Together, Mak-RIF and KCCA agreed on a forward-looking roadmap: a formal partnership agreement, joint dissemination of research, and pilot testing of impactful projects in Kampala. It was a moment of convergence where research meets policy, and policy meets the people.

## A Global Perspective: Courtesy Visit by Professor Christine Suniti Bhat



Mak-RIF was delighted to receive a courtesy visit from Professor Christine Suniti Bhat, President of the American Counselling Association and a globally respected scholar from Ohio University. Prof. Bhat engaged deeply with the Fund's mission, expressing admiration for its focus on national impact.

In their discussions, the potential for collaboration in mental health, counselling, and higher education became evident. Prof. Bhat's presence was a powerful reminder that Mak-RIF's work resonates far beyond Uganda's borders. It demonstrated how local research excellence can foster global relevance and forge new pathways for international cooperation.

**Looking ahead:** Mak-RIF's engagements highlight its pivotal role as a convener, catalyst, and champion for research and innovation in Uganda. Each story reflects a growing commitment to evidence-based policy, institutional capacity, and cross-sector collaboration.

Mak-RIF remains steadfast in its mission to build a resilient, home-grown research ecosystem that empowers Uganda to solve its own challenges, shape its own destiny, and inspire the region and the world.



# PUBLICATIONS



Journal of Veterinary Behavior 77 (2022) 13–18

Contents lists available at ScienceDirect

**Journal of Veterinary Behavior**

journal homepage: [www.elsevier.com/locate/jvb](http://www.elsevier.com/locate/jvb)

**Exploration of circumstances surrounding bites from potentially rabid dogs on rampage, and the coping strategies of victims and communities in Central Uganda**

Dickson Stuart Tayebwa<sup>a,b,c</sup>, Njallira Kasim Rashid<sup>d</sup>, Wilfred Enoko<sup>e</sup>, Colin Surkandi<sup>f</sup>, Alex Kyabwanga<sup>g</sup>, Jesse Mutezinda<sup>h</sup>, Mariam Komugisha<sup>i</sup>, Sonila Agye Atim<sup>j</sup>, John Kateregga<sup>k</sup>, Denis Muhangi<sup>l</sup>, Robert Twyongye<sup>m</sup>, Savino Biryomunaho<sup>n</sup>, James Okwee Acai<sup>o</sup>

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**Leveraging Spatial Analysis for Sustainable Land Use Change Management: A Case of the Mountain Elgon Region**

Isidore Paterson Gama<sup>a</sup>, Agnes Serwanga Rwashana<sup>b</sup>, Benedict Oya<sup>c</sup> and Daniel Wainwa<sup>d</sup>

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Lubogo et al. BMC Public Health (2025) 25:790  
<https://doi.org/10.1186/s12889-025-21936-9>

BMC Public Health

**RESEARCH** Open Access

**Effects of nutrition education, physical activity and motivational interviewing interventions on metabolic syndrome among females of reproductive age in Wakiso district, central Uganda: a randomised parallel-group trial**

David Lubogo<sup>1</sup>, Henry Wamunzi<sup>2</sup>, Roy William Mayega<sup>3</sup> and Christopher Gatimu Ochi<sup>4</sup>



**European Journal of Nutrition & Food Safety**

Volume 17, Issue 2, Page 1-15, 2025; Article no.EJNFS.130258  
 ISSN: 2347-5641


**On-Farm Cocoa Fermentation Practices and their Effect on the Quality of Cocoa Beans in Three Agroecological Zones of Uganda**

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MDPI

**Detection and Molecular Characterization of Rift Valley Fever Virus in Apparently Healthy Cattle in Uganda**

Eugene Arinaitwe<sup>1,2</sup>, Kallfyn Waters<sup>3,4</sup>, Bonto Faberay<sup>5,6</sup>, Gladys K. Nakanjako<sup>1,2</sup>, David Kalemzi Anshaire<sup>4,5</sup>, Mathias Alanya<sup>4</sup>, Frank Norbert Mulinde<sup>4,5</sup> and Joseph Erume<sup>4</sup>



Contents lists available at ScienceDirect

**Multimodal Transportation**

journal homepage: [www.elsevier.com/locate/mt](http://www.elsevier.com/locate/mt)

**Sustainable urban transportation planning: Integrating an electrified metro system into Kampala metropolis**

Imail Kimuli<sup>a</sup>, John Baptist Kirabira<sup>b</sup>, Ismael Nkambwe<sup>c</sup>, Saadat E.K. Nakyejwe<sup>d</sup>, Michael Lubwama<sup>e</sup>, Kasiru Sendawula<sup>f</sup>, Nashua K Nabaggala<sup>g</sup>

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**PLOS GLOBAL PUBLIC HEALTH**

RESEARCH ARTICLE

**Optimal waist circumference cut-off points for predicting metabolic syndrome among females of reproductive age in Wakiso district, central Uganda**

David Lubogo<sup>1\*</sup>, Henry Wamunzi<sup>2</sup>, Roy William Mayega<sup>3</sup>, Christopher Gatimu Ochi<sup>4</sup>

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Ashahine et al. AIDS Research and Therapy (2025) 22:24  
<https://doi.org/10.1186/s12861-024-00687-4>

AIDS Research and Therapy

**RESEARCH** Open Access

**Predictors of survival among older adults with HIV in Uganda's AIDS support organization centers of excellence (1987–2023): a retrospective longitudinal study**

Christine Atuhairwe<sup>1</sup>, Leonard Atuhairwe<sup>2</sup>, Stephen Ojumbo Wandera<sup>3</sup>, Dinah Amongiri<sup>4</sup>, Titus Ochieng<sup>5</sup> and Cyprian Naisinde<sup>6</sup>



Contents lists available at ScienceDirect

**Next Research**

journal homepage: [www.elsevier.com/locate/nextresearch](http://www.elsevier.com/locate/nextresearch)

**Impact of natural ventilation on the subjective thermal comfort in low-income tropical housing**

Derrick Kajjuba<sup>a,b</sup>, Peter W. Olupot<sup>c</sup>, John B. Kirabira<sup>d</sup>, Rachel Wesoonga<sup>e</sup>, Jeffy Britton Saemodda<sup>f</sup>, Richard Muganyizi<sup>g</sup>, Hillary Karode<sup>h</sup>

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Extracellular hydrolytic enzyme activities and biofilm formation in *Candida* species isolated from people living with human immunodeficiency virus with oropharyngeal candidiasis at HIV/AIDS clinics in Uganda

Benson Muniguti<sup>1,2</sup>, Andrew Akumprira<sup>3</sup>, Hope Derick<sup>4</sup>, Lathan Turyemushika<sup>5</sup>, Alex Mweziwa<sup>6</sup>, Edson Mwebesa<sup>7</sup>, Vicent Mweigye<sup>8</sup>, Immaculate Kabagidde<sup>9</sup>, Tabalu Sekulima<sup>10</sup>, Francis Gocheng<sup>11</sup>, Herbert Itabangi<sup>12</sup>, Gerald Mboowa<sup>13,14</sup>, Obondo James Sande<sup>15</sup>, Beatrice Achau<sup>16</sup>

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Impact of heavy metals on antibiotic resistance of *Escherichia coli* from slum wastewater in Kawempe division, Kampala district, Uganda: a case study

Isaac Byaruhaba<sup>1</sup>, Alice Nabatondo<sup>2</sup>, Emmanuel Muhumusa<sup>3</sup> and Joseph Kyambadde<sup>4</sup>



Analyzing the drivers that shape people's perceptions of the impact of changes in forest cover and human population on water availability in the Mt. Elgon water tower

George Kimbowa<sup>1,2\*</sup>, Jamiat Nanteza<sup>3</sup>, David Mbitumukiza<sup>4</sup>, Saul Daniel Dumba<sup>5</sup>, Denis Nseka<sup>6</sup> and Frank Mugaga<sup>7</sup>

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Breaking Barriers and Empowering Marginal Women Micro-Entrepreneurs in Kampala Central Division, Uganda for Sustainable Economic Growth: A Narrative Inquiry

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Acceptability of an online peer support group as a strategy to improve antiretroviral therapy adherence among young people in Kampala district, Uganda: qualitative findings

Yerusa Kinyi<sup>1</sup>, Sabrina Kituku<sup>2</sup>, Joan Kalyango<sup>3</sup>, Joseph Rujumba<sup>4</sup>, Gloria Adobea Odei Obeng-Amoako<sup>5</sup>, Mathew Amollo<sup>6</sup>, Joan Nangendo<sup>7</sup>, Charles Karamagi<sup>8</sup>, Philipa Musoke<sup>9</sup> and Anne Katabagire<sup>10</sup>



Mortality among children aged 28 days–17 years with pneumonia who are not severely undernourished and the effect of macronutrient supplementation: a systematic review and meta-analysis

Damalie Nalwanga<sup>1,2</sup>, Alison Annet Kinyangye<sup>3,4</sup>, Andrew Kiggwa<sup>5</sup>, Abel Abera Negash<sup>6,7</sup>, Moses Ocan<sup>8,9</sup>, Nakalembe Loyce<sup>10</sup>, André Briand<sup>11,12</sup>, Kathryn Maitland<sup>13</sup>, Victor Muslime<sup>14</sup>, Charles Karamagi<sup>15</sup>



The Gendered Impact of Agricultural Market Reforms on Financial Benefits in Uganda's Smallholder Farming Households

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Impact of natural ventilation on the subjective thermal comfort in low-income tropical housing

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## EDITORIAL

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## FRONT COVER PHOTO

**R-L:** During the Makerere University Research and Innovations Week 2025, President Museveni was welcomed by Hon. Dr. Joyce Moriku Kaducu, the State Minister of Health in charge of Primary Health Care, Mrs. Lorna Magara, Chairperson of the Makerere University Council, Prof. Barnabas Nawangwe, Makerere University's Vice Chancellor, and Prof. Fred Masagazi-Masaazi, Chairperson of the Mak-RIF Grants Management Committee.

## BACK COVER PHOTO

Makerere University's Top Management, the Mak-RIF Grants Management Committee, and the Mak-RIF Secretariat pose for a photo with President Museveni (C) and other dignitaries during the Makerere University Research and Innovations Week 2025.





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