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# We must be the masters of our future

**Makerere University, Uganda's oldest university will next year celebrate 100 years of its existence. Barbara Kaija, Conan Businge and Richard Kayiira caught up with the First Lady and Minister of Education and Sports, Janet Kataaha Museveni, in an exclusive interview about the institution and higher education in general.**

**Makerere, which is the seventh oldest university in Africa, is celebrating 100 years in existence next year. In your view, as the education and sports minister, what are its greatest milestones in the last 10 decades?**

Makerere University provided the initial and strong foundation for Higher Education in Sub-Saharan Africa. For some time, it stood alone in this region, and therefore, provided Higher Education to the prominent leaders of Africa and beyond who became pioneers in political leadership after colonial rule.

Leaders such as Mwalimu Nyerere who was the first President of Tanganyika later on Tanzania entered Makerere University in 1943 to 1947. Others included Jaramogi Oginga Odinga, Presidents Mwai Kibaki of Kenya and Benjamin Mkapa of Tanzania. And most of the prominent African leaders not just in politics but doctors, economists, and writers such as Okot p'Bitek, Ali Mazrui, and many others.

Makerere University was also the first university to admit women that included the first African female doctor in East Africa – Dr. Sarah Nyendwoha Ntiro, who passed away recently in 2018 at the age of 93 years. Therefore, we can very proudly say that Makerere University was a pioneer in Higher Education on the African continent. It played the role of producing the first pioneer candidates in many professions.

**Looking back at the history of Makerere University, what do you think should have been done differently in the past, for the betterment of this academic institution?**

I happen to be a person who believes in liberty and building independent institutions. I believe that if Makerere University had started building an



**...we can very proudly say that Makerere University was a pioneer in Higher Education on the African continent. It played the role of producing the first pioneer candidates in many professions.**

**Janet Museveni, Education minister**

**What do you think should be done to make Makerere University more productive, as incubation of research and knowledge, for the development of the country's industrial and economic growth?**

I think that doing what they have already started, namely, reducing in the intake of undergraduate students and slowly making Makerere University a research-led university is one of the major points that will bring some breakthroughs to become more productive. Research will bring some innovations that will bring life to our industrialisation efforts. Research will also bring the university the desperately needed resources. If these resources can then be re-invested in the endowment fund, then surely sooner rather than later, Makerere University will become a master of its own future and provide the engine for our industrialisation revolution and economic growth as a country.

**Makerere, like most other public and private universities, has for years been operating on a very low budget for research and innovation. Most of the research done in these universities is funded by donors who at times have their interests. What is Government planning to do, to reverse this trend?**

Funding our universities' research effort by donor support is indeed like feeding a country with food donations. It cripples people so that they never make any effort to produce their own food.

That is why as the country becomes more financially stable, government will slowly increase the funding for education including Higher Education but also help to guide universities better.

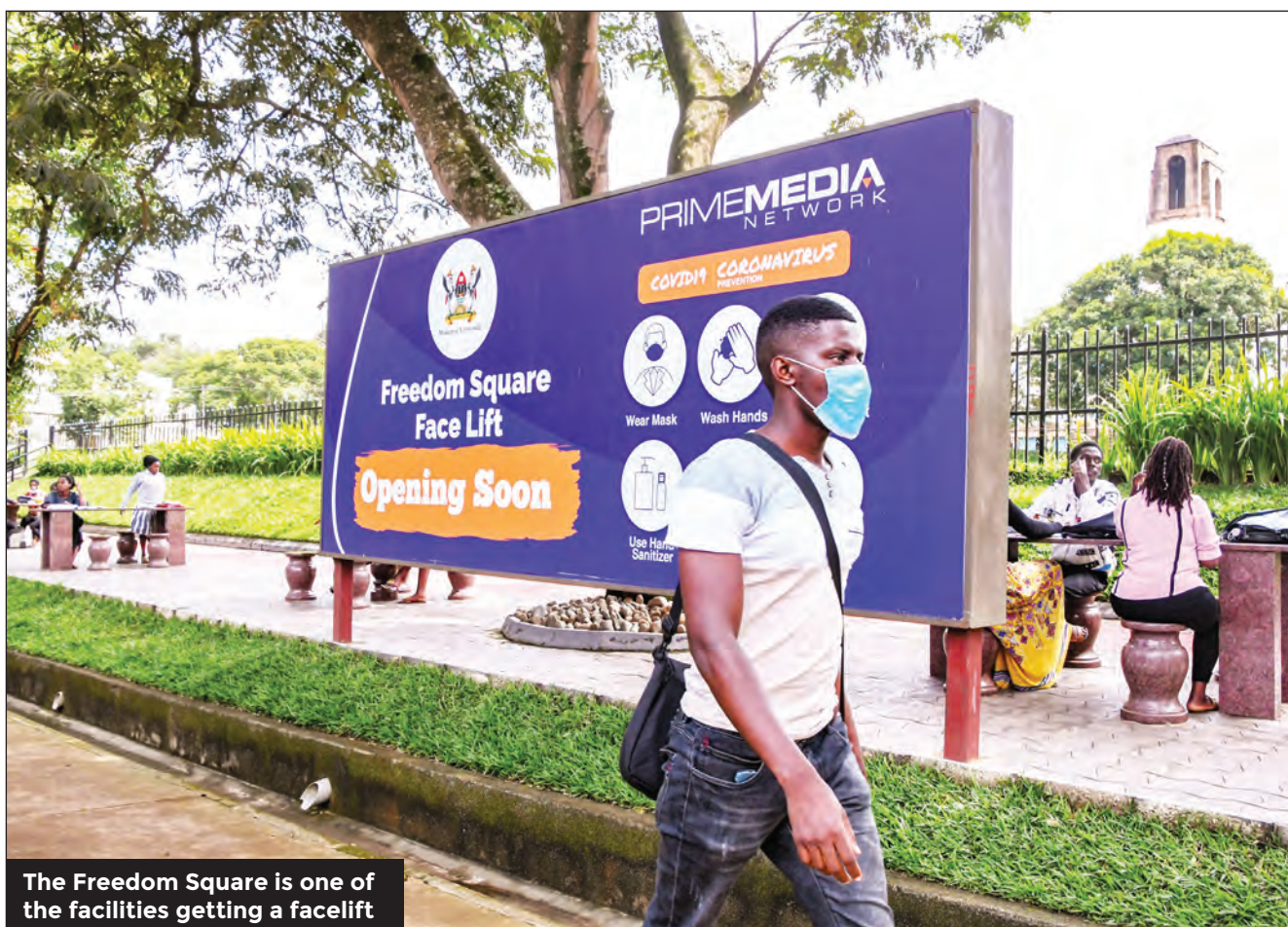
For example, the Higher Education White Paper

endowment fund right from its young days, Makerere would have been able to stand the test of time. I know that most of the old universities in other countries practically own the towns around them which bring all the benefits to these universities.

This empowers the universities to expand at will, to fund their research programmes, maintain their infrastructure, and offer scholarships to some of their students including the needy ones from other countries. Therefore, I regret the fact that Makerere University was founded by a colonial government which may have ignored that important fact. Unfortunately, even our own governments that took over after independence did not consider that life-giving detail. Hence, the vulnerability of Makerere University continued.

However, by God's grace, I am happy to report that on April 30, 2021, I am scheduled to launch an endowment fund of one of the constituent Colleges – the College of Business Administration and Management Sciences (CoBAMS) of Makerere University. The Bible cautions us in Zechariah 4:10 not to "despise the days of small beginnings." While this may sound like a small thing now, it may be the beginning we need, and it may catch up like wildfire. With time, you may find Wandegaya becoming a true university town.





The Freedom Square is one of the facilities getting a facelift

## New life at 100

**What special message do you have for the students, staff, Council, and the country as Makerere University celebrates 100 years?**

I want to reassure all concerned that we at the Ministry of Education and Sports know how emotional this celebration is for students, staff, the University Council and the country as a whole. Recently, I toured the Makerere University campus to get an on-spot assessment of the situation, especially the infrastructure that includes lecture rooms, the main library, and the halls of residence.

I would like to see some new life injected in most, if not all, of the buildings at Makerere for the 100 years celebrations to give real meaning to all concerned. Therefore, it is my sincere prayer that government will support the Ministry of Education and Sports to give Makerere University a meaningful celebration of 100 years.

which is now being written from the Rwendeire Visitation Report will give guidelines that will streamline the management of higher education institutions so that their budgets bring better results from all the funding they get from either government or other sources such as non-tax revenue. This will empower universities to do more research with home-grown resources.

**In the next five years, what is the Government plan to continuously develop Makerere University to a level of making it the best university on the continent?**

In the next five years, we are concentrating on first fulfilling the government promise of paying the salaries of the personnel in public universities so that staff can seriously and patriotically go an extra mile to improve on the quality of their performance.

This will in turn improve the performance of students so that sooner rather than later we regain Makerere's glory. Not that it has been doing badly at all, but we want it to become even better. As of the year 2020, Makerere University is ranked fifth on the African continent and grouped between 400th and 500th in the whole world.

**What plans does Government have to improve the university's unit cost of educating university students in public universities, since most of them are struggling financially?**

An inter-ministerial committee comprised of the Ministry of Education and Sports, Ministry of Finance, Planning and Economic Development, the Ministry of Public Service, and public universities was set up in 2020 to study the different unit costs for running the programmes in public universities in Uganda as well as

the various funding models of university education.

This programme is still ongoing but I can say in summary that government has not yet agreed on a conclusive unit cost for a university student. However, I trust that the work that has started will get us to the conclusion of this question.

**Makerere University offers not only day but also evening and external study programmes to a student body of about 35,000 undergraduates and 3,000 postgraduates. However, the university is gradually turning into an entirely post-graduate university, shedding off undergraduates who need high-quality education at this institution. What is the plan for the undergraduate students?**

The truth of what Makerere University is doing may have been misunderstood. The transformation of Makerere University into a research-led university will not entirely throw out undergraduate courses altogether. It is merely adjusting the ratios of undergraduate and postgraduate enrolment.

The recommended ratio for a research-led university is at least 30% of the total enrolment should be graduate students. The plan, therefore, is to have a phased reduction in the number of undergraduate students and an increase in the enrollment of post-graduate students.

Makerere University, I have learned, plans to have 15,000 undergraduate students and 10,000 postgraduate students by the end of the year 2030 which is the end of their Strategic Plan period 2020 – 2030. You can note that the number of undergraduate students will still be higher than the postgraduates. Therefore, Makerere University will not eliminate undergraduate programmes.

**What plan does Government have regarding the restoration of Makerere University's main building, which requires about sh15b for reconstruction?**

Government is going to find funding from its Consolidated Fund to reconstruct Makerere University's Main Building. However, Makerere University is also not short of friends that include alumni of the oldest university in sub-Saharan Africa.

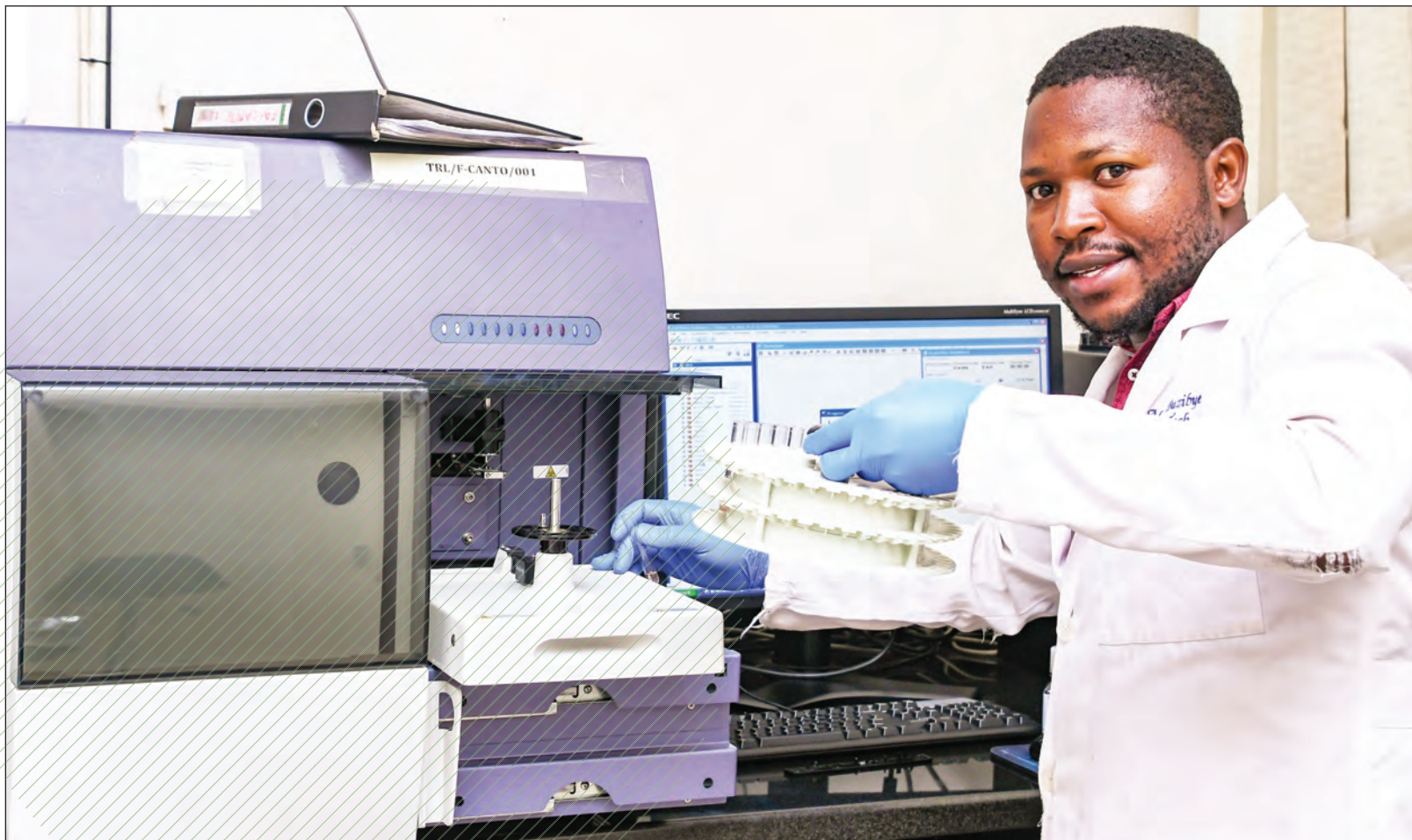
In fact, if it had not been for government denying the university to accept donations earlier on, Makerere probably would have raised the funds already. But the Ministry of Finance has now allowed the university to accept support from friends who come from practically across the globe. Therefore, I have no doubt in my mind that the Main Building at Makerere University will not be a problem, for a long time.

**Over the years, the government has been improving the remuneration of staff in Makerere and other public universities. But there is still a high rate of brain-drain. What do you think needs to be done to resolve this issue?**

That effort of improving the remuneration of staff is still ongoing. When it is well concluded it will make a big difference.

People may begin to feel secure to come back and serve their homeland because they will now know that serving other countries brings nothing more than their own country can give them. I trust that gradually, brain drain will end and instead we will see a re-migration homeward.





Research at  
the Infectious  
Diseases  
Institute

# Our future is research

**In the years ahead, Makerere University will shift focus to its graduate programmes. Lorna Magara, the Makerere University Council Chairperson, explains why**

In 2020, Makerere University Council approved the new Strategic Plan 2020-2030, which focuses on transforming the university into a research-led university. The Strategic Plan's goal is to have all the research output align with the National Development Plan III (NDP3) and Vision 2040, thus establishing a link between Makerere University and the development needs of the nation.

This strategic plan builds on previous Government studies, including the Rwendeire Visitation Committee Report (2016), which emphasised the need for Makerere University



The goal is to move from just knowledge creation to knowledge that will spur social transformation and economic development



## The numbers



# 30%

Desired postgraduate enrollment

# 500

Number of researches ongoing in a variety of sectors.

# Sh30b

Government funding for research in the last financial year.

to focus on research. H.E. President Museveni and the Visitor to Makerere University has severally encouraged the university to research Africa's development challenges to develop homegrown solutions.

Research is critical in enabling a country to modernise. Countries such as South Korea, Malaysia, and Singapore in Asia, and Mauritius and Botswana in Africa demonstrate that the successful transformation, modernisation, and independence of nations require the application of indigenous knowledge and locally contextualised ideas instead of reliance on external prescriptions to local challenges. These countries focused their energies on research to resolve the challenges.

Makerere University has played a leading role as a champion of human capital development and knowledge production in Uganda. According to Times Higher Education World Universities Rankings report 2020, Makerere occupies the fifth position in Africa and is among the 500 best Universities globally. Guaranteeing Makerere's competitiveness and positioning her as a leader in finding sustainable and homegrown solutions necessitates the University to follow a research-led agenda.

Considering the fast-changing environment globally in the provision of higher education, Makerere University will be restructured in the programmes offered, the mode and delivery of learning, and any other services that support the realisation of the universities' mandate. There will be a distinct shift in the ratios of graduate and undergraduate students. The goal is to have at least 30% of the student enrollment as graduate students. STEM courses will be promoted as required by the Government. Consultations with staff in all the 10 colleges and School of Law, plus external stakeholders, are ongoing.



PhD students at the Institute of Social Research



Maxine Atuheirwe, a Master's student of Immunology and Clinical Microbiology storing blood samples

Makerere University will leverage existing capacities of the knowledge generated and engage the public and private sectors to create a research and innovations eco-system that is multi-disciplinary and multi-institution. This research eco-system will provide demonstrable economic, environmental, health, and social impact. The goal is to move from just knowledge creation to knowledge that will spur social transformation and economic development.

Building an impactful research-intensive university requires reorienting and investing in Makerere's human, financial, and capital resources to focus on research and innovation.

## FUNDING NEEDS

We appreciate Government for the financial support given towards the vision. In the last financial year, Government gave the University, Uganda sh30b towards research. As a result, there are over 500 ongoing research projects. We will continue to seek government support in the following areas:

- Finance the Makerere University Postgraduates Scholarship Scheme (MUPSS) which will enable brilliant and talented students to enroll in post-graduate study programs. Currently, all post-graduate programs are privately sponsored. This is a significant impediment to attaining the desired 30% post-graduate enrollment.
- Investment in rehabilitating the existing infrastructure and establishing new ones, such as research laboratories, libraries, residential halls for graduate students, and ICT facilities.
- Fund the establishment of research centres of excellence and think-tanks, focusing on different and emerging research interests and topics.
- Through the Ministry of Trade, Industry and Cooperatives, and other line Departments and Authorities, recommend and facilitate partnerships between Makerere and the private sector to leverage the industry's experience, while allowing students to interact with potential employers directly
- Support the establishment of a Makerere University Press specializing in academic publishing of monographs, scholarly journals, and books, hence enlarging the reach of Makerere's research output.
- Support the establishment of the Makerere Science and Technology Park and enforcement of Intellectual Property Rights laws to inspire innovation and commercialization of research innovations/outputs and the establishment of spin-off companies.

At the bedrock of Makerere's research-led agenda is a commitment to build a dynamic University whose mandate is to become a knowledge hub and a driver of national development. Makerere University Council is committed to ensuring an enabling policy environment for the implementation of this strategy.



# Makerere rivals major global universities

**According to World University rankings by Times Higher Education (2020), Makerere is ranked fifth best in Africa**

**T**hey say that Makerere University is now like any other major global university and I tend to think that they are probably right," Prof. Barnabas Nawangwe, the Vice-Chancellor of Uganda's prestigious university says.

And the Vice-Chancellor is right: anybody who has been at Makerere lately will attest to its remarkable transformation. What was once Uganda's most strike-prone university is now a contrast of its dark past: pot-holed driveways have been replaced with smooth asphalt, the lawns are regularly mowed and skyline is changing with new structures.

## **Fifth best in Africa**

On the academic front, Makerere is grabbing headlines. According to World University rankings by Times Higher Education (2020), Makerere is ranked 5th best in Africa, and best in East Africa, based on four performance areas of teaching – research, knowledge transfer and international outlook.

This places Makerere together with Mansoura University in Egypt, the University of Ibadan, Nigeria, and Durban University of Technology in South Africa, among others in the same position.

"When I applied for the position of Vice-Chancellor, my slogan was unlocking Makerere University's potential. Under this slogan, I pledged to unlock the huge under-utilised potential of Makerere University. I am glad I have accomplished about 90% of what I set out to do," he says.

Nawangwe credits improved governance at the university, which

has ensured efficiency and prudent use of resources.

"No organisation can run efficiently and effectively without the appropriate governance structures. This is even more important for a complex organisation like Makerere University, with multiple stakeholders and numerous international links and partnerships," he says.

## **Governance structures**

According to Nawangwe, the University Council – which is the university's supreme governing body which works through committees – is now more effective than ever.

He says the committees of council have been restructured and the Council Charter has been revised. The relationship between Council and Senate, the supreme academic body, has been streamlined. College boards have



## **TRANSCRIPTS**

**It has now become a norm, that students get their transcripts before graduation. Although we still have a few hitches with the system, we are working to improve it.**

**Prof. Barnabas Nawangwe, Makerere University Vice-Chancellor**

been strengthened and compliance ensured.

The College Statute has been fully operationalised and many academic and administrative functions are now

concluded at the college. Participatory budgeting and participatory policy formulation are now the norm.

All university policies have been uploaded on the website and sensitisation on key policies, including the anti-sexual harassment policy has been undertaken.

"Restructuring of the entire university is on-going, in order to achieve a structure which will enable our strategy of becoming a research-led University," he says.

## **Academic Reforms**

The outcry about delayed examination marks, lost marks and difficulty in obtaining academic transcripts had reached alarming levels.

"We have addressed this problem by making every lecturer answerable for their marks and devolving issuance of transcripts to the colleges. It has now become a norm, that students get their transcripts before graduation. Although we still have a few hitches with the system, we are working to improve it," he says.

Equally important is the setting up of the Open, Distance and e-Learning (ODEL) programme, which Nawangwe describes as the future of university education, with the emergence of global challenges such as the COVID-19 pandemic.

Nawangwe adds that the persistent public outcry about the duplication of 'our academic programmes' is no more. "Over the last four to five years,

## **ADMINISTRATIVE REFORMS**

**The University is now connected to the Government Integrated Financial Information Management System (IFIMS). This has greatly simplified and streamlined financial management. Budget management discipline has also been greatly enhanced.**

**Makerere University is also connected to the Government-owned Academic Information Management System (AIMS), which is also used by all public universities in Uganda. IFIMS is connected to AIMS and this has helped to streamline management of student records, including verification of fees payment.**

**Makerere University is working on a more advanced Academic Records Information System (MakARIS), which will address the complexity of Makerere University as a major research institution.**

**Regular reporting by Management to Council and by colleges to the Centre has been operationalised. The regular flow of information in the university's administrative hierarchy has greatly enhanced the spirit of collegiality and collective responsibility, hence reducing conflict.**





we have reduced the number of undergraduate academic programmes from more than 150 to 62. The harmonisation of programmes will help us produce graduates who are more prepared for the job market and for entrepreneurship. It will also help us free our professors from the heavy load of teaching and allow them time for research," he explains.

### Research and Innovation

Makerere University desires to be a more research-intensive university because this is what will sustain her profile as a leading global university. "Modern universities are not only expected to produce good graduates, they are also expected to create knowledge and transform that knowledge into products and services that enhance the quality of life of the societies in which they operate," he says.

Prof. Nawangwe says Makerere University has seen a tremendous transformation in her research profile in the last three years. In setting itself for the new role, Nawangwe says the university has not only modernised its laboratories, but also established new laboratories and other research infrastructure.

"We have several centres of excellence, including two World Bank centres of excellence, one in crop improvement and the other in materials and nanotechnology. These centres are training the next generation of researchers for many countries across the African Continent," he says.

### STAFF WELFARE

Nawangwe says all these could not have been achieved without the support of the Government, which has enhanced salaries of staff at public universities and they are now very competitive in the region.

"This has greatly improved staff morale, even if a few challenges still remain, which we are working on," he says.

Apart from salary enhancement, he says the university has put in place a medical insurance scheme for members of staff. This has greatly improved access to medical care for members of staff and it is a major contributor to staff stability. Then there are SACCOS which are helping members of staff access affordable loans to solve some of their problems. "While a few years ago we were losing many highly qualified persons to the private and public sectors, today many of those who left are anxious to return," he says.



He reveals that research institutes, including the Infectious Diseases Institute (IDI) and the Makerere Institute for Social Research (MISR), are conducting research at the highest international standards, as are many academic units in all the colleges.

"Our publication rate has grown tremendously. For the first time, we passed the 1,000 publications per annum, despite the challenges brought by the COVID-19 pandemic," he says.

"We thank the Government and our development partners for the enormous investments in our research infrastructure, as well as in the development of our human resource. We now boast of one of the

best laboratories at any university globally and we have probably the best research human resource on the African Continent. Our think tanks, including MISR and the Economic Policy Research Centre (EPRC) are internationally recognised and they play a big role in lifting our image as a research University."

He says since the Government injected sh30b as research funds in the university last year, innovations have changed the face of the University.

Nawangwe explains that cutting-edge research has led to major innovations, including the anti-tick vaccine, peptides for the manufacture of COVID-19 testing kits, the Bulamu

## Challenges

The university has not been without challenges. And the biggest of all them, according to Prof. Nawangwe, has been the COVID-19 pandemic.

"COVID-19 devastated the whole world and higher education institutions were the worst affected," he says, before adding that rather than lie down, "We faced the challenge of COVID-19 head-on, with the resilient Makerere spirit."

With new universities cropping up everywhere, Makerere University is responding to the stiff competition for resources through innovation in teaching and learning and reinforcing its competitive advantage as a graduate training institution.

low-cost medical ventilator, protocol for evaluation of youth employability, solar-powered hand washing device including water recycling and many others.

Nawangwe says such innovations have a huge potential for transforming the manufacturing industry in Uganda and for the first time making indigenous manufacturing at the centre of industrialization.

"Our next challenge is to commercialise all these innovations and we are steadily getting there," he says.





The building that currently hosts the administrative offices

# Towering over the others

**With at least 90% of all research in Uganda conducted at Makerere, the university has established a reputation in the field**



**Year two students of telecommunication engineering working on a mortar during a lecture**



**M**akerere University will clock 100 next year, an anniversary that will no doubt be celebrated on the backdrop of many highs.

Makerere is the fifth top university in Africa, and the premier university in East and Central Africa, according to world university rankings by Times Higher Education. The ranking places Makerere together with Mansoura University of Egypt, the University of Ibadan of Nigeria, and the Durban University of Technology of South Africa, among others in the same position.

Makerere is also the undisputed leader in research hosting regional Centres of Excellence and collaborative research projects with reputable global agencies. At least 90 percent of all research output in Uganda is conducted at Makerere. The university also has the highest number of qualified staff, with over 700 of its 1452 staff having PhDs. The story can go on and on. However, all these accolades are not by accident.

Born in 1922 as a Technical Institute, Makerere later became a constituent College of the University of London. "Mak had that status until 1961, when we became the University of East Africa," says Prof Umar Kakumba, the Deputy Vice Chancellor Academic Affairs. "The entire region had one university – Nairobi and Dar es Salaam were branches of," he says.

It is therefore not surprising; he says that the university has consistently been ranked among the top 400 universities in the world out of 100,000 universities that are assessed by the Times Higher Education.

The diversity of disciplines and training programmes offered at the university, is another contributing factor to its high rankings, Kakumba says.

"There are about 10 major discipline categorisations and we have them all," he says. They include health sciences, Physical Sciences, law, education, Business & Management, Arts & Humanities and engineering & Technology, among others.

The other big plus is its research output. "Last year, we had about 1,200 research publications, which was higher than what we had previously (944)," he says.

This, he says is in part due to the decision by government to up its contribution to the university's Research and Innovation fund basket from a paltry sh2b about 10 years ago to sh30b. "That has given us a very big boost," he says.

At the same time, the university continues to receive funding from external donors, some of which include the Swedish (SIDA), Norwegians (NORAD) and the Americans through several agencies including, the Carnegie Corporation of New York, National Institute of Health, Rockefeller, USAID, among others.

"Research is our major contribution. Makerere has 9% of all research conducted



## **BROAD SPECTRUM**

**The diversity of disciplines offered at the university, is another contributing factor to its high rankings,**

**Dr Prof Umar Kakumba,  
the Deputy Vice Chancellor  
Academic Affairs**

in Uganda," he repeats his earlier assertion, adding that over 300 research projects receive grants every year.

"We came out strongly in COVID-19 research output. Besides that, we have been able to carry out research on many other infectious diseases," he says. "That informs our strategic direction. That why we are striving to become a research-intensive university."

## **Revised strategic direction**

In order to achieve its aims, Makerere revised its vision and goals, part of which has culminated in the current restructuring of courses at university. The restructuring has resulted in the reduction in the number undergraduate programmes, which is being achieved by scrapping some and merging some programmes with others.

From 120 undergraduate programmes 10 years ago, the university will have only 78 in the academic year 2021/2022. Kakumba says at the same time they have embarked

on increasing the postgraduate programmes enrolment while downsizing undergraduate student numbers as they push to become a research university.

"A research-led university can be described as one whose foundations of knowledge creation, generation, teaching and learning is predominantly derived from research, and which utilises its research knowledge outputs to impact society in positive transformation. Through research, Universities produce quintessential bodies of knowledge and innovations to understand the underlying constraints to development and provide solutions to transform societies, enterprises and nation states".

"In doing this, you have to reduce undergraduates because undergraduates hardly do publishable research. On the other hand, there is a lot of research output from graduate students, which we hope to publish. So, whatever we are cutting in the undergraduate programmes, we are going to compensate in the graduate programmes enrolment. Focusing on graduate education means more masters, graduate diplomas and PhDs," he says.

He says the university hopes to achieve this goal thanks to its generous share of highly qualified human resources when compared with other universities in the country.

"We have over 700 staff (of the 120 staff at the university) having PhDs. A PhD can train a PhD and Masters students. That means each graduate student will have a research output as a minimum which can be in journals, policy briefs, innovations, patents, and text books," he says.



# Educating Uganda for new market realities

**The College of Education and External Studies is engaged in activities to ensure that educators are equipped with the skills necessary to prepare Ugandans for the changing job market**

**T**he nature of work is changing and in order to adjust to this change and ensure workers are equipped with the skills required to succeed, education will also need to undergo a transformation.

This is already happening at Makerere University, where the College of Education and External Studies (CEES) is engaged in a number of innovations that are aimed at changing the way the education sector operates.

Prof. Fred Masagazi Masaazi, the CEES Principal, says they are mandated to prepare educators, community workers, administrators, inspectors of schools, curriculum designers and community outreach implementers to work at all levels and forms of the education system.

The college also focuses on the provision of adult, continuing, community, open, distance and e-learning. The college is a centre of excellence in the development, research and application of professional educational approaches in response to national and global needs.

With the world undergoing rapid, global changes, including serious environmental problems, Masaazi says education must be ahead.

He notes that through the research they carry out and as an institution responsible for education they help the ministry understand what is on ground to make informed decisions.

"We are writing policy briefs to the Ministry of Education and Sports about interventions to improve the sector and before the semester ends, we will submit them to the stakeholders," Masaazi says.

He says the transformation of Uganda lies in transforming its teachers who are vital in the education sector. "A teacher is a conduit of information to learners and parents. When the teachers have the right information and right skills the country benefits," Masaazi says.

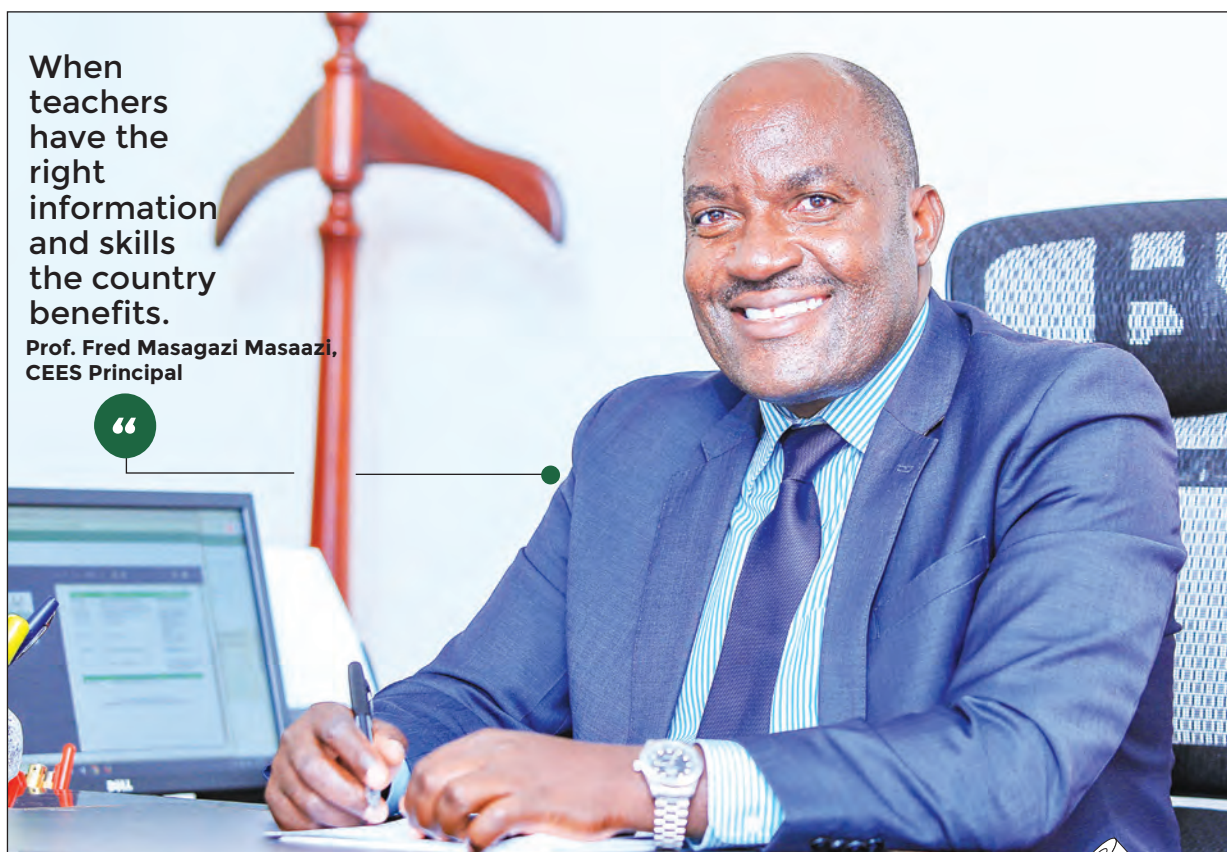
The college has been supported by government under the Makerere University Research and Innovation Fund. Under this fund from government of Uganda, the college has been able to carry over 15 research projects all aimed at improving the education sector.

Masaazi says the research portfolio is improving at Makerere University. "The research funding from government has increased, research skills improved and this has improved knowledge transfer and skills," Masaazi says.

One of the projects under the college is promoting youth employment by integrating employability skills in teacher and BTNET education in Uganda by Masaazi.

**When teachers have the right information and skills the country benefits.**

**Prof. Fred Masagazi Masaazi, CEES Principal**



The project aimed at identifying the employability skills gaps in selected teacher and BTNET education institutions in Uganda. Develop a transformative framework for integrating employability skills and delineate the employability concept in way that is clearly understood by teachers.

With a number of researches done by the college, the education ministry has been able to make informed decisions backed by data says Prof Anthony Mugagga-Muwagga, the Director Makerere University Institute of Education Research

"Most policies are not backed by data; they are now using our information which is key contribution from us," Muwagga says.

Meanwhile, Dr John Sentongo says they have made recommendations to the National Curriculum Development Centre and the education ministry to include science in the Lower Primary Thematic Curriculum.

"Science is not spelt out in the lower curriculum and we think science concepts should be taught in lower primary," Sentongo says.

## Teaching teachers

David Kabugo, the Centre for Teaching and Learning Support director, notes they have introduced the Postgraduate Diploma in Higher Education Pedagogy to skill lecturers. Introduced in 2019, it aims at transforming the way teaching is conducted at university.

"The most dominant way of recruiting lectures is getting students who have excelled with First-Class or Second-Class degrees. This affects learning because these don't have the skills," Kabugo says.

With the introduction of the diploma, all lecturers recruited are required to undergo training at the college to get teaching skills. "We are now aiming at retooling professors," Kabugo says.

It is now a requirement for everyone to have a certificate in higher education pedagogy before they can teach at Makerere. The same service is being extended to other universities.



# School of Law: Tried and tested

**More than 50 years old, the School of Law has had the biggest influence on the country's legal terrain**

**M**akerere Law School is the oldest and biggest law school in Uganda, accounting for the largest share of the country's lawyers produced over many decades.

From just 23 pioneer students and two lecturers at its inception more than 50 years ago, the school is now home to more than 40 staff and over 2,000 students.

Makerere Law School has produced many of the country's eminent legal minds. With alumni of over 350,000 legal minds in gainful employment and influential positions in government and private practice at home and abroad, the School has built a name to reckon with.

Prof Christopher Mbazira, the Principal of Makerere School of Law, identifies the reputation of the institution as one of its biggest selling points and enduring legacies.

"We have the reputation as a serious law school in the region. We are ranked highly in East Africa and have a number of collaborations with law schools all over the world," he explains.



**As students learn, they are also exposed to the practical challenges that the community faces.**

**Prof. Christopher Mbazira, Principal**

Prior to its establishment in 1968, Ugandans who wanted to study Law would have to go to the University of Dar es salaam or the UK.

Students from Makerere Law School have enrolled into some of the world's most prestigious colleges and universities, including Harvard, Cambridge and Oxford.

Apart from the broad profile of lawyers and judges who have come out of Makerere, the school has also produced the top legal academics in Uganda and the region. Compared with other law schools in the region, Makerere has the largest concentration of doctorates.

One of the defining features of Makerere's Law School is its community engagement, in which several projects deal directly with the community.

These include: the Human Rights and Peace Centre, which handles human rights and social justice issues; Refugee Law Project, one of the highly-rated projects serving refugees globally, and the Public Interest Law Clinic, the first of its



**Law students holding discussions**

Students seeking to join the school are now subjected to a pre-entry exam that checks one's analytical, comprehension and communication skills and general knowledge on contemporary issues. This has helped to check the quality of students and ensure there is a mix of bright students from all academic backgrounds and social class.

Through the *Makerere Law Journal* that was first launched in 1971, the Law School community publishes research and other content on contemporary issues.



kind in Uganda and the region to provide free legal aid services to the community.

The School of Law is also proud of its wealth of research on legal issues.

In 2012, the school embarked on a process of becoming a college, transforming from the erstwhile Faculty of Law to the School of Law, with a measure of independence.

Besides the Bachelor of Laws (LLB), the law school offers the Master of Laws, the Doctor of Laws (LLD) and a number of short courses.

Through clinical methods and hand-on techniques of teaching, students have had exposure to practical methods such as moot courts, clinical projects, student research and internships.

Over the years, the academics at the school of law have contributed to jurisprudence, especially in courts of law, including in 2016 when they intervened in the presidential election petition.

According to Mbazira, the involvement of law dons in the presidential election petition made a significant contribution in terms of proposals for legal reform that were implemented.

The growth of public interest litigation, through outreach clinics, has helped transform the way law is taught at university. The last five years, for instance, the methods of teaching law have undergone reform to ensure that students learn while they provide service. "As students learn, they are also exposed to the practical challenges that the community faces, while we show them how to respond," Prof Mbazira explains.

Students from Makerere Law School have won numerous moot awards and recognition for service. Senior members of staff have also gained international recognition for their contribution to research in various fields.

All the accomplishments have, however, been registered in spite of key challenges including ageing, colonial-type infrastructure that needs a new face. On the bright side, Makerere University has budgeted for a new building for the school.

In 2018, Makerere Law School celebrated the 50-year anniversary. According to Mbazira, the school will now strive to maintain its reputation as the premier law school in Uganda and the region, and embrace technology to teach law in a post-COVID-19 era.



**Universities rely heavily on tuition to run their operations. However, this key source of funding has been affected due to disruptions in learning triggered by the COVID-19 pandemic. This has necessitated universities to be innovative in order to survive. Prof. Josephine Nabukenya, the Deputy Vice-Chancellor Finance and Administration explains how the university is riding the tide**

# Makerere planning



Prof. John Baptist Kirabira teaching students of the College of Engineering, Design Art and Technology

## Q Describe to us the operations of finance and administration.

The operations of the finance and administration entity of Makerere University involve assisting the Vice-Chancellor's functions such as overseeing finance management, administration of assets and human resources, investment and resources mobilization as well as planning and development of the University.

Particularly, the entity is responsible for ensuring effective management and mobilisation of the funds of the University; putting in place proper planning, budgeting and development methods of the university; overseeing human resource functions as a means to bridge the gap between employees' performance and the university's strategic objectives.

The entity is also responsible for managing security matters to ensure a safe teaching, learning and research environment for the students and employees of the University.

Other roles include framing of the university's effective financial policies and regulations in order to provide efficient financial management, risk mitigation, and the alignment of financial operations with the overall mission of the Institution. Overseeing the procurement and disposal



functions to ensure coordination of the procurement and disposal activities of all the user departments in the university also responsibilities under this docket.

### What are some of the revenue mobilisation strategies you have come up with to ensure the university is up and running?

We have and continue to develop and undertake Public Private Partnership (PPP) framework proposals; promote and build an endowment fund.

We have also undertaken commercialisation of innovations and project startups incubating through PPP incubation centres development. In addition, we are augmenting traditional revenue opportunities (tuition and

funds from Government) with other sources such as research funding avenues) as well as promoting grant/project proposal writing for funding research and other unfunded priorities.

We have also enhanced savings from efficiency and reduction of administrative costs; and are undertaking fundraising activities and mobilising funds from alumni and other friends and well-wishers of the University among others.

### What are some of the innovations you have come up with to ensure operations are sustained?

We have done the same as above, and in addition we are developing a digital service enterprise architecture for the university to support digitisation of the

university finance and administrative services including the academic services.

We have internally automated the human resources management processes and currently embarked on the automation of the university finance processes as well as the academic records management services.

Accordingly, the university will enhance its data management and reporting, hence optimizing sustainability of its operations.

### Tell us about funding gaps (shortfalls) and how you plan to bridge the gap going forward

We are majorly constrained by the following issues: staff recruitment and

## PAYMENT OF TUITION IN TIME

There is also a continuous reminder to students of the tuition fees payment deadlines. Only after full payment and registration, can students generate examination cards from AIMS. We ensure that no student sits exams without full payment.

Prof. Josephine Nabukenya,  
Deputy Vice-Chancellor Finance and Administration



# endowment fund

promotion due to limited wage. We are addressing this through the continued engagement with the Government to provide additional funds to meet our wage bill in order to recruit and promote staff.

In addition, the university is undergoing restructuring and reviewing of its staffing in order to support the new vision of turning Makerere into a research-led university.

The university also has a challenge of domestic arrears, especially the in-house retirement benefits scheme. This, we are addressing, through the continued engagement with Government to clear the domestic arrears.

We are also minimising the accumulation of domestic arrears through use of the commitment system under IFMS.

Lastly, there has also been limited financial support for capital development projects such as Multi-purpose teaching facility III, multi-purpose students' centre and student halls. We are addressing this by undertaking PPP frameworks.

We also continue to mobilize funding from Donors and Development Partners; and a continuous engagement with Government for more funds under capital development.

## **What are you doing to ensure more students pay fees in time?**

We are undertaking the following

measures: facilitating the enrollment of students and invoicing on AIMS, which is a government system used to manage students' academic records and tuition fees payments.

There is also a continuous reminder to students about the tuition fees payment deadlines. Only after full payment and registration, can students generate examination cards from AIMS.

We ensure that no student sits exams without full payment. We also ensure implementation and enforcement of

existing tuition fees payment policies, procedures and regulations.

## **What is the impact of delayed fees payment on the operations of the university?**

Priority activities such as teaching and learning may be compromised; and the university ends up accumulating domestic arrears. There may also be increase in court cases which may result in garnishing of university accounts including donor funds.

**Students at the Makerere University campus. The coronavirus pandemic has affected learning**



## **Scholarships**

**Many universities have a scholarship fund to cater for bright but needy students. Does Makerere have such a fund?**

No, it does not. This is part of our futuristic plans to promote a research-led university through creation of graduate fellows who are academically and intellectually competent to support some of the university key roles such as teaching and research.



**Students during a discussion**



**Last year, Makerere University was named Africa's fifth best university and the best in East Africa, according to the World University rankings by Times Higher Education. Makerere is second in Africa in research.**



**Prof. Mukadasi**

**T**he Government has been funding research at Makerere University, which has helped the university develop new strategies to become a global academic centre of excellence.

From just under sh2b, about 10 years ago, the university now receives sh30b annually, which goes into the Makerere University Research and Innovation Fund. This has boosted Makerere's long-held ambition of becoming a research-led institution.

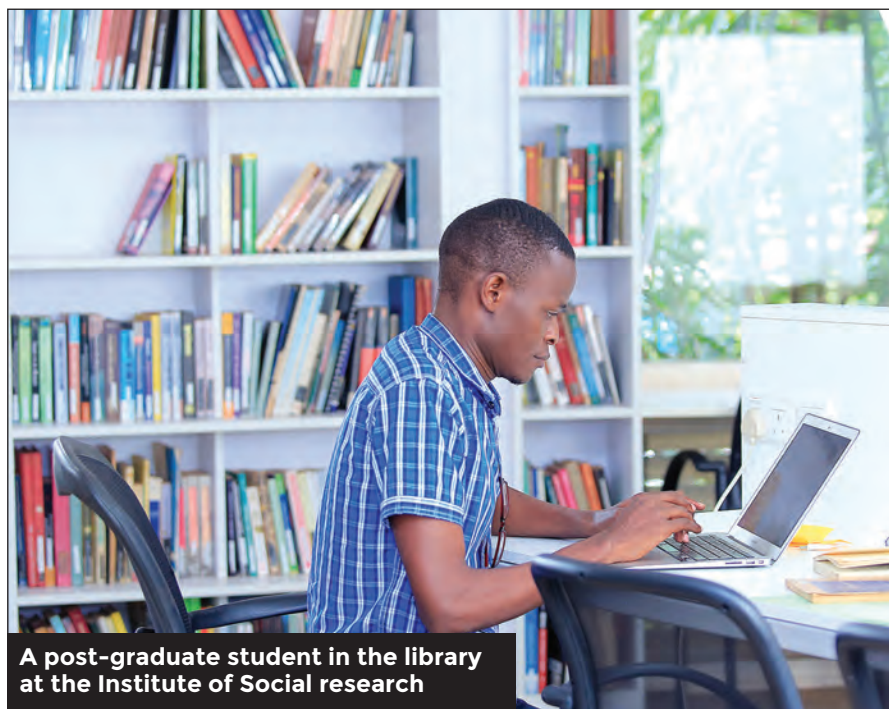
According to Prof. Buyinza Mukadasi, the Director of Research and Graduate Training, there are many reasons for pursuing this ambitious plan, most important being the need to harness the university's niche in research which has seen the university hog a number of international accolades. Last year, the university was named Africa's fifth-best university and the best in East Africa, according to the World University rankings by *Times Higher Education*.

Makerere's academic supremacy is also contained in indicators produced by Higher Education Research and Advocacy Network in Africa (HERANA) which placed Makerere as the second university after Cape Town among 'flagships' in eight African countries in terms of research, scholarship and knowledge production.

#### **A research focus**

"To sustain ourselves at the pinnacle of excellence, we need to sustain the

# MAK among the best universities in research



**A post-graduate student in the library at the Institute of Social research**



## **The numbers** **Sh30b**

The amount the Government gives to Makerere University or research.

## **\$90m**

The money Makerere received from donors during the 2013-14 academic year for research.

## **\$13m**

Received from the Bill & Melinda Gates Foundation as the biggest donor.

#### **What is a research-led university?**

It is one where research takes up the central part of its mission. Such universities have a strong focus on research. Globally research universities are predominantly public universities with heavy funding from the state, due to the importance of their research in nation building. According to Prof Buyinza, despite the sh30b from the Government, they are pushing to have this funding increased because it is not enough to run their research programmes. He says they need a lot of money especially to set up infrastructure like laboratories and science programmes. "Some of these (laboratories) need not less than \$20m to set up," he says.

momentum," says Prof Buyinza, before adding: "We have a research agenda to become the best university in health sciences, agriculture, natural resource management and climate change governance and culture."

Buyinza says the university's new direction is also born out of the desire to broaden the university's international network and act as a vehicle for social transformation in Uganda and the rest of Africa. "We want to make a significant

contribution to SDGs (Sustainable Development Goals), the Africa Charter, Uganda Vision 2040 and also achieve on our strategic plan," he said.

He explains that good research could be used by companies in making important decisions about things like pricing and investment. "We want to go beyond the academic boundary and build alliances with the private sector," he said. He explains that in countries like South Africa, companies invest lot of money for research by universities. The research produced by those universities is the lifeblood of the company operations.

#### **International collaborations**

Things seem to be moving in the right direction as the vision is coming to light. Beside the sh30b annual funding from government, the university has increased collaborations with international agencies who are bringing in more resources. During the 2013-14 academic year, for example, the university reportedly attracted \$90m (sh315,000) in external support for research from a number of donor agencies and foundations.

"The largest sum – \$62m (sh217,000m) – went to research in health sciences, \$8.9m (sh31,150) for natural sciences, \$5.4m (sh18,900) for institutional development, \$4.5m (sh15,750m) for engineering, design, art and technology and \$3m (sh10,500m) for agriculture, business and management sciences," says <https://www.universityworldnews.com>.

The Bill and Melinda Gates Foundation was the biggest donor, contributing \$13m (sh45,500), followed by the National Institutes of Health with \$12.6m, US Centres for Disease Control and Prevention (\$9.4m), the European Union (\$8.2m), the Wellcome Trust (\$8.2m) and USAID (\$7.2m). Makerere also collaborates with other universities like Massachusetts Institute of Technology (MIT). This, according to [www.universityworldnews.com](http://www.universityworldnews.com), is part of a multidisciplinary effort led by seven world-class universities working to evaluate and strengthen real-world innovations in development. These include Duke, Michigan State, Berkeley, College of William and Mary, Texas A&M, Makerere and MIT.



Every now and then, Makerere University carries out self-assessment which is a requirement by the National Council for Higher Education as part of quality assurance.

Dr Vincent Ssembatya, the Makerere University director Quality Assurance, reflects on the recent self-assessment the university carried out.

"Quality assurance rides on the principal of continuous improvement by looking at the things you do, how you do them and the output of these activities. You see where you have fallen short and then seek to improve.

In the last research we saw a lot of improvement in each of the areas we assessed compared to what we had earlier. When it comes to human resource, we realised that the academic staff had increased in their qualifications and we have close to 900 PhDs in Makerere alone and this is the largest number we have had in the history of the university.

Among the academic staff we saw the productivity increase. We attained the highest number of researches produced at the university with over 1,300 publications in just a single year. What makes it very special is that this was achieved during the COVID-19 year.

#### Better student to staff ratios

We have also improved in terms of ratios. When you divide the number of students to the number of staff, we are now close to 1:20, closer to the ideal divide of 1:18, set by the National Council for Higher Education. With fewer students, the staff can focus more on research.

We also focused on the distribution of staff in the colleges, their age, gender, how much money the lecturers bring in because many of them apply for grants and then supervision of students.

#### Infrastructure

We also talked about E-learning, Governance and management and other supporting elements where we take a look at the infrastructure based in the university such as the buildings and the facilities like the ICT, libraries, students' welfare and offices.

We have schools that Makerere owns such as Makerere College School, in addition to primary schools and nursery schools.

#### Gender

On the issue of gender, the self-assessment revealed that the admissions are balanced, but on graduation, girls are more than boys.

# Makerere keen on quality assurance

**In 1988 we had only 5,000 undergraduate students. Thirty years later, the number has grown to over 180,000 students**



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#### BETTER SALARIES

There has also been an improvement in the salaries of lecturers across the board.

**Dr Vincent Ssembatya, the Makerere University Director Quality Assurance**

about 45 million people. For the PhDs we have 44 per every one million people.

We want government to come back and sponsor PhD studies because Uganda has a shortage of PhD holders. We are not graduating the PhD numbers we should because the students are self-sponsored and this is costly.

Most of our publications are in medicine and they attract a lot of funding. We have also won the World Bank funded award for excellence.

The university has greatly benefited from the research. There have been financial and reputation benefits. The rankings depend on the publications you produce and the resulting citations.

#### Implementing findings

We have levels of implementing our findings. Things that do not require money are implemented immediately once there is agreement that we should go that way.

However, for those that require budgeting, we normally try to fit within our budgets and in some cases, we rely on support from the Government.

## GRADUATE STUDENTS

**We want to achieve a balance of 60% undergraduate students and 40% graduate students. Right now, the graduate students are 13%. We have really moved to get to that figure.**

**We didn't expect the graduate students to grow from 13% to 40% overnight, because in 1988 we had only 5,000 undergraduate students and Makerere admitted all of them. Thirty years later, we have 180,000 students. We have students from 43 different countries up from 34 last year. We have Japanese, German, Swedish and Norwegian nationals. Our target is to grow the numbers to over 200 countries.**

Over the last three graduations, however more female students have been graduating than the boys.

In the Science, Technology, Engineering and Mathematics (STEM) we have achieved more than 43% of female student admissions.

All the countries that have taken off in one way or the other a lot of science and technology at universities.

According to international protocols, we need to have 40% female admission into these courses. In Africa only two countries – South Africa and Mauritius – have attained this.

#### Researchers

As a country we do not have researchers. We currently have about 2,000 researchers in a population of



# New sexual harassment policy guarantees students' safety

## The gender mainstreaming directorate trains students and staff on sexual harassment and supports other universities to develop policies against the vice

**T**he pervasive footprint of sexual harassment has left far-reaching scars on victims globally, no far less than at institutions of learning.

Following a 2004 study by the Gender Mainstreaming Directorate that found that acts and practices related to sexual harassment were widespread, Makerere University promulgated its first policy against the vice in 2006.

The policy and its attendant regulations aimed to stamp out sexual harassment between or among students, academic staff, support staff, contractors, partners, visitors and researchers.

The policy helped to broadly outline the different acts or practices that constitute sexual harassment, and draw a firm red line against the cruel practices.

However, while the policy was well-intentioned and offered a rare window to victims to report abuse, it turned out to be ineffective, Euzobia Mugisha Baine, the Director of the Gender Mainstreaming Directorate at Makerere University, explains.

"Implementation of the policy was difficult. It was not easy to investigate colleagues and act on the findings because of conflict of interest and victims' reluctance to report due to fear of retaliation among other reasons," she explains. Cases would be talked about in whispers and occasionally in the mass media, but would not be officially reported for handling according to the policy.

### Revised policy

In 2018, the university decided to review the policy to understand why



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## PENALTY FOR SEXUAL HARASSMENT

A person found guilty of sexual harassment may, depending on the gravity of the offence, be subject to a written warning, counselling, restraint, apology, compensation to the aggrieved, a fine, suspension, demotion, dismissal or a criminal investigation and prosecution.

**Dr Euzobia Mugisha Baine head of the gender mainstreaming directorate at Makerere University.**

it was not as effective as was expected. After a thorough study, the university revised the policy with significant changes that have gradually helped to transform its implementation and promote vigilance.

Unlike in the past, when cases of sexual harassment were handled by committees that were more prone to compromise, the new arrangement provides key safeguards for victims and the accused.

The revised policy provides for a standing committee of 100 members appointed by the Vice Chancellor, from

which a special investigations team is picked to investigate a case of sexual harassment if and when it emerges.

### The committee

The committee members represent all categories of groups, including academic, administrative and support staff as well as students (undergraduate and postgraduate).

Members of the committee are selected from competent people of integrity with no previous allegations of sexual harassment and abuse against them.

## The numbers

**21**

The number of cases that have been reported to the gender mainstreaming directorate since 2019.

**100**

The number of members on the ad hoc committee from which a special team is picked to investigate a case of sexual harassment.

**2018**

The year the university formulated a new policy on sexual harassment.

## What is sexual harassment?

The new policy expounds further on what constitutes sexual harassment to cover inappropriate physical contact, unwanted propositions to engage in sex, exposure of sexual body parts, stalking, lustful gestures and stares, sexual assault and demands for sex in exchange for academic favours or employment.

Most of the sexual harassment cases reported to the directorate relate to solicitation of sexual activity in exchange for marks, a pervasive culture that undermines key learning outcomes.

## Reforms

According to Baine, one of the landmark reforms under the revised policy was granting the mandate to coordinate implementation of the policy to the Gender Mainstreaming Directorate. The directorate performs this function with support from the Directorate of Legal Affairs, the office of the Vice chancellor, academic and administration units, among others.

Baine says the revised policy has dealt with the issue of conflict of interest, ensuring that no person under investigation has prior knowledge of the investigating team.

Unlike in the old policy, the revised policy lays emphasis on confidentiality for the complainant and the accused so that cases are handled with care.

While anonymous complaints on their own are not deemed admissible, they can be investigated and followed up by the directorate when filed, given the complex nature of sexual harassment.

"While the old policy did not allow for anonymous complaints, we now know that sexual abuse is emotive. The fear of retaliation and stigma restrain people from reporting. Therefore, if we receive an anonymous complaint, we still follow up and explore if there is merit in what is being reported," Baine explains.

## Sexual harassment - penalty

A person found guilty of sexual harassment may, depending on the gravity of the offence, be subject to written warning, counselling, restraint,



apology, compensation to the aggrieved, a fine, suspension, demotion, dismissal or a criminal investigation and prosecution.

At least 21 cases have been reported to the directorate since 2019, with four concluded (including three dismissals, and an acquittal); six are ongoing and 10 are at a preliminary stage of collecting evidence.

The directorate runs policy dissemination and sensitisation seminars about sexual harassment to empower learners and staff with the knowledge and skills to prevent, resist and report incidents.

The directorate currently provides support to other universities to develop their own policies against the vice. The revised policy against sexual harassment is evidently beginning to bear fruits.

**The Makerere University Gender Equality Policy**

The directorate oversees the implementation of Makerere University's Gender Equality Policy that seeks to promote full participation of males and females in all spheres of life of the university.

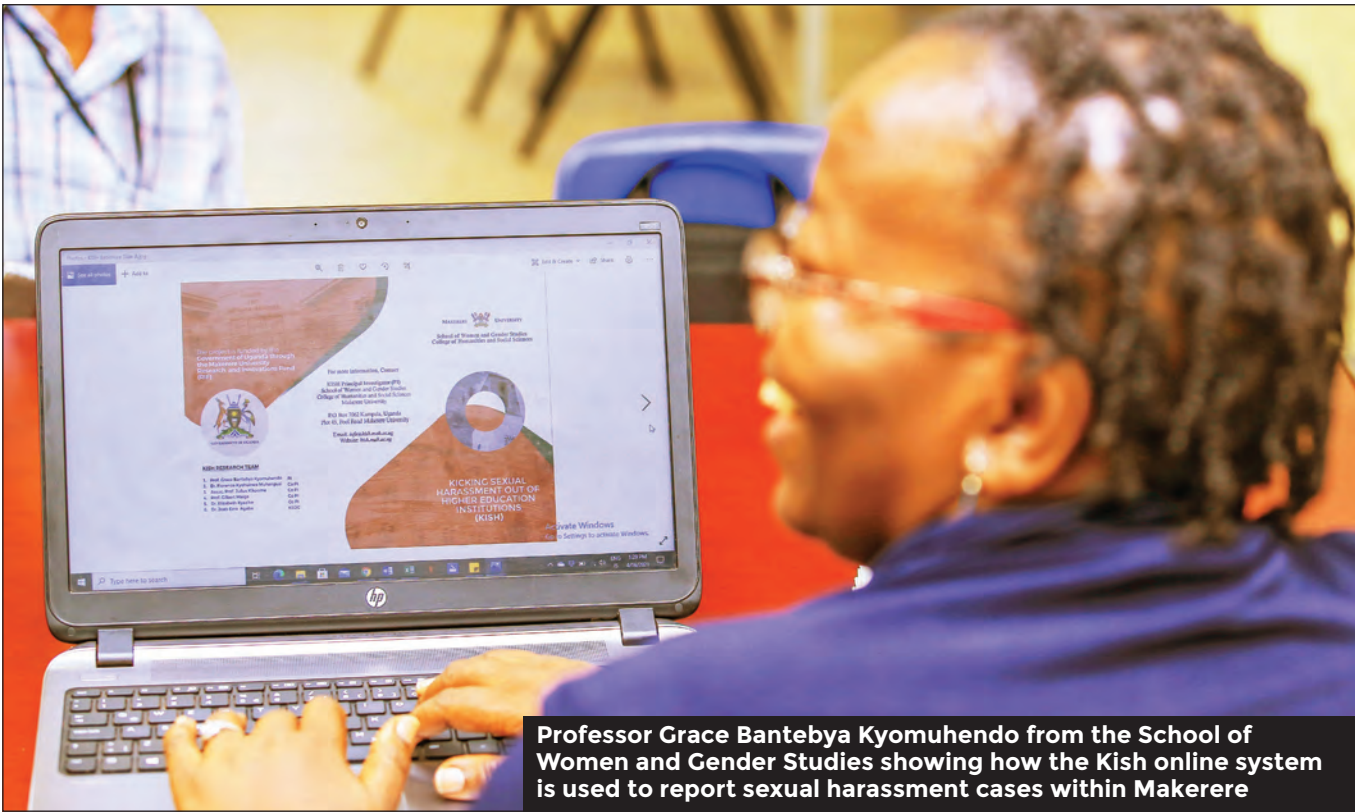
The policy is an instrument for changes at all levels of the university functions and for addressing the root causes of gender inequality within university functions and practices.

According to Baine, the directorate is responsible for coordinating and providing technical support to colleges and departments to ensure that the gender equality policy provisions are incorporated in all aspects of university operations, with focus on 10 strategic areas.

Some of these include: engendering the curriculum (content and methodology), promotion of women in leadership and university management and decision-making processes.

Developed in 2009, the policy has brought forth numerous benefits, even though key challenges remain. For instance, while affirmative action has aided more girls to enroll for undergraduate and graduate studies, girls still trail their male peers in science, technology, entrepreneurship and mathematics, the Directorate's analysis conducted last year reveals.

In order to improve gender representation in STEM and operationalise the gender equality policy, effective 2020/2021 academic year, the University Council put in place an allocation of slots based on a 60:40 ratio for students in STEM in order to prop up the numbers of the disadvantaged gender for each



**Professor Grace Bantebya Kyomuhendo from the School of Women and Gender Studies showing how the Kish online system is used to report sexual harassment cases within Makerere**

**WOMEN IN TOP POSITIONS**

According to Baine, there are fewer women in top leadership positions of university management structures such as Heads of Department, Deans, Principals, Central Management, Senate, and Council. “We have fewer women entering academic ranks at entry level and even fewer as you climb the academic ranks. If you don’t have a critical mass at the base, you are unlikely to get more women coming out to compete for leadership. We have to have a multipronged strategy to increase the numbers of women at recruitment and providing opportunities for growth such as opportunities to conduct research, publications and leadership training for women among others. in those positions, as well as men,” she explains.

academic programme.

The Gender Equality Policy is also under review after 10 years of implementation. One of the weaknesses that have already been identified is lack of gender-specific quantifiable targets in recruitment and promotions and some of the University policies that are not aligned to the Gender Equality Policy.

The Gender Mainstreaming Directorate is currently advocating for gender-specific specific targets on gender responsiveness that are measurable and can be periodically evaluated; adoption of gender responsiveness in calls for research proposals and the processes for conducting and disseminating research;

internship and supportive policies and infrastructure to support positive work-life balance such as work place day care centers.

As part of its mandate to conduct research for institutional strengthening, the gender Mainstreaming Directorate is conducting a study in six public universities to enhance women's visibility participation in decision-making organs of higher education institutions.

The research was supported by the Government of Uganda, through the Makerere University Research & Innovations fund and a baseline study on women in leadership has been completed.



The findings from the baseline have helped in the design of modules that will help in bridging the knowledge gap and will guide the action research on enhancing women's visibility in leadership and management of Universities.

The formulation of the Makerere University Gender Equality Policy and the Policy and Regulations Against Sexual harassment are hallmarks in Makerere University's commitment to its Gender Mainstreaming Programme. It also provides a mandate for the Gender Mainstreaming Directorate, an independent organ that came into effect in 2010 but started as a Division under the Academic Registrar's Department in 2001.





**With its rich collection of content, the library provides a strong foundation for the university's research goals**



Isaac Obong goes through the manual catalogues

# A backbone for research work

**F**or any scholar, hardly any experience may measure up to a walk through a hallway of a well curated collection of information sources, in the physical space or virtually.

Such is the experience at Makerere University Library which serves as an academic library, national reference library, national Legal Depository for all works published in, on Uganda and by Ugandans, including Government publications. It is also a depository for the United Nations and other related bodies' publications.

The University Library is mandated to collect, develop, manage, disseminate information, as well as control and coordinate all library and information services of Makerere University.

Dr. Helen Byamugisha, the University Librarian, says the library provides access to 12,000,000 electronic journal titles and over 240,000 electronic book titles.

The Main Library emerged in 1949 from a small tutor's library that was housed in the then Makerere University Main administration building.

The university later received a grant of 140,000 pound sterling and constructed the current old wing of the Main Library. It was completed in February 1959 and had an area of 3,065 square metres.

The Main Library was completed and opened by the Queen of England in 1959. It had an area of 3,065 square metres and could accommodate 270 users from a student's body of 750 with 40 staff. It had 120,000 volumes of books and periodicals.



Dr Helen Byamugisha, the University Librarian

This translated into a student to book ratio of 1:160 and 4 square feet per student, much higher than the current student to book ratio of 1:40 book ratio and 2.5 square feet per student.

More than 45 years later, in 2007, an additional 4,000 square metres of space was created at a cost of sh3.4b, and subsequently, another 4,000 square metres were added in 2012 at a cost of sh5.2b, raising the additional space by 8,000 sq. metres altogether.

Currently, the total area of the main library is 12,000 sq meters and has sitting capacity of 3,980.

In 2018, additional space and furniture were acquired at Albert Cook College of Health Sciences Library through a partnership between the College and Stanbic Bank. The College of Humanities and Social Sciences (CHUSS) also earmarked \$40,000 to support the ongoing expansion of the library space and to procure information resources. According to Dr. Byamugisha, Makerere University Library currently serves a population of approximately 30,000 students, over 1,000 Makerere staff and researchers.

The Main Library has the following sections: Africana, Book Bank, Bindery, ICT, Microfilming and Digitization; Periodicals/Serials, Reference and Circulation (Law, IDA/Basic text books, Reserve collection and open shelves) and Technical Services.

The University Library also has nine College Libraries and one School of Law Library.



## The collections

**T**he Makerere University library collection consists of over 290,984 titles (450,995 copies) of print books and 11,261 print journal holdings that are accessible electronically through the online catalogue. It also has access to 12,000,000 electronic journal titles and over 240,000 electronic book titles. Close to 7,792 records of digitised materials are accessible in the institutional repository.

The library provides various services that include: document delivery, reading carrels (special study rooms for researchers), group study/discussion rooms, a computer laboratory and other academic services for people with disabilities, a Mothers' space, as well as a Power Point room for users who wish to project their presentations to study groups.

There is an institutional repository where researchers can self-archive their research outputs (in electronic format) and become visible locally and internationally.

There are meeting rooms, research commons for graduate students and senior researchers, learners commons for undergraduates, a multi-media unit; two computer laboratories for users with own laptops, and a multi-purpose computer training unit for conducting information literacy trainings.

The library also has a Legal Deposit collection and archives consisting of the national imprint from Ugandan authors, authors who have written about Uganda and documents on Uganda's heritage. This collection is housed in the Africana Section and boasts of a special collection of pre-independence newspapers, minutes of Uganda Chamber of Commerce since its beginning in 1905 to 1951, letters written by and for Sir Apollo Kagwa, Apollo Kivebulaya's diaries and Ham Mukasa and Ezera Kabali's papers.

There are manuscripts of Gerald Portal and other earlier colonial administrators and Church Missionary Society files. Africana Section also houses government collections dating from the defunct East African community territories, other African colonial territories, UN bodies, including UNESCO and UNICEF. The Africana section also holds a unique photographic and newspaper collection that depicts the political history of Uganda and that of Makerere University. Also in the archives is the history of medicine in Uganda which is housed at Albert Cook Medical Library in the College of Health Sciences. The rich and unique Legal Deposit collection and archives, together with other important references, enable the library to continuously attract both local and international researchers.

Makerere University Library provides outreach services to non-Makerere university users, and hence works closely with other government departments such as the National Planning Authority, the National Library of Uganda, National Council of Science and Technology, National Information Technology Authority-Uganda (NITA-U), among others.



The strong room

### 290,984 titles

(450,995 copies) of print books and 11,261 print journal holdings that are accessible through the online catalogue.

### 10 affiliates

The University Library has nine College Libraries and one School of Law Library.

### 30,000 users

The library currently serves a population of approximately 30,000 users, comprising of students, over 1,000 Makerere staff and researchers.

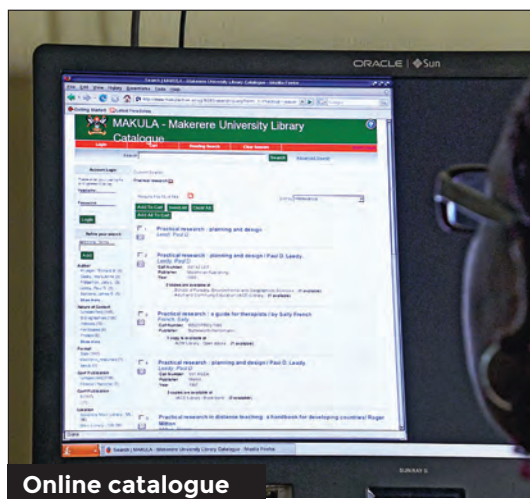


### 12,000 square metres

The total area of the main library

### 3,980

Seating capacity of the main library



Online catalogue

## Digital Environment

Dr. Byamugisha says Makerere University Library has embraced information, communication and technology applications, including social media applications to serve key stakeholders. She says that although the library was physically closed during the COVID-19 lockdown, it was able and continues to provide information services online.

The library is banking on the digital environment to enhance access to current or updated electronic resources, real time communication, as well as space and storage solutions. It can be accessed through its website: <https://mulib.mak.ac.ug>

The library has highly trained staff. Most of them have Master's and doctoral degrees with research skills and capacity to adequately provide information and advice to researchers. Some of the staff members are professors.





Vice-Chancellor Prof. Nawangwe (left) poses with Master Card scholarship beneficiaries in March

# Funders help turn the wheels

**To succeed, universities receive support from a variety of funders. Makerere University has over the years benefited from partnerships that facilitate the smooth running of operations**

**M**akerere University is what it is because of the outstanding contribution of funders. Universities receive financial contributions from various sources in order to perform their statutory obligations in the field of education, research and knowledge valorisation.

Valorisation involves the use of scientific knowledge, increasing knowledge value and innovation. The funds received from different funders form the basis of the university's financing for its educational and research tasks.

The funders at Makerere University include: Mastercard Foundation, the Embassy of Sweden (the Swedish International Development Cooperation Agency), the United States Agency for International Development (USAID), the Norwegian Agency for Development Cooperation (NORAD) and the Carnegie Corporation of New York.

The Mastercard Foundation Scholars Programme at Makerere University is one of the biggest partnerships between Mastercard Foundation and Makerere University. It offers scholarships to 1,000 academically bright, but economically disadvantaged youth from Africa to study at the university.

Dr Justin Namaalwa, the programme coordinator at the Scholars Programme Mastercard Foundation, says the 10-year project worth \$21m is in its seventh year

of implementation at the university.

Namaalwa says the programme has recruited and educated 1,032 students from seven African countries, of which 211 have graduated and are either employed, undergoing further studies or into entrepreneurship.

The programme offers comprehensive support to the recipients of the scholarship as follows; tuition and functional fees, accommodation, feeding and stipend, a laptop and other learning materials, excluding textbooks.

The other support includes: financial support for academic internship, financial support for academic research/or special projects, transport to and from home and personal medical insurance.

She says the scholars are provided with psychosocial and mentoring support. They are expected to participate in community engagements. It is hoped they will give back to their communities.

They are equipped with professional development skills that consists of the following; leadership development, career support, communication skills, Information Communication Technology (ICT), entrepreneurship development, financial literacy, gender and human rights.

"The programme emphasises girl child education, out of the 1,032 scholars recruited on the programme



to date, 780 are females, which represent 76% of the total number of scholars," Namaalwa says.

## SIDA support

Dr. Gity Behravan, First Secretary Research Cooperation at the Embassy of Sweden, says in 2000, the Swedish International Development Cooperation Agency (Sida) selected Makerere University (MAK) one of the largest Ugandan public universities as the site for support.

The support is aimed at building up sustainable research capacity that contributes to the establishment of a coherent agenda for research and research training in Uganda.

From 2010, four other Ugandan public universities were introduced into the cooperation; namely Gulu University, Mbarara University of Science and Technology; Kyambogo University and Busitema University.

Support has been given for five consecutive agreement periods (Pilot Phase ( September 2000- Dec 2001) 15 million SEK, Phase I ( 2002-June2005) for 104.110 million SEK; Phase II (2005-2009) 181 million SEK; Phase III (2010-2015) 215 million SEK and the current and final phase IV (Nov 2015- June 2022) 320 million SEK).

From 2000, the Swedish research funding to





The old CEDAT building. Below, the new USAID-funded building



Uganda has included components of institutional support that is organically linked to support for graduate training.

Institution-building, postgraduate training and the existence of an environment that is conducive for research and research training are all part of one single effort.

"This is why we support the University Library, labs, ICT, GIS, gender mainstreaming, cross-cutting PhD courses, supervision training, Curriculum development for Master and PhD training, the system for Quality Assurance, the competitive small research grants, core support to Makerere University Centre for Health and Population Research (MUCHAP) and the research management system," Behravan says.

The current and final phase of the programme (November 2015- June 2022) consists of 17 projects and consists of a network between five Universities in Uganda and 17 universities / institutions and agency in Sweden. Projects are spread across teaching and service units.

The five Makerere University colleges are: Humanities and Social Sciences, Computing and Information Technology, Natural Sciences, Health Sciences and Agriculture & Environmental Sciences

"To transfer a teaching university to a research-led university takes time. It requires change in organization, right conditions and incentives, infrastructure and a critical mass of trained researchers," Behravan says.

**T**he 20 years of Swedish support have among others brought forward transformations of key importance for academic sustainability.

"A great step is that the Makerere University has systems for local PhD training and has also developed guidelines for supervisors of doctoral candidates (2016)," Behravan says.

Behravan explains that more staff members have completed their Masters and PhD studies, Post doctorate researchers are trained and provided with research opportunities, relevant and promising research has been conducted.

"Infrastructure for research has been upgraded and mechanisms for maintenance improved. This work will continue and be consolidated during the phase out period," Behravan says.

Today the number of academic staff who obtained their Masters, PhD, Postdoctoral qualifications and small grants through the Swedish support stands at 407.

With the ongoing 389 (121 PhDs, 182 Masters, 61 Post doc and 26 small grants) by 2022 in total it will be 796 academic staff from five public universities in Uganda.

"The lesson learned from our cooperation is that funding of universities cannot only be left to international donors. This would indeed not be sustainable. The issue of funding universities is a matter of development of and for a country and needs to be steered nationally," Behravan says.

With the support from many individuals and institutions Makerere University will continue to support development processes. It is said that unity is strength and when there is teamwork and collaboration, wonderful things can be achieved.



# The evolution of social research

**Established in 1948, the Institute of Social Research is giving Makerere an international reputation**

**T**he transformation of the Makerere Institute of Social Research (MISR) began in 2012 with the introduction of the five-year multi-disciplinary MPhil/PhD programme in Social Studies.

MISR was until then a consultancy unit where the client sets the research question. After 2012 it gradually became a research institution, where the student and faculty researchers formulate the question.

The research output and impact is manifest in many activities. MISR publications over the years have covered many diverse areas. These include: land; food; ethnic issues; political movements; integration; history.

MISR has held many workshops based on original research on various topics like higher education; beyond criminal justice; governance; security and land in Uganda. MISR offers a seminar every Wednesday where MISR and external researchers submit the results of their research. The seminars have covered numerous topical social, economic and political issues.

Professor Mahmood Mamdani, director at MISR, says when COVID-19 made travel impossible, MISR shifted to Zoom and launched a weekly series of 'Global Conversations' with scholars from around the world speaking on their work. Some of the matters discussed included: capitalism as a mode of colonising the Future; coping with COVID-19; the future of sustainable development; democracy and populism.

Others were: who is afraid of "gender"; the religion of translation; thinking about religion through Wittgenstein; a democratic theory of finance for the 21st century; imperialism, nationalism and Chinese thought in early 20th Century.

Mamdani says there has been a remarkable expansion of higher education on the African continent, particularly in the middle belt colonised in late 19th century, over the past two decades. Student numbers have gone up astronomically, but not that of instructors.

He explains that the gap is filled by 'moon-lighting' faculty from more established universities, and by instructors whose qualifications remain limited to Master's level. Not surprisingly, most universities remain teaching institutions, with research a poor add-on. He notes that this context explains why the doctoral fellows who graduate from MISR are eagerly absorbed in higher institutions in Uganda, for example,



Prof Mamdani. Below, with PhD students at the new faculty building

## PUBLISHING

MISR has established its own press, the MISR Press, and its own journal, *The MISR Review*, gaining Makerere continental and global recognition. Some of the books published by the MISR Press recently include: *Saviors and Survivors: Darfur, Politics and the War on Terror*; *Displacing Human Rights: War and Intervention in Northern Uganda*; *Define and Rule: Native as Political Identity*; *Getting the Question Right: Interdisciplinary exploration at Makerere University*.

Others are: *The land question: Socialism, capitalism and the market*; *Gender, ethnicity and violence in Kenya's transitions to democracy: States of violence*; *Scholars in the marketplace: The dilemmas of neo-liberal reforms at Makerere University, 1989-2005*; *Subjects of empires, citizens of states: Yemenis in the Port of Djibouti and its hinterlands*.

## A 73-year story

**M**ISR was established in 1948. She has been able to change with the times, at times to muster the courage to defy scholarly convention, often to be at the cutting edge of change at Makerere.

MISR was led by anthropologists Audrey I. Richards, Lloyd Fallers who saw themselves as giving voice to 'native peoples' inside an otherwise hostile colonial establishment.

On the morrow of independence, MISR was fortunate to be steered by young nationalist scholars Ali Mazrui, Victor Uchendu, Yash Tandon who saw themselves both as pioneers of an emancipatory nationalist scholarship and as critics of nationalism's anti-liberal tendencies, especially when these tended to undermine the autonomy of the scholar.

When the times were difficult, MISR found prudent directors Samwiri Karugire, Dan Mudoola who understood that the most important goal under the circumstances may be survival.

When MISR and Makerere came under pressure from those who shelter under the banner of 'market forces', MISR found a director Nakanyike Musisi who endeavoured to turn the situation to institutional advantage.

Mamdani has been the director since 2010. He retires next year. Over the last 10 years he focused on building the PhD program. He has transformed the institute from a consultancy unit to a centre of excellence, a research centre which now produces African researchers in great demand.

Today, MISR takes a critical look at how it has been shaped by this legacy, in particular the impact of 'market forces' over the past decade. In the face of a growing and pervasive culture of consultancy, MISR recommits itself to its original vocation, social research. It cannot do this alone.

To build a sustainable research culture MISR seeks to join hands with others, starting with the different Faculties at Makerere that contribute to the study of society, government departments that appreciate the importance of research for the country's future, and then going outward to embrace the wider world of research and social activism.

at MISR (Yahya Seremba), Gulu University (Laury Ocen) and Uganda Martyrs University (David Ngendo-Tshimba).

MISR graduates are just as warmly welcome in the more established universities around the continent. Mamdani cites a few examples such as at the Centre for Humanities Research at the University of Western Cape in South Africa (Ayanda Nombila); the Faculty of Social Sciences in Addis Ababa University where Yonas Ashine has risen to the position of Deputy Principal in a short time; the institute of Ethiopian Studies (Netsanet GebreMicheal), also at Addis Ababa University; and Cheikh Anta Diop University in Dakar (Haydee Bangerezako).

"Wherever MISR graduates go, they tend



## Adapting to COVID



Doctoral programmes have adapted in the face of the pandemic and certain adaptations will likely be maintained once the pandemic abates.

**1 Online lectures on Zoom.** This will likely make it possible to introduce a long distance version of the three-year MPhil. This will make the programme sustainable by increasing the share of locally raised funds in the budget.

**2 Building of an online collection of books and other educational materials in the library that will make it possible to make the most economic use of limited funds.**

to take 'the MISR model' along," Mamdani says. He adds that the model has inspired parallel experiments at Makerere University, in particular at the College of Humanities and Social Science, which is in the course of introducing its first 'taught PhD', departing from the entrenched British model which focused almost exclusively on a research-based PhD.

"The inadequacy of the older model has become most evident where undergraduate training has been so weak that most of its graduates are unable to move directly into an exclusively research-based PhD," Mamdani says.

He says that though the academy is the primary destination for MISR graduates, it is not the only one. It is followed by the policy-making world (Barbra Nakungu at the World Bank in Washington D.C.) and local community-based organisation combining activism with research. He cites two examples — Teresa Aliou the executive director of Land and Equity Movement in Uganda (LEMU) and Frank Muhereza who has been elected executive director of Centre for Basic Research. Both organisations are based in Kampala but their activities cover the entire East African region.

"MISR has also been the site of innovative research, though research takes a longer time to bear fruit," Mamdani says.

He identifies two theses likely to be noted for bringing an original contribution to the world of scholarship. The first is Yonas Ashine's thesis on the genealogy of the Ethiopian state. The second is Teresa Aliou's soon to be competed thesis that offers a critique of the World Bank's programme to commodify customary tenure, at the same time offering an alternative project for increasing the productivity of agriculture in an equitable manner.

# A new vision for agriculture

## The Economic Policy Research Centre seeks to unlock Uganda's full agricultural potential by driving industrialisation

**T**he Economic Policy Research Centre (EPRC) is Uganda's leading think tank in economics and development policy-oriented research and policy analysis.

Established in 1993 as an autonomous not-for-profit organisation, the centre fills vital vacuums in economics research, policy analysis, and capacity building for Uganda's effective policy processes. EPRC is founded by Government of Uganda, Makerere University and Bank of Uganda.

In 2018, through the Strategic Economic Policy Management Forum, the EPRC, together with the Ministry of Finance and Economic Development, Operation Wealth Creation and the Private Sector Foundation Uganda, conducted a study on a sustainable agro-industrialisation agenda in Uganda.

This study made a case for activating transformative agro-industrialisation (AGI) in the context of Uganda's proposed national industrial policy.

Dr Sarah Ssewanyana, the executive director at the EPRC, says that with agriculture as a dominant source of livelihood AGI offered an excellent opportunity for Uganda to embark on its long-term aspiration of transitioning into a modern industrial economy for several reasons. These include promoting inclusive and equitable growth; Uganda's positive trade balance in agro-industrial products and the need to promote export of high-value products.

"Government urgently needed to shift the country's economic centre of gravity from low-value agriculture to value-added manufacturing," Ssewanyana says.

She adds that more efforts are required to leverage the domestic market for selected agro-industrial products through import replacement.

"Agro-industrialisation would address the high post-harvest losses experienced throughout the country," Ssewanyana says.

The EPRC proposed an integrated model where agricultural production is anchored on agro-manufacturers, with the government playing a key strategic role in providing public services such as research and development guided by industrial



Dr Sarah Ssewanyana

requirements. The model encourages manufacturers to work closely with farmers by facilitating the formation of farmer cooperatives to smoothen information flow.

Ssewanyana says that in addition to ensuring agro-input availability in the right quantities, high-end manufacturers could identify the knowledge gaps to be filled by the extension services. "The manufacturers must create an incentive system that motivates farmers to supply raw materials of the right quality and industry quantities. Within this model, government creates an enabling environment for transformative value chains."

"The aim is to unlock the critical productivity enablers such as research and development, increase technology adoption, unlocks opportunities for irrigation, establish better storage facilities, increase access to finance, and encourage efficient land use. The government adopted our suggestions," Ssewanyana says.

The AGI study culminated into the Public Investment Management for Agro-Industry (PIMA) Strategy. This joint effort gave rise to the Agro-Industrialisation Programme of the National Development Plan III (NDP III). In 2020, the EPRC conducted market studies for the nine PIMA commodities. The studies focused on the prospects for industrialisation are expected to help government in the implementation of the NDP III agro-industrialisation programme.



**The EPRC made a case for focusing on nine game-changers:**

1. Coffee
2. Cotton
3. Tea
4. Fisheries
5. Dairy
6. Beef
7. Cassava
8. Maize
9. Vegetable oil





Students are assisted with getting internship placements, scholarships and employment opportunities

**Dr. Gilbert Gumoshabe, Director, Confucius Institute**

# Pioneering Chinese language classes

**At the Confucius Institute, members of the public can opt to take a short course in the language**

**T**he unique role of the Confucius Institute is to teach the Chinese language and culture in Uganda. The institute teaches the Chinese language as part of Makerere University's Bachelor of Chinese and Asian Studies and as a subject under the Bachelor of Arts (Arts) and B. Arts (Social Sciences).

Dr. Gilbert Gumoshabe, the director at the Confucius Institute at Makerere University, says Chinese is taught as a short course to the members of the general public at the Confucius Institute.

Gilbert says that in partnership with the National Curriculum Development Centre (NCDC) the Confucius Institute supports the teaching of Chinese in the Ugandan secondary schools under the new curriculum.

"Our achievements include introducing the teaching of Chinese language in Uganda. Because of the Confucius Institute we were able to formally introduce Chinese which has been embraced by the public, secondary schools and other tertiary institutions," Gumoshabe says.

Training teachers to teach Chinese in Ugandan secondary schools is another of the institute's achievements. The nine-month trainings are done in partnership with the National Curriculum Development Centre (NCDC). The institute also supported NCDC in the development of the syllabus for teaching Chinese and has also partnered with NCDC to develop the A' level syllabus for Chinese.

The institute has organised cultural and academic events through which the secondary school students of Chinese can improve their proficiency.

He says that every university and secondary school student has an opportunity to compete in the Chinese bridge competition

to demonstrate their knowledge of the Chinese language, culture, talent and general knowledge about the world.

The winners get prizes and are sent to China to represent Uganda in a global competition. Winter and summer camps have been carried out to improve the learners' knowledge of the Chinese language.

The institute has transformed into a link between the students/graduates and Chinese employers in Uganda.

"The students are assisted with getting internship placements, scholarships and employment opportunities," Gumoshabe says.



**Students at the institute**

The institute acts as a bridge between graduates and the Chinese universities and Ugandan employers. Through the Confucius Institute, qualifying Ugandans receive over 30 scholarships at various levels to study in China.

Gomushabe says that with the approval of their partners they are looking forward to training another 500 Ugandan teachers. He adds that they plan to construct a state-of-the-art building to house the Confucius Institute. The building will provide space for teaching, offices, language laboratories, computer labs and a conference centre.



PHOTOS: MICHAEL NSUBUGA



**Makerere prides itself in providing an environment that nurtures sporting talent**

# Mak championing sports development

**M**akerere University is committed to the promotion of sports and a healthy lifestyle among all students, academic, administrative and support staff. The broader vision is to enable them enjoy equal opportunities and access to sports activities and facilities. Sports at Makerere University is a means of education and one factor that brings students and staff together.

The university recognises sports as a powerful means of enhancing the health, wellbeing, entertainment, recreation and nurturing of talent of her members.

According to Peninnah Kabenge, the head of sports and recreation, this commitment is demonstrated by two basic aspects of the rich sports programme: organised and competitive championships in various sports and informal self-directed and purely recreational sports.

"While the primary function of the university is academic, the value of the holistic development of students and establishing a culture of participation and competition is central to the institution's focus on the well-being of students," Kabenge notes.

"Makerere University has dedicated resources to sports and games thus the University prides itself in providing an enabling environment for students to nurture their skills and talents."

She says Makerere sport contributes

not only to building a strong Makerere brand and the university's sportsmen and women, but churns out top sports administrators in the country and internationally, thus playing a big role in the development of sports worldwide.

"The idea of forming the Association of Uganda University Sports was hatched at Makerere University by the then Dean of Students George Kihuguru as the President and the then Principal Sports Tutor, Era N. B Mugisa, the first General Secretary.

## Games

"The national university games are a product of Makerere University and have grown and produced world class athletes, so are the other programmes such as the 3x3 Basketball Challenge, The University Basketball Foodlights and the University Football League, which have been championed with Makerere University at the helm".

Makerere University has hosted University Games at all levels like no other university in Africa.

Makerere hosted the second National University Games, several editions of the East Africa University Games, the 5th All Africa University Games 2008, the Third World University Netball Championship.

Makerere also has the hosting rights to the 2024 FISU (Federation of International University Sports ) Mind



**"The national university games are a product of Makerere University and have produced world class athletes.**

**Peninnah Kabenge, the head of sports at Mak**

Sports Championship and the FISU Weightlifting Championship.

## Enormous opportunities.

Makerere participates in regional, continental and international events where the university dominates positions on the representative teams.

Mak is planning to redevelop its facilities to increase capacity and

aesthetics. "We aspire to rise to a standard similar to (or even better than) the top universities on the continent so we can live by our motto "Building for the Future," Kabenge says.

"Getting engaged in games and sports activities promotes individual talents."

"Strong partnerships and linkages with organisations in other sectors has helped to ensure competitive sport where talented athletes have achieved their full potential in personal and social development through participation."

Mak is home to the Federation of Africa University Sports (FASU) and the Federation of East Africa University Sports. It has seen FASU grow into a formidable continental organisation.

Students' exposure to different sports activities at international level such as FISU Volunteers Leadership Academy, FISU Young Journalist Programme, the FISU Forum, World University Games, Continental Games and Championships has given them a competitive advantage and produced the leading sports administrators in the country, region, continent and the world.

## Future plans

Mak is looking at having a healthy campus which aims to enhance students' wellbeing and the campus community at large. Having state of art sports facilities as will be guided by the sports policy once approved.



**At the Infectious Diseases Institute, a key goal is African-led research that benefits the locals**

# Connecting with communities

**T**he Infectious Diseases Institute (IDI) at Makerere University connects the traditional strengths of academia (research, training and clinical excellence) to real-world challenges in the community in Uganda and Africa at large. This work is primarily undertaken in the field of infectious diseases, which includes HIV/AIDS, tuberculosis, malaria, and more recently, emerging infectious diseases like Ebola virus disease and COVID-19.

According to Dr. Andrew Kambugu, the Executive Director of IDI, scholars at the institute undertake research and capacity building activities which are relevant to our communities. That is why today the institute not only has programmes in Kampala and Wakiso, but also in the West Nile and Karamoja regions.

IDI is a non-profit organisation whose mission is to strengthen health systems in Africa, with strong emphasis on infectious diseases, through research and capacity development.

The institute was established in 2002 by a group of infectious diseases experts from Uganda and the US. They included: Dr. Merle A Sande, and Dr. Nelson K Ssewankambo. Their steady vision of an Africa free from the burden of infectious disease has enabled the IDI to become a world-class centre of excellence.

This institute has provided excellent care for People Living with HIV (PLHIV) in Uganda, by training healthcare workers to serve the tens of millions of PLHIV in Africa, to maintain the strategic emphasis on prevention, and to conduct research relevant to improving the outcome of the epidemic.

When the College of Health Sciences was established in 2004, IDI became an integral part of the School of Medicine within the college.

"The institute has an interesting journey, the public might not be aware that our trainees are from beyond Africa, the philosophy we train one who trainees thousands, we have had

## OPERATIONS

1. Prevention
2. Care and Treatment
3. Training
4. Research
5. Laboratory services.
6. Global health security

## REACH

The institute has established programmes in Bunyoro, Central Uganda, West Nile and Karamoja.



**Dr. Andrew Kambugu**



**A Microbiology Master's student experiencing the virtual reality technology that will be used to train frontline health workers to manage COVID-19**

## SOME IDI PRODUCTS

Beneficiaries nurtured through IDI's research programmes include: Prof Pauline Byakika, who specialised in Malaria and HIV, Prof Damalie Nakajanko, the Principal of the College of Health Sciences (HIV Immunology), Prof Noelina Nakasujja, a psychiatrist (HIV and Mental Health) and Prof Posiano Ocama, liver specialist (HIV and Liver Diseases).

trainings that have enabled us build capacity especially in HIV, today we have so many health workers who can prescribe ARVS. Traditionally doctors used to prescribe but because of the long lines, it was going to be hard for doctors so we introduced something called task shifting. Nurses and clinical officers can now prescribe ARVs if they are well trained. It has enabled government to have this life-saving

treatment in all the corners of the country," Kambugu says.

What drives their research programmes is the desire to generate evidence that can inform guidelines and policies, at the same time make sure it is Ugandans and Africans doing the research. The institute does this through the Ssewankambo Scholars' Programme.

"We want Africans to independently

undertake research, from conception of a scientific idea to protocol writing, implementation, and dissemination. Our research programme emphasises the journey towards scientific independence. Through the Ssewankambo Scholar Programme many scholars have been mentored who have also turned out to be leaders in the university," Kambugu says.

The institute seeks to make contributions beyond HIV, given the scientific and programmatic progress made towards achieving HIV epidemic control.

"When we saw the progress, we had made with HIV, we started scanning the environment and we realised the increasing number of emerging infectious diseases in central and East Africa. So, we started a global health security programme in 2016. This investment paid off when COVID-19 hit Uganda. We had already established some capacity to do the detection and response through the programme. That way, we have been key in supporting the health ministry to make sure Ugandans are safe," Kambugu says.

The Institute is also central to the harnessing of the data science revolution to deal with health challenges within the university. In March 2019, the 2nd African Centre of Excellence in Data Science and Bioinformatics was launched at Makerere University.

Through a university-wide networks of data scientists, this centre will be a catalyst for innovation and research, including exciting fields like artificial intelligence and machine learning.





# MUBS seeks to end plastic bag menace

**Under the Research and Innovations Fund, Makerere University Business School is digging up solutions to everyday problems**

**F**igure this out: your garden is strewn with lots of polythene bags (*kaveera*), old jerricans, mineral water bottles and all manner of environmentally hazardous waste. It is a real problem on your hands. And you have been scratching your head but cannot figure how to clear this mess in preparation for the planting season.

Well, thanks to a new innovation being pioneered by Makerere Business School, plastic waste such as *kaveera* could cease being a problem to farmers in Uganda.

"We are trying to look at how we can manage polymers waste," says Susan Watundu, the brain behind the innovation titled "Management of polymers waste in slum areas in Kampala: A randomised control experiment".

Watundu and a group of other researchers are trying to look at an enzyme that will decompose plastic waste such that it does not become a problem to the soil, making it possible to convert dumping grounds into agriculture zones.

On average, it takes about 350 years for the plastic to decompose which has made it nightmare for the country's farmers. However, with the innovation, Watundu says plastic can turn into a useful ingredient to the soil the way, like any organic waste, such as banana fibre, because it will decompose rapidly.

"We are trying to find how to degrade plastic and make it important to the soil rather than it being the problem it is now," she says.

Although the country currently depends on

## OTHER STUDIES

**1 The Governance Forum (GF): A culturally based model for building grass root governance structures undertaken by Dr Isaac Newton Kayongo.**

**2 The Design and implementation of an innovative Milestone-based program monitoring system for the university undertaken by Diana Ntamu, and Policy and regulatory compliance with Smart Grid Technologies.**

**3 Post electricity sector reform in Uganda by Dr Hassan Bashir.**

recycling to deal with the problem, not all the waste can be removed from the environment. As such, the waste is finding itself on farming fields, and some of it is getting washed into water bodies, which is becoming a big challenge to aquatic life such as fish.

Watundu's project is part of three others that are taking shape at Makerere Business School. The projects are being done with the support of the Government of Uganda through the Makerere University Research and Innovation Fund (RIF) grant.

MUBS is benefiting from the research fund by virtue of being an affiliate institution to Makerere University.

## UNPACKING MAKERERE RESEARCH AND INNOVATION FUND

The Government of the Republic of Uganda is funding Makerere University to support high impact Research and Innovations to drive Uganda's development Agenda. This unique initiative was a climax of strategic meetings and continuous engagements involving Makerere University Management and the Government.

Under the Fund, Makerere University receives special funding worth sh30b (equivalent to \$ 8.1m) from the Government under the Research and Innovations Fund (RIF) to support high impact Research and Innovations.

The money is directed towards increasing 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.

The Research and Innovations grant targets researchers and innovators from Makerere University. These include Makerere University appointed academic staff (assistant lecturers, lecturers, senior lecturers, associate professors and professors) and research staff who hold a valid and current appointment (research fellows and senior research fellows).

### HOW THE FUND IS ADMINISTERED

The Principal Investigator (PI) should be an academic or research staff of Makerere University on permanent or full-time contract or a senior staff member from one of the administrative units linked to research (Library, Gender Mainstreaming, Quality Assurance, and the Directorate of Research and Graduate Training (DRGT))

- The PI should be actively in service (not on study leave or sabbatical leave).
- The PI should obtain a letter of support from his/her department/school or College (any one of the three).
- The PI should attach a copy of his/her appointment letter or most-recent letter of promotion issued by the Directorate of Human Resource of Makerere University.

- A researcher cannot be a PI on more than one application but it is allowable for a person to be on multiple applying teams.

- Researchers from Makerere University are encouraged to collaborate with resource persons from civil society organisations, government sectors, other universities within Uganda, independent research institutions, business and industry as part of their teams; in such cases, the external team members will provide a letter of support from their institution.



**The fund aims at increasing the local generation of translatable research and innovations that address key gaps in order to drive Uganda's development agenda**

# Research, innovations elevate Makerere's global rank



**M**akerere University received special funding from the Government to support high impact

research and innovations that address national development priorities.

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.

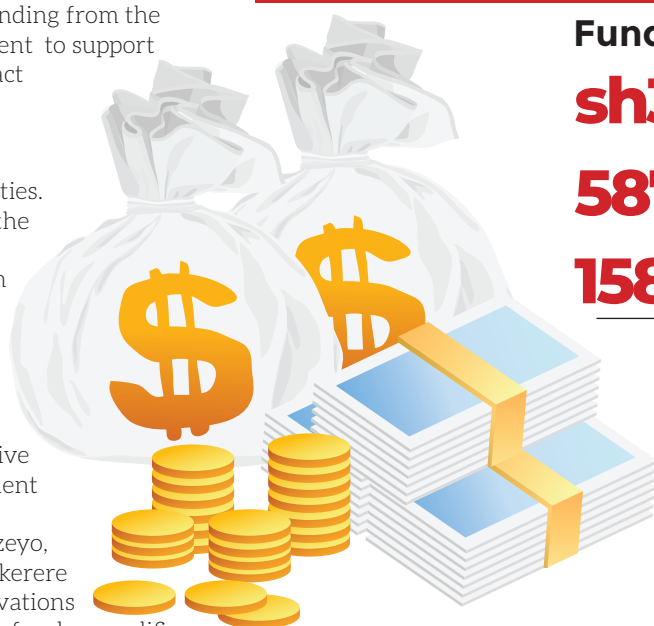
Prof. William Bazeyo, the head of the Makerere Research and Innovations Fund (RIF), says the fund exemplifies the role government attaches to research and innovations as key drivers of development and national transformation.

The fund is open to researchers from all academic colleges of Makerere University who have research that aligns with national priorities.

The initial focus was on already existing research and innovation ideas among researchers, with grants awarded on a competitive process in response to call for applications.

## The beneficiaries

A potential beneficiary may be any scholar who has a research and innovation idea that has a clear connection to or fills critical knowledge



## Funding in numbers

**sh30b** Funds received in 2019/20 financial year

**587** Number of projects awarded grants out of 1,446 applicants

**158** Number of projects funded in 2020/21

gaps in the national development plan, relevant sector development plans or the sustainable development goals and are within the framework of Makerere University's Strategic Plan.

The fund aims to complement

available research funding to address unfunded priorities critical to accelerating development across different sectors of the economy in Uganda.

Over the 2019/20 financial year,

## RESEARCH IS KEY

The fund exemplifies the role government attaches to research and innovations as key drivers of development and national transformation.

**Prof. William Bazeyo, the head of the Makerere Research and Innovations Fund**

## COVID-19 RESEARCH PROJECTS AWARDED

A total of 112 special COVID-19 research projects were awarded to generate rapid information on the effects of COVID-19 on the economy and to generate quick solutions and innovations to address gaps in the following response areas:

- Addressing psychosocial impact of COVID-19 (for example stigmatisation, sexual and gender-based violence-SGBV)
- Agriculture and livestock production and productivity
- Approaches in promoting uptake of behavioral measures for prevention of COVID-19
- Clinical manifestation, diagnosis and treatment of COVID-19
- Education and ICT (including Data mining and modelling)
- Health system issues and health shocks from other high burden diseases
- Innovations in preventive health care against COVID-19
- Justice, security and human rights (including employee retention and employability, Livelihood's resilience, socio-economic impacts and income transfers
- Low-cost appropriate technologies in response to COVID-19 (e.g., engineering and manufacturing; ICT (including data mining and modelling)
- Strengthening surveillance and contact tracing



Makerere University received a total of sh30b (\$8.1m) , giving a boost to local innovations across several fields.

A multi-sectoral Grants Management Committee has been appointed after wide consultations with the Colleges and has received the Terms of Reference.

The committee rapidly developed grant guidelines and has so far issued four grant calls, attracting 1,446 applicants and 587 awarded projects with the potential to transform Uganda.

The grants are guided by four core principles – results and impact, equity and inclusion, multi-disciplinarity and accountability and utilisation.

They include commitment to actionable results within one year and potential for wider impact, ensuring that all colleges to benefit, with women researchers and junior faculty representation; involvement of more than one sector in the projects, and a commitment to protect the university's reputation, accountability and use.

The funded projects are also required to be research-based, innovation-based and capacity building-based.

The research agenda may be drawn from consultations with researchers, government sectors, the National Planning Authority and implementing partners.

Summary of the calls and response to-date

	CALL	NO. APPLICANTS	NO. AWARDEES
1	RIF1 Response to national priorities	704	224
2	RIF 2 Response to national priorities (resubmissions)		66
3	RIF 1 Institutional capacity building needs		10
4	Special coronavirus (COVID-19 grants	356	112
5	COVID-19 urgent needs		16
6	RIF 2 New research agenda-based projects	386	159
	TOTAL	1,446	587

Grant Principles

**Results and impact**  
A commitment to actionable results within one year and potential for wider impact.

**Equity and inclusion**  
All colleges to benefit; women researchers and junior faculty representation ensured.

**Multi-disciplinary**  
Major development challenges require more than the effort of one sector; this should be reflected in the projects.

**Accountability and utilisation**  
To protect our reputation, accountability and utilisation will be of utmost importance.

**Types of projects**  
There were three types of research gap –research based, innovation-based and capacity building based.  
A total of 447 projects have been funded in response to national development needs, of which 289 were awarded in the FY 2019-20 and 158 have been awarded in the FY 2020-21.

10 special projects

Ten emergency-need special projects were awarded to address innovations in key areas of emergency demand for the sectors. The projects specifically include the following:

1 Building mathematical framework for guiding decision making and assessing potential intervention policies in the wake of novel COVID-19 pandemic outbreak.

2 Purchase of COVID-19 Sars-Cov Project- Makerere University Immunology Lab.

4 Characteristics of persons screened, tested and diagnosed with COVID-19 disease at health facilities in Uganda.

5 Assessment of the feasibility and safety of Immune/Convalescent Plasma Treatment among COVID-19 patients in Uganda (COVID Trial).

6 Development of an open design Low-Cost Ventilator in Response to the COVID-19 Need.

7 A randomised Open Phase II Clinical Trial to determine the Efficacy of Hydroxychloroquine for Treatment of COVID-19 in Adults in Uganda.

8 Efficacy and practicability of the Buy Uganda Build Uganda Initiative.

9 Investing data and evidence to Inform Education Policy in response to the new normal caused by COVID-19 pandemic.

10 Virtual Centre of Excellence for Sustainable Health to Support the COVID-19 Response and Post-COVID Recovery Process COVIDCanIDoIt: A COVID-19 Daily Activity Risk Assessment Tool.

OUTPUTS FROM PROJECTS THAT ARE NEAR COMPLETION

Some of the key projects that have so far produced tangible research products generated from this research and with potential transformation are summarized by college as follows:

**College of Agriculture and Environmental Sciences**

- Enhancing Value addition on Potato-Sorghum enterprises
- Empowering the Agro-Processing Industry to meet standards for the local and export market, etc

**College of Computing and Information Sciences**

- Crane Cloud: An open-source multi-cloud service layer for highly available cloud-based services
- Gamification to strengthen Science, Technology, Engineering, and Mathematics (STEM) education, etc

**College of Health Sciences**

- Makerere Antimicrobial Resistance Monitoring System
- Leveraging technology to reduce cardiovascular-metabolic risk.
- Scaling-up the “Training on outbreak preparedness and response at district level”.

**College of Engineering, Design, Art and Technology**

- Portable Deep Learning-based Platform for Passion Fruit Disease Identification.
- Parametric Optimisation of Solar Autoclaves for use in

Rural Health Centres

- Integration of on- and off-grid decentralized renewable energy systems: Enabling Uganda’s largest distributor UMEME to pilot the integration of off-grid decentralised renewable energy systems with grid systems to extend electricity access to unserved communities.
- Establishing a Knowledge Management and Evidence Response Unit: A Knowledge Management & Evidence Response Unit (KERU) has been established to accelerate the pooling of evidence to inform policy and to accelerate its uptake.

**College of Business and Management Sciences**

- An interrogation of Tax Education Gaps in the Informal Sector: This research has identified gaps and proposed approaches to help URA widen the tax-based from the informal sector.
- Using Telehealth Services to Support the Continuity of Family Planning Information, Access: Researchers are utilising an existing telehealth platform for the provision of reproductive health services during and post COVID-19 pandemic.
- Skills Matching, Wages and Productivity gains: Findings from this research will inform policy makers on the appropriate policies needed to improve the responsiveness of labor supply to labour demand, bridging skills gaps, enhancing productivity and bridging income inequalities.



# Tackling challenges of development

## Programmes at the College of Business and Management Sciences aim to enable students to analyse and deal with problems of development

**T**he College of Business and Management Sciences is a constituent college of Makerere University. It was formed in 2011 as a merger between the then Faculty of Economics and Management (FEMA) and the Institute of Statistics and Applied Economics and is composed of three schools, seven departments and a centre.

The School of Economics is made up of the Department of Economic Theory and Analysis and the Department of Policy and Development Economics. The School of Business comprises of the Department of Marketing and Management and the Department of Accounting and Finance.

The School of Statistics and Planning has the Department of Planning and Applied Statistics, the Department of Population Studies, the Department of Statistical Methods and Actuarial Science and the Center for Population and Applied Statistics (CPAS).

The college is currently home to 5,500 students across 21 taught programmes from undergraduate to doctorate level. The training programmes seek to prepare learners for further studies. The programmes aim to enable them analyse and deal with problems of development in the region through a blend of theory from the classroom with practice from the 'world of work' through the internship program.

The college offers short-term training courses for mid-career managers and policy makers on a fee-paying basis and self-sponsorship. The total staffing position of the college stands at 238 members, 131 of whom are academic staff members. Of these, 43% are PhD holders.

The overall objective and strategy is to position the college as a relevant and sustainable institution of international standing with high calibre staff, an active presence in public policy research and formulation and contribution to the community.

Dr. Eria Hisali Principal at the College of Business and Management Sciences, says that in order to fulfill the college's mission while working towards attaining the vision, they are implementing many strategic level interventions.

They have made strides in laying a firm foundation for future financial sustainability, brand visibility, research and collaborations, human resources capacity and staffing, quality assurance, teaching and learning.

The 142nd Meeting of the Makerere University Council that sat on March 1, 2018 approved a proposal from the college to establish an endowment fund as one of the measures for financial sustainability.

It will be a perpetual self-sustaining fund where



the principle will be preserved. Only a percentage of returns will be spent to supplement the university's human resource capacity development efforts.

The fund will facilitate cutting-edge research and outreach. It will offer scholarships to talented but under-privileged candidates enrolling on programmes that fall within the mandate of the college.

The college has initially committed sh300m of its annual remittances from the centre to the fund over the last two years.

The official launch of the Fund will take place in April 2021. Hisali says that they are aware of the principle that a higher fund value earns higher returns. "The college has set itself an enviable target of raising sh20b in 10 years," Hisali says.

The college has positioned itself as a center of choice by international development organisations for short term training and capacity development in the areas of data management and statistics on the continent.

The School of Statistics and Planning has over the last three years won grants worth about \$550,000 from the World Bank and the African Development Bank.

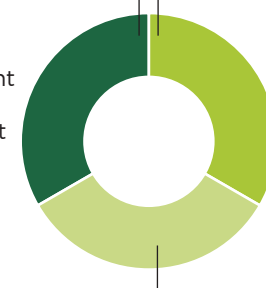
## The structure

### School of Economics

- Department of Economic Theory and Analysis
- Department of Policy and Development Economics

### School of Business

- Department of Marketing Management
- Department of Accounting and Finance.



### School of Statistics and Planning

- Department of Planning and Applied Statistics
- Department of Population Studies,
- Department of Statistical Methods and Actuarial Science
- Centre for Population and Applied Statistics





The potential of the college to contribute to policy formulation, implementation and evaluation remains largely untapped

**Dr. Eria Hisali, COBAMS Principal**



The grants are to facilitate training for government officials from Africa in the areas such as data management and analysis, poverty analysis, gender and agricultural statistics.

It recently received a grant of \$452,000 dollars from the World to support IT equipment and facilities in order to strengthen its capacity to continue with its short term and long-term capacity development efforts.

The college is home to a centre of excellence in Public Investment Management supported by the World Bank and a regional centre for Environment and Development (EfD) supported by SIDA.

The EfD Centre at Makerere University is one of the 15 such centres worldwide. It works with relevant government departments, the private sector, development partners and civil society to drive research and policy action.

The research and policy are underpinned by issues regarding environmental management and sustainable development.

The college has for the last five years supported research and publication through its small grants programme. This intervention has increased the number of publications from under 40 in

2017/18 to over 160 in 2019/2020. The college has established three new flagship activities, one at each of its three schools.

These are the Data Analysis and Management Unit, based at the School of Statistics and Planning. The other is the Macroeconomic Modelling, Analysis and Forecasting Unit at the School of Economics. The Makerere University Entrepreneurship and Innovation Center is at the School of Business. These are meant to coordinate public policy, industry and community and engagement, improve visibility and contribute to long term financial sustainability.

On research and visibility, he says most of the research and community engagement activities at the college are currently individual based.

He notes that there are few established frameworks such as Centers of Excellence, Policy Labs and journals within the College to mainstream such engagements in order to respond to problems of society and even challenges that policy makers face.

“The potential, therefore, of the College to contribute to policy formulation, implementation and evaluation remains largely untapped,” Hisali says.

In the medium-term, Hisali says attention will be given to the following: expanding the graduate students’ numbers to 45% of enrolment over the next five years.

This will be realised through new programmes such as the proposed Master of Investment and Risk Management, Master of Development Finance, Master of Arts in Development Economics, Master of Science in Actuarial Science, Master of Science in Impact Evaluation, Master of Arts in Demography, Master of Economic Policy Modelling and PhD programmes in accounting, finance and management.

This will go hand in hand with measures to strengthen research and the graduate students’ office to improve on the graduate students’ experience at the college.

They will institutionalise seminar and working paper series, policy labs and establish a multi-disciplinary journal for the college to enhance its visibility.

The college will complete the transition to the learner-centred teaching methods by mainstreaming modern technologies such as multimedia, video, online content, electronic boards, computers, cyber networks and virtual platforms, among others.

They will establish new partnerships and strengthen existing ones with reputable academic and research institutions across the globe.



**Students at the university**

## IN NUMBERS

# 238

Total staffing at the college. Of these, 131 are academic staff members, 43% of whom are PhD holders.

# 5,500

Number of students, across 21 taught programmes from undergraduate to doctorate level.

## Other plans

The college will expand its revenue sources beyond the endowment fund through among others expanding the graduate students’ intake, executive programmes and internationalisation.

They will complete the process of international accreditation of the college and its flagship academic programmes

They will increase the number of publications and research outputs to about 350 per year within three years.

They will expand and maintain physical infrastructure to cope with emerging demands .

Hisali says the college will review the college research focus and agenda. They will set up the college research infrastructure and systems (institutional review board, grants office), ensure staff exchanges, secondments and professional affiliations as a way of retooling academic staff and researchers.

They will mainstream and improve processes that enhance quality and service delivery including quality assurance, communication and grievance resolution.





Dr Peter Olupot (centre) with his students learning about the recyclable water hand washing facility (ECO-WASH)

# Commercial innovations take the lead at CEDAT

The College of Engineering, Design, Art and Technology (CEDAT) was born out of a merger of the then Faculty of Technology and the Margaret Trowell School of Industrial and Fine Art.

At the time of formation of colleges, the former Faculty of Technology was split into two schools one for engineering and the other for built environment. The college is comprised School of Engineering, School of Built Environment and the Margaret Trowell School of Industrial and Fine Art.

In 2020, the School of Engineering and the Art Gallery at the Margaret Trowell School of Industrial and Fine Art celebrated 50 years.

Each of the three schools that form CEDAT has three departments handling specialised programmes/courses in their respective fields.

CEDAT has also established centres to facilitate research, including the Centre for Research in Transportation Technology; Centre for Geographical Information Systems; Centre for Technology Development and Transfer; Centre for Renewable Energy and Energy Conservation.

The college also had the institute of heritage conservation and restoration.

## Many of CEDAT's flagship innovations have since been commercialised or at advanced stages of production



Prof. Henry Alinaitwe

There are two new centres at the college: the Africa Center of Excellence on Materials, Product Development and Nano-Technology that is supported by the World Bank and the East African Centre for Renewable Energy and Energy Efficiency that is supported by United Nations Industrial Development Organisation.

Prof. Alinaitwe, the Principal of CEDAT, says the college and Makerere University have transformed over the years of implementation of the Collegiate system.

### Innovations

CEDAT is riding high on innovations that have given Makerere University an edge, as the college develops ground-breaking applications.

One of the star innovations is the KIIRA EV, born out of a student extra-curriculum activity that has morphed into a corporation, Kiira Motors Corporation. The staff at KMC are former students from the three schools and they have continued to demonstrate the work collaboration initiated while at the college.

The other innovation that CEDAT prides itself in is the biodegradable sanitary pad dubbed MakaPads, a biodegradable sanitary napkin made out of papyrus that is highly absorbent and cheap.

The low-cost sanitary napkin was born out of research that found that most school-going girls dropped out of school or could not attend class because they could not afford sanitary pads during menstruation.

According to Prof. Alinaitwe, the MakaPads are not only good for the learner due to affordability but also for the environment since they are biodegradable. The Makapads project was spearheaded by the late Dr Moses Musaaazi.

CEDAT is also proud of the solar-powered irrigation project headed by Dr Joseph Kadoma Byaruhanga.

Backed by the Presidential Initiative on Science and Technology, the solar irrigation project is envisaged to help promote the adoption of irrigation technologies by small holder farmers to irrigate crops and guarantee all-year production and improve the country's food security.



**Biodegradable packaging solution for liquid-based cosmetics using response surface methodology by Eng. Ronald Kayiwa**

There is an increase in the usage of cosmetics mainly due to an exponential growth in number of consumers as well as rising standards of living.

Their relatively short lifespan has resulted in a need for frequent replacement by consumers. This has triggered a need for their frequent manufacture and inevitably that of their packaging. Yet this packaging is predominantly made of plastic.

The damping rate in landfills is high and the hazardous effects of burning such waste are immense. This project has results showing the possibility of sustainable manufacturing of liquid based cosmetic packaging from agricultural waste.

Not only does this abate the consequences of the prevalent plastic packaging but also improves the livelihood of the third tier suppliers of the waste materials.



**Ronald Kayiwa (left), a PhD student and Emmanuel Echwalu a master's year-two student working on the low cost self-disinfecting glove**

**Parametric Optimisation of Solar Autoclaves for rural health centres by Eng. Gerald Kiseka**

As the world's burden of surgical diseases increases, so does the gap between access to life saving and disability preventing surgical care, both between and within countries.

The surgical care gap between developing and developed countries could be substantially reduced through integrated strategies including appropriate medical equipment design for surgical procedures in low-infrastructure areas.

Rural clinics in developing countries provide primary care for three billion people worldwide, but more than half of them do not have access to electricity.

Additionally, although they lack the proper equipment, nurses at these clinics are faced with the decision to compromise patient safety by attempting to provide care. An autoclave is a vessel capable of holding high pressure steam at 15psi (pounds of force per square inch) and insulation to maintain the internal temperature at 121°C.

The solar autoclave is a machine used to disinfect reusable medical tools and medical

waste before disposal. This machine uses solar energy.

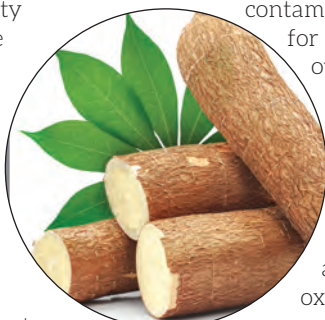
It uses a principle of irradiance and insolation concentration using parabolic surfaces to heat water to temperatures beyond 100°C.

The first prototype built has been tested and can raise the temperature of water to 100°C.

**Valorization of Cassava Peels for Abatement of Active Pharmaceutical Contaminants from Water Systems in Uganda by Engineer John Baptist Kirabira**

Pharmaceuticals can be introduced into water sources through sewage, from uncontrolled drug disposal (e.g. discarding drugs into toilets) and from agricultural runoff comprising livestock manure.

One technology, reverse osmosis, removes virtually all pharmaceutical contaminants but is very expensive for large-scale use. On the other hand, conventional treatment processes with chlorination (free chlorine) can remove about 50% of these compounds, whereas advanced treatment processes, such as ozonation, advanced oxidation, activated carbon can achieve higher removal rates.



**Up-cycling plastic wastes by incorporation of agricultural residues for the development of environmentally friendly packaging products by Eng. Michael Lubwama**

Plastic waste management is a major problem affecting cities and towns in Uganda. Plastics are disposed haphazardly and most of them end up blocking drainage channels.

In addition, agricultural residues are also produced in very large quantities and their disposal by open burning has negative environmental consequences. This project has developed agricultural residue reinforced plastic products using waste plastic bottles and agricultural residues including rice husks, coffee husks, groundnut shells.

Pre-treatment of the agricultural residues was done to improve compatibility between the plastic and agricultural residues. The project has developed value added products such as jewellery boxes and egg trays from the waste thus enhancing their overall value and promoting an attitude change.

The project team embarked on a search for low-cost, eco-friendly sustainable sources of activated carbon from cassava peels to obtain active carbon. This study characterised the peels of six predominant cassava genotypes grown in the

four agricultural zones of Uganda for production of AC nanoparticles. The results showed viability of the waste to be harnessed for AC production capable of impounding active pharmaceutical ingredients from water systems in Uganda.



**Makerere University College of Health Sciences is a leader in medical training and research in sub-Saharan Africa, ranking second after the University of Cape Town**



A lab attendant examining a sample with a microscope at the College of Health Sciences

# New lab expands research at College of Health Sciences

**T**he Makerere University College of Health Sciences (MAKCHS) has championed a number of health innovations and researches over the years. Created in 1924 as a Faculty of Medicine and subsequently transformed into College of Health Sciences, MAKCHS is the oldest and leading medical school in East Africa and one of the best in Africa.

MakCHS has led innovations in medical education in the region; with the introduction of student-centered learning approaches to medical education; including problem-based learning, community-based education and research as a part of medical training, competence-based training and inter-professional education; all of which are the leading approaches to medical training worldwide. This has contributed greatly to keeping MakCHS a leader in medical training and research in sub-Saharan Africa;

ranking second after University of Cape Town.

"Graduates of MAKCHS continue to meet requirements of graduate training worldwide and faculty are internationally recognised leaders in medical education and research," says Prof. Damalie Nakanjako the Principal of MakCHS.

She adds, "Throughout the COVID-19 pandemic, we have scaled up our virtual learning opportunities. We now provide our learners with virtual opportunities for interactive clinical discussions through online tutorials, clinical grand rounds and mini rounds, journal clubs, and various webinars of international repute."

## Laboratories

According to the Principal, Prof. Damalie Nakanjako their state-of-the-art diagnostics laboratories set up through collaborative support with local and international partners have

boosted their efforts in undertaking research and innovations at the college.

She says they have been able to tackle HIV/AIDS and Tuberculosis because of their expanded research capacity. The research laboratories enabled them to support government's national COVID-19 response through expanding testing and research. Similarly, in partnership with the Government and the University of Cucurova in Turkey, the college was able to set up a forensic pathology centre led by Ugandan scientists and pathologists.

## Research

Clinical research discoveries at MakCHS have contributed to advances in patient care in Uganda and the region. Burkitt's lymphoma was first detected in Uganda, initially described as a sarcoma (a type of cancer) of the jaw and subsequently, in 1962, discovered to be a distinct form of

Non-Hodgkin lymphoma. This led to the establishment of a dedicated cancer research institute – the Uganda Cancer Institute in 1967.

Similarly, in 1970, research on Kaposi's sarcoma was conducted in Uganda through early immunological studies, where a striking impairment in the delayed hypersensitivity response to dinitrochlorobenzene (a molecular formula) was noted in patients with a "malignant" type of tumor. "Fast forward to 1985, 'Slim disease' was described by three MAK scientists as a new disease associated with HTLV-III infection," says Prof. Nakanjako.

Subsequently, the 1999 landmark HIVNET 012 study showed that single-dose Nevirapine at the onset of labour and a single dose to the infant led to a 42 percent reduction in maternal-to-child HIV transmission, providing the developing world with a cheap and simple option to protect thousands of children born by HIV-infected mothers.



### Epi-Tent: Field 'hospital' for health and humanitarian emergencies

The COVID-19 pandemic saw a sharp increase in demand for appropriate treatment spaces to help decongest the few treatment centres. The Epi-tent, which was invented by a team of researchers from the Resilient Africa Network (RAN) at Makerere University, came in handy.

Dr. Roy William Mayega from MakCHS' school of public health says that the team was supported by RAN and USAID.

The Epi-tent is a portable housing that vastly improves the living environment for emergency service delivery.

"By integrating smart humane-centered design features, it reduces extreme temperatures in very hot conditions by an average of 100 degrees centigrade," he explains, adding that, "The tent also improves air circulation to prevent cross-infection."

The design makes it possible to have deployable portable hospitals available within national epidemic and disaster response inventories.

Away from COVID 19, usually, health workers working in emergency treatment units in very hot humid environments such as where there is an outbreak of Ebola, face life threatening challenges. In such circumstances, the Epi-tent provides a sustainable solution.

Mayega says with funding from the private sector and in corporation with the Ministry of Health, they have so far set up Epi-tents at Masaka, Mbarara, Mbale and Gulu regional referral



**Prof. Damalie Nakanjako, the Principal College of Health Sciences**

## Adapting to COVID



Several inventions were made Makerere's College of Health Sciences:

**1** The Epi-tent, which was invented by a team of researchers from the Resilient Africa Network at Makerere University, came in handy to decongest treatment centres.

**2** Low-cost Bulamu ventilator open design ventilator used in treating COVID-19 patients.

**3** A forensic pathology centre.

hospitals. Another tent was set up at the Busia border to support the immigration surveillance activities for COVID-19.

### Necessity, the mother of invention

According to Korukundo, an early engineering prototype of Bulamu ventilator was developed in April, 2020 and the project was launched amidst the COVID-19 pandemic.

It was intended to design, prototype, optimize and bring to scale an effective but low-cost ventilator for treatment of severe COVID-19 and other similar severe respiratory and heart illnesses in Uganda and East Africa region.

Meanwhile, this project is a collaboration between Makerere University and the ministry of science, technology and Innovation which is represented by Kiira Motors Corporation which is leading the technical design and development process towards a refined functional ventilator.

Makerere University is providing the project leadership through Resilient Africa Network (RAN) while the College of Health Sciences (CHS) will carry out bench top tests. The College of Veterinary Medicine, Animal Resources and Bio-Security (CoVAB) is responsible for the animal trials.

The project is currently working on the fourth generation prototype which is undergoing testing and validation. It includes bench-top testing on computer models, standard test lungs and test equipment; tests in animals and tests in human subjects.

### Multidisciplinary innovation ecosystem

Higher education Institutions in low- and middle-income countries face a challenge of producing graduates who are not innovative.

They also lack the skills and ingenuity to develop ideas and products that contribute to national development and job creation.

It's against that background that a team at Makerere University school of public health with support from RAN; an Innovation Lab at the university developed a tool kit for mainstreaming Innovation training and innovation ecosystem development into the academic programs of Makerere University.

Dr. Roy William Mayega says the tool kit involves a package of easy to integrate materials that introduce students to vital knowledge in human centred design and designing for Impact. This toolkit also includes resources for skills building in: The innovative approach and design science, designing with the user-experience in mind, how to take ideas and products to scale, how to present a good pitch to potential funders, entrepreneurship skills including business model and go-to-market strategy development, and managing innovation.

"These skills prepare our graduates to face the challenges of the 21st Century, better their lives and drive us into a middle-income country," Mayega says.

The project also aims to build the capacity of university teaching staff to be able to develop sustainable innovation support ecosystems. That way, individual academic units can support an innovator right from idea conception to development, project management, application for seed-grants, going through regulatory approval, linkage to potential scaling partners, protection of intellectual property and industrialization of products and applications.

### BULAMU VENTILATOR AND TREATMENT OF COVID-19 PATIENTS

A team at MAKCHS also invented The "Bulamu" ventilator; a positive pressure device designed for high dependency units and emergency applications. It is a low-cost open design ventilator used in treating COVID-19 patients.

"Bulamu has been designed as a safe and compliant medical ventilator. It uses locally available parts as well as standard parts which are standard-compliant," says Pauline Korukundo, the project member.

Key parts of the ventilator have been developed using printed circuit boards, embedded software, computer-aided design, 3D scanning, metal fabrication and 4th Industrial revolution technologies such as additive manufacturing, among others.

Korukundo says the ventilator uses mandatory ventilation to push air to the patient's lungs.

"It is supplied by an AC power supply and backup system for off-grid use," she adds.

The main gas tubing connects from a blender which mixes oxygen and air in preferred ratios. The air flow and pressure are regulated inside the unit and injected into the breathing circuit to provide the driving force for each patient breath. The oxygen and air supply lines are attached to the blender. Additionally, anti-viral and anti-bacterial HME and HEPA filters are integrated into the ventilator to ensure air quality purification and cross-contamination prevention, and with that, possible complications arising from mechanical ventilation are greatly minimised.



**Bulamu ventilator**



# Mathematical modeling key

**At the onset of COVID-19, the department of mathematics came up with two mathematical models to manage the pandemic**

**W**hereas most people see mathematics as an abstract and difficult subject to understand, mathematics cannot be avoided in almost every aspect of life.

Various aspects of mathematics have evolved since mathematics was discovered in the 6th Century BC.

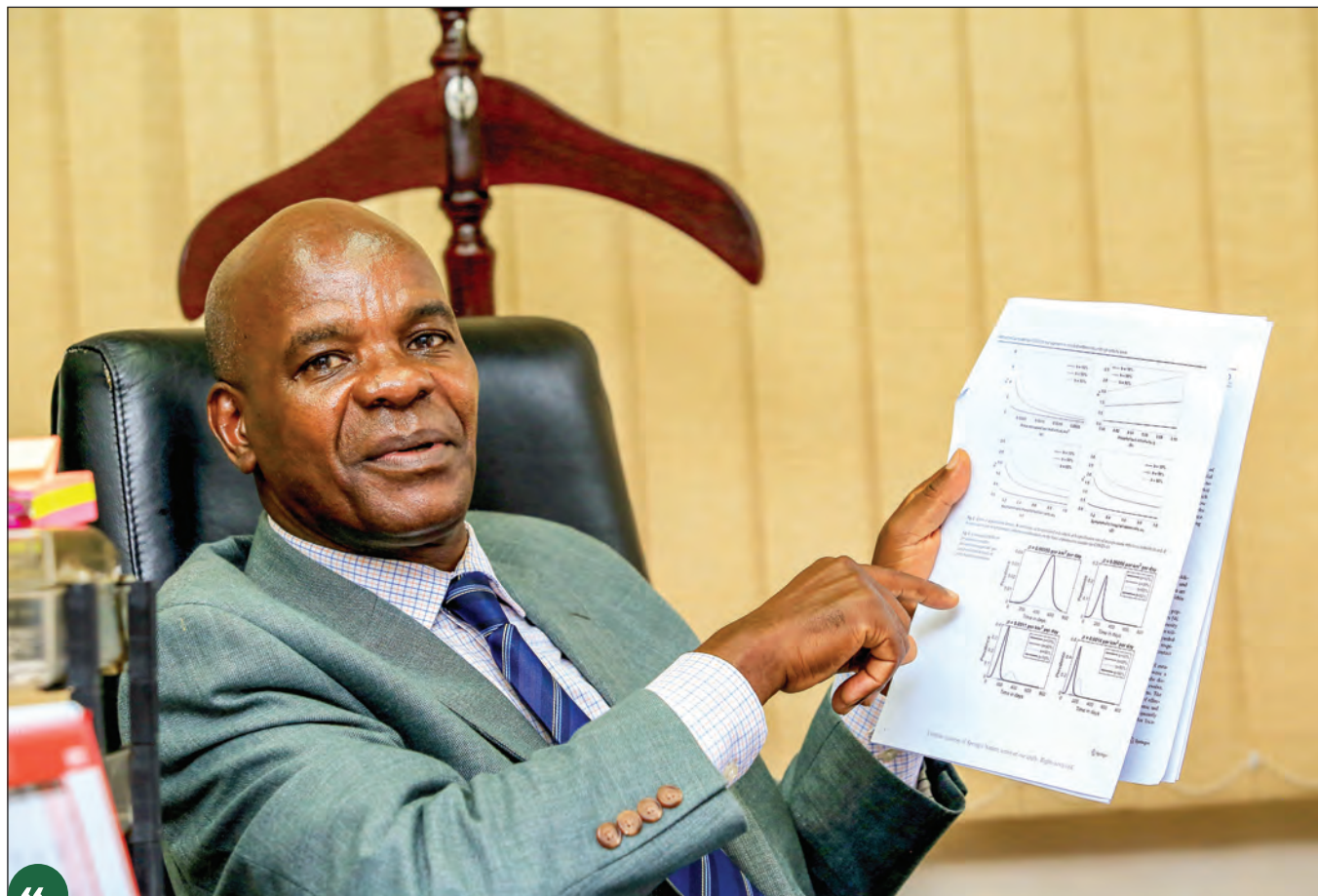
"From objects to symbols, different areas of mathematics were developed. The first and very popular area was pure mathematics. But, the various applications of mathematics led to the development of applied mathematics," says Joseph Mugisha a professor of Biomathematics and Principal Makerere University College of Natural Sciences (CoNAS).

Applied mathematics became useful in many fields; for example, before you look you must measure. If you are going to bake you must measure the ingredients. All that is simple but applied mathematics.

"In real life situations you find mathematics in finance, markets and banks. Eventually, we developed other forms and one of the interesting forms we are using is applications of mathematics in biology and biomedical processes," Mugisha says.

## Applying mathematics

"A typical application of mathematics in biology can be noted in cell biology – the rate at which the cell is developing – multiplying and the rate at which it is diminishing – then we are able to tell you that your brain cell is degenerating at this rate and, if we don't be careful you are going to die in the next certain number of years because they will be depleted" says Prof. Mugisha.



## COVID-19 MATHEMATICAL PROJECTIONS

**The staggered ease of lockdown was to let the population return to some level of normalcy not contravening the guidelines. The effectiveness of standard operating procedures and monitoring the reproductive number to inform the system of how it can be brought to less than unity.**

**Prof. Joseph Mugisha,  
Principal, Makerere University College of Natural Sciences**

In medicine the applications of mathematics have now generated a new research area known as mathematical epidemiology.

For example, if there is a population of 20 persons in a closed room and one person has the flu, the immune systems notwithstanding, one will catch it depending on the proximity to the infected person.

If one person has flu, he or she is likely to infect another person and the infected person will also infect another person and soon the rate of interaction can lead to an outbreak of the infection in that population.

"We have a threshold value we talk about; the basic reproduction number, that depending on how many people the chain has produced, then the entire group will get flu. If one person has infected more than one and that person infects more than one then the entire population will get infected.

"That is where we start to say we are applying mathematics in medicine to identify how the disease is being transmitted, and depending on the levels of susceptibility and the immune system, where they are seated and how they are mixing with each other all those are conditions we embed and

form a mathematical model," says Prof. Mugisha

## Mathematical modelling

Mathematical modelling is a system generated by hypothesis and from there, subsequent equations, that will generate answers are formed.

"The models have epidemiological and demographic parameters that we use to make accurate estimates," says Prof. Mugisha.

"Ideally mathematical models are meant for predication and control," he says.

In 1985, HIV/AIDS had no vaccine or treatment and nobody knew what it was. People were dying at alarming rates and eventually, the only option was to predict the next course of action.

Mathematical models were formulated to predict the effectiveness of interventions such as, use of condoms, sticking to one sexual partner or abstaining.

"The question was what fraction of people should use condoms so that we see the disease going down? What fraction of people should abstain or have one sexual partner," Mugisha says.



# in fighting pandemics

“The underlying epidemiological numbers were used in different models to see the trend and impact of various intervention measures. We were able to explain what was happening and what needed to be done to help public health systems in curbing the spread,” says Prof. Mugisha.

“It is important that before you go into mathematical modeling of epidemics you must read the biology of the disease.

“When the Spanish flu came it killed almost everybody because it was novel. Nobody knew what to do but hide behind masks just like with the coronavirus,” he says

## Dealing with COVID-19

The case of COVID-19 is a global puzzle. “We need to know the dynamics of this virus, we are enforcing social distancing but how much distance should we put? How long should the lockdown be? Uganda had the capacity to completely lockdown but you saw how people became unsettled.

Prof. Mugisha explains that by the time President Yoweri Museveni eased the lock down, it was not because COVID-19 had ended but because other things must work if the entire population is to survive.

In this situation, the mathematics of how to effectively and successfully project enforcement of intervention measures becomes the basic focus.

## Projection

The main challenges associated with the novel COVID-19 pandemic that needed mathematical projections included the flattening of the curve in order not to overwhelm Uganda’s poorly and ill-equipped health system.

The staggered ease of lockdown was to let the population return to some level of normalcy without contravening the guidelines.

The effectiveness of standard operating procedures and monitoring the reproductive number to inform the system of how it can be brought to less than unity.

One important aspect that becomes very useful in interventions of such novel pandemics is the effective implementation of vaccination programmes.

“While we wait for processes of vaccine development, mathematicians prepare models to suggest the most appropriate ways to administer vaccination. Here, mathematical



The College of Natural Sciences building

## MAK-RIF PROJECT

One of the projects funded by the Makerere University Research and Innovations Fund is Documentation, bioactivity and phyto-chemistry of selected herbal medicines used by local communities in family planning management in Uganda by Dr Madina Mohamed Adia

The modern family planning methods like Implants are expensive for most Ugandans and some women fear using them because of the side effects like obesity. As a result, some resort to natural methods of family planning like withdrawal which are not effective.

Traditional fertility control methods like taking herbs to prevent pregnancy are not safe and their efficacy is unknown due to lack of research, yet these studies are important in discovering the effectiveness of herbal drugs and establishing their dosage.

Some plants like *Prunus africana* and *Sporobolus pyramidalis* were identified as being used in birth control in Mpigi and Kamuli respectively.

A database of plants used in family planning management in Uganda is almost complete. This database can help in further research like phytochemical analysis to find out the active ingredients responsible for stopping conception. The policy makers can base on the findings to do a clinical trial and to make herbal products for family planning.

## Models to manage COVID

At the onset of COVID-19 in March 2020, the department of mathematics came up with two mathematical models to manage the pandemic.

**1** The first was the mathematical model of COVID-19 transmission dynamics in Uganda implications of complacency and early easing of lockdown.

“We were able to show that if you mess up and ease the lockdown as early as everybody wanted, we would be in shock as it required some element of staggered (phased) opening. We also suggested measures to avoid a possibility of second wave of the infection,” he says.

**2** The second was the mathematical model for COVID-19 management in crowded settlements and high activity areas.

“We said to open for activities in high-activity areas we need to specify certain area acreage,” he says.

models answer questions such as what fraction of the population should be vaccinated to obtain herd immunity.

“We want to see that herd immunity is attained as soon as possible and at minimum cost, so how long should vaccination take to see the peak of the pandemic start to decline.”

The other side of the intervention measures has to do with crowd control. Many systems are governed by large gatherings – schools, places of worship, markets, malls and transport – so how much populations and appropriate space should any of this take at any time to avoid continued spread.





Raspberry Pi, a surveillance camera

## HUB OF INNOVATION

The College of Computing and Information Sciences (CoCIS) is without doubt the hub of innovations at Makerere University. According to Prof. Tony Oyana, the CoCIS Principal, the college has received over 30 grants under the Makerere University Research and Innovations Fund (Mak-RIF) in all the funding cycles since it was established.

"We have received close to sh3b, since the project was launched," Prof Oyana says.

He adds that the fund has enabled them come up with creative projects and is helping them build the research capacity of their staff.



# Computing a path to the future

**The following projects have been rolled out at the College of Computing and Information Sciences with funding from Mak-RIF**

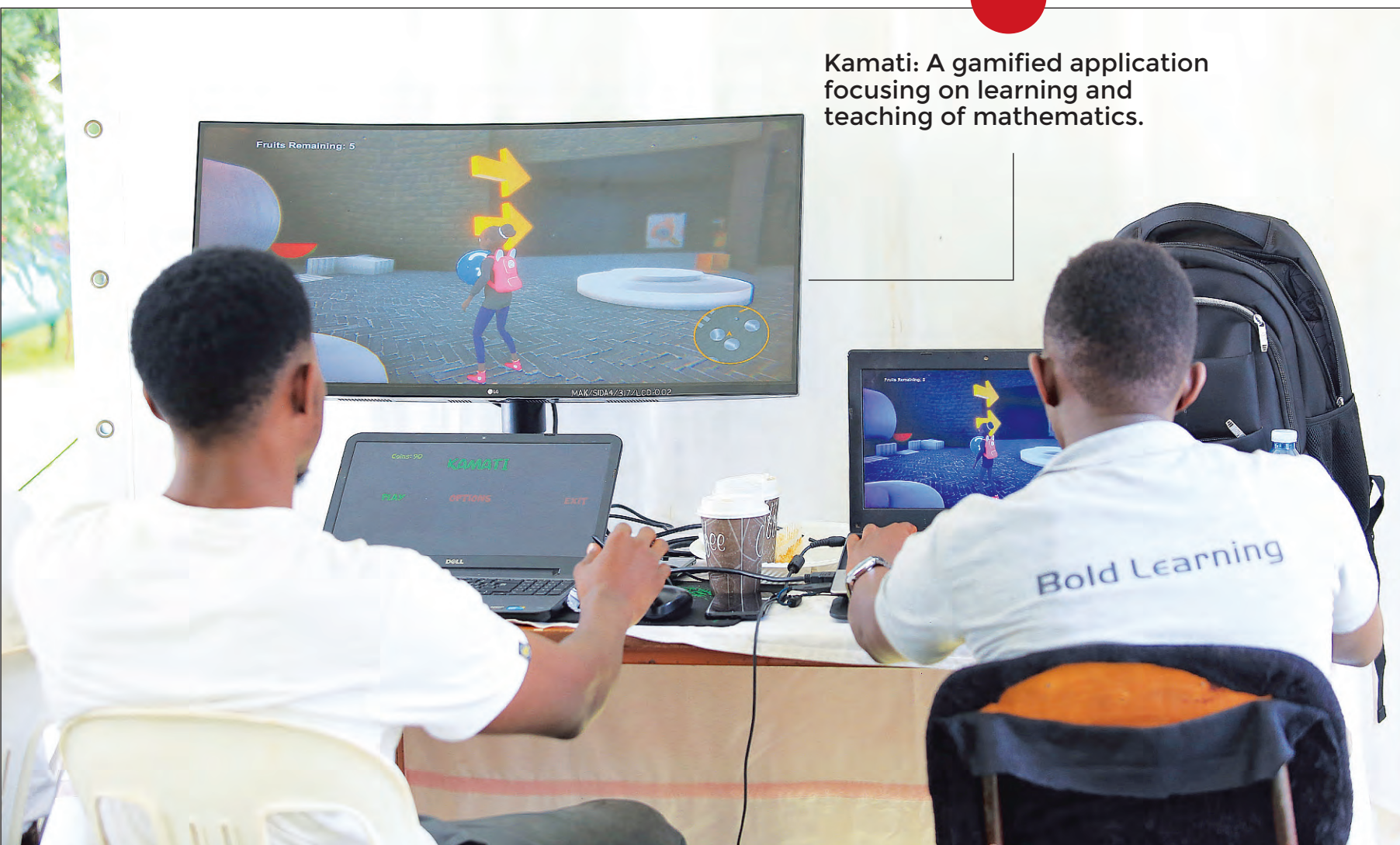
## >> 1 **Crane Cloud** *An open source multi-cloud service layer for highly available cloud-based services in Africa by Engineer Bainomugisha:*

Cloud computing when used effectively can accelerate Africa's realisation of the Sustainable Development Goals (SDGs). For instance, cloud computing can accelerate access to affordable online educational services and content, digital financial services, online agricultural extension services, and e-health services. Cloud computing is also a key enabler for the Fourth Industrial Revolution (4IR), which has been recently embraced by African countries including Uganda. The Ministry of ICT and National Guidance has identified Cloud computing as a proxy measure for a digital economy. With the 4IR, data is the new "cash crop" and cloud computing providing the necessary fertile ground for it to thrive. This project is an important and relevant step towards preparing Uganda and the continent for the 4IR. An open source multi-cloud service layer for highly available cloud-based services is now available on <http://staging.cranecloud.io> hosting a couple of sample applications. Uniquely, this server is capable of hosting Uganda's and other countries in Africa's data to avoid the need to host this data in other continents such as Europe and America.

## >> 2 **Strengthening Science, Technology, Engineering, and Mathematics (STEM) Using Gamification in Primary Schools (GamePlus)** *By Benjamin Kanagwa*

Obtaining quality education is the foundation to improving people's lives. Improving the quality of education and ensuring high quality skilled population is one of the critical game changers to realizing the demographic dividend. In order to develop a well-educated, skilled and innovative labour force, Uganda needs to address the underlying causes of the deteriorating quality of education in all institutions. This project team has built a National Gamification Portal for distributing gamified content. The portal is located on <http://mathsciencegames.com>. The first application is *Gustro Trek*, focusing on teaching and learning of the human digestive system using game mechanics, aesthetics and dynamics. They also completed and released the *Kamati*, a gamified application focusing on learning and teaching of mathematics. The third game focusing on blood circulation is under testing.





**Kamati: A gamified application focusing on learning and teaching of mathematics.**

### 3 A Mobile E- Governance Service Advisor (AMESA): A Citizen Centric Process Alignment to Public Service Delivery. By Prof. Gilbert Maiga:

Good governance characterised by citizen participation (as advocated in this project) and control of corruption is identified as a prerequisite to transform the economy to a middle income status. In Uganda's second National Development Plan (NDP 2015 – 2020), the ICT sector is mandated to provide sustainable, effective and efficient development, harnessing the utilisation of ICT to enable the country achieve its national development goals. Essentially, this project aligns with Uganda's National development framework by providing a process based model that leverages the concepts of e-governance to increase citizen participation in municipal government to enhance PSD in the sectors of education, health, water and waste management.

The AMESA system is a tool that leverages concepts of e-governance to enhance citizen participation in the delivery of public services in public health, water and waste management. System validation is on-going in Gulu and it is yet to be carried out in Mbale, Tororo, Mbarara and Jinja municipalities too. After user validation, the final system will be ready for wider use and adoption.

### 4 A Mobile Health Individualized Dietary Plan and Behavioral lifestyle tracker for Diabetes in Uganda By Alice Nandawula Mugisha

People living with diabetes Mellitus are particularly at high risk of poor health outcomes, including obesity, hypertension, dyslipidemia, "cardiac risk equivalent", and neuropathy. In Uganda, despite the adoption and effectiveness of the Nutrition, Education, Exercise,

Drugs and Self-monitoring (NEEDS) strategy in clinical settings, there are still nutrition challenges consequently impairing quality of life. Healthy eating is a primary method of treating diabetes with individual dietary plans proven to be a useful remedy against diabetes. However, appropriate nutritional treatment, implementation, and ultimate compliance with the diet plan remain some of the most vexing problems in diabetes management. This is because the differences in dietary structure based on the type of diabetes and the ever evolving plethora of dietary information available

This project has developed a state-of-the-art evidence-based, user-centered mobile application that will support diabetes management among persons living with diabetes. The Application comes with twomajor functionalities; dietary monitoring and behavioral lifestyle tracking. This application shall minimise morbidity but also ensure effective management of diabetes hence an improvement in quality of life and a reduction in mortality cases. Further scale up of the application shall entail an artificial intelligence feature to automatically recommend particular food nutrients based on one's previous diet or lifestyle.

### 5 Makerere University's e-Human Resources Management System (e-HRMS), Dr Josephine Nabukenya

The Directorate of Human Resources at Makerere University operates a manual system / paper-based system with respect to its processes from entry of a new employee to the exit of this employee. These processes are labour-intensive and paper-based records and thus, tend to produce outdated and untimely information, which affects the HR decision-making process.

Worse still, the HR processes are run by uncoordinated functional units resulting in production of diverse and duplicated records on the same type of employee. Due to the uncoordinated functions, the University is often faced with costly litigations,. The uncoordinated functions further cause losses to the university, for instance, the analysis of employees who retire or whose contracts expire are not effectively reported for the payroll adjustment in time. This often causes payment of salaries to retired and un-contracted employees. This project team has addressed this problem by successfully streamlining the records of all staff in Makerere University into a digitised online Human Resources Management System.



# Offering solutions to daily challenges

**Researchers at the College of Agricultural and Environmental Sciences (CAES) are among several beneficiaries of the Makerere University Research and Innovations Fund. According to the Principal of the College, Prof. Bernard Bashaasha, the innovation fund will go a long way in facilitating the development of innovations aimed at increasing food security and development of new markets and employment for the youth.**

## **Enhancing Value addition on Potato-Sorghum enterprises for Improved Livelihoods in Uganda (EvaPoSIL) by Prof. Johnny Mugisha**

Currently, the project team is producing carefully baked nutritious and delicious cookies made from Irish potato flour.

This project focused on enhancing physical, economic and nutrition value of potato and sorghum in Uganda with interest in the South-western region. Potato and sorghum are the region's main enterprises.

However, they compete for farm resources and in terms of household food, they are neither substitutes nor complements.

Sorghum occupies the largest farm area but is among the lowest yielding and lowest profitable crops. The variety grown (sweet) has high socio-cultural value among the population, but limited use (local drinks – *bushera* and *muramba*) and no industrial use.

Similarly, in potatoes, value addition is largely limited to consumption of fresh tubers; 92.6% as boiled potato and productivity has been declining, from 7.0 MT/ha in 2007 to 4.2 in 2017.

Furthermore, 30-40% of the output is non-marketable small size tubers; a loss of \$13.7m-\$18.3m per annum.

This cutting-edge research is adding value to Irish potatoes, providing jobs, increasing income and improving livelihoods for the communities. The project targeted small holder farmers with the purpose to increase production and productivity, reduce post-harvest losses and increase incomes of value chain actors.



## **Improving access to biodiversity data for conservation decision-making: A case of the National Biodiversity Data Bank, Makerere University, Uganda by Dr Daniel Waiswa**

Our country needs to conserve biodiversity and use natural resources rationally if they are to avoid continued environmental degradation that jeopardises sustainable development and human wellbeing.

Additionally, many government agencies cannot access or use the biodiversity data they need to make informed decisions for environmental and economic management.

It is from this research that we have coined a fully-fledged one stop data base for biodiversity data in Uganda. This research team is heavily contributing to the enhancement of tourism, economy and livelihoods in the communities. In addition, the team is ensuring that the government Civil Society Organisations and academic bodies build on existing infrastructure and work together to break down barriers to data access and sharing and mainstream biodiversity information into decision-making. These include the Uganda Wildlife Authority, Uganda Tourism Board and National Environmental Management Authority among others.



**A pedal seed cleaner**

**A pedal-operated seed cleaner (pos-cleaner) to boost post harvest grain & legume quality, increase school-study time & create financial freedom in rural Uganda by Dr Peter Tumutegyeize**

Unclean seeds and foreign materials promote mould development resulting in dry matter loss, nutritional changes, seed quality loss, aflatoxin contamination and post-harvest losses during storage and processing.

In the developing world, powered grain cleaners exist, but they are impractical in rural regions because of electricity that is either expensive or unavailable. The objective is to develop a low cost, pedal operated cleaner that is designed using readily available parts.

By preventing post-harvest losses, this pedal operated seed cleaner is contributing to revolutionising agriculture the backbone of Uganda's economy, employing 70% of the population, and contributing half of Uganda's export earnings and a quarter of the country's gross domestic product (GDP).

The seed cleaner is ready for commercialisation. Five Seed cleaner machines have been developed and preliminary test results indicate efficiency of 90%.

This is promising in that it will save a lot of time for farmers. Where they have been spending more than five hours to clean their produce, one hour will be sufficient. They will also be free from dust that was reported by over 90% of the respondents as being the source of diseases during winnowing.



### **Digitalising the Makerere University Soil Test Kit (NAK-STK) for rapid soil assessment, improved soil management, crop yields and incomes among farmers in Uganda by Dr. Emmanuel Opolot**

Declining soil fertility, together with erratic and variable rainfall resulting in droughts and dry spells, remains a serious threat to food security and poverty eradication in Uganda and sub-Saharan Africa.

Yet, Uganda's agriculture is dominated by resource poor and subsistence farmers who continue to endure unsustainable exploitation of soil resources for their livelihoods.

Accurate assessment of soil is key for its efficient use for crop production. The conventional process of soil fertility assessment involves collecting soil samples and taking them to the laboratory for analysis. Although this process produces accurate and reliable results, it remains expensive and time consuming.

The MAK-STK comes in handy to provide rapid and affordable soil fertility assessment. It is easy to use and gives soil results for five parameters (pH, Nitrogen, potassium, Phosphorus and soil organic matter) within minutes.

This digital soil test kit is enabling farmers to realise improved yields because they are now



able to identify the best soil for different crops.

This project aimed at advancing the use of MAK-STK for improved and timely access to

digital soil information, for informed soil and nutrient management for crop production.

Using the existing Uganda national soil information, and supplementing with additional soil surveys, sampling and analysis, the project will generate a digital soil database, calibrate the MAK-STK and develop a digital platform through which results from the MAK-STK are translated into valuable soil management and fertilizer recommendations currently needed by farmers and other stake-holders.

The project will improve the MAK-STK by calibrating it with laboratory measurements so as to directly translate soil test kit results into laboratory equivalence required to generate fertilizer and liming rates.

By developing the digital soil database and web-based and android application, the project aims at improving and easing access to soil information through which prompt soil management decisions can be made by farmers, agricultural extension workers and policy makers.

### **Design and development of mobile irrigation technology systems for farmers in rain constrained areas of Uganda by Dr Kivumbi Balimunsi Hussein**

Agriculture in Uganda is predominantly rain-fed and is increasingly suffering adverse effects due to climate change and variability manifested in erratic rainfall patterns, prolonged dry spells and floods.

As a result, farm-level productivity is far below the attainable potential for most crops. Under these conditions, irrigation is critical in aiding farmers in climate change adaptation and plays an integral role in transitions from subsistence to commercial farming by ensuring year-round production coupled with farm employment.

There is unreliability of food security in Uganda caused by over-reliance on rain-fed agriculture by the biggest percentage (97%) of households in Uganda. This is further exacerbated by prolonged droughts, which lead to food scarcity in the country. Introduction of Irrigation systems as per the National Irrigation Master Plan provides a solution to this problem.

This project has developed a mobile irrigation system that will help farmers who suffer with unpredictable rainfalls and those in areas which experience long drought seasons to have an all-year harvest of produce.



**A farmer drying ginger in one of the solar dryers Makerere agriculture research centre in Kabanyolo**

### **Developing an automatically controlled commercial solar-dryer and efficient resource recovery innovation for sustained market responsive fruit production in Uganda by Dr Ahamada Zziwa**

Food insecurity and poor livelihoods continue to prevail in Uganda partly due to high post-harvest losses, limited value addition options and low farm-gate prices particularly for perishable foods (FAO, 2013).

The lack of affordable preservation options contributes to over 30% postharvest losses because the majority of farmers have no access to electricity for processing and preservation and adoption of renewable energy options is still low.

Uganda being endowed with fresh fruits; this project team developed a solar dryer that is ready for commercialisation and use in the communities. The

fruits can now be effectively dried while retaining all the nutrients and maintaining their original taste and colour.

The project supported the value addition efforts of the Ministry of Agriculture, Animal Industry and Fisheries focusing on promotion of solar food drying. It also supported the Ministry of Energy and Mineral Development's efforts to promote the development and utilisation of climate resilient and renewable energy technologies.

The project will enhance utilisation of perishable food stuffs to produce value-added products including biogas and manure for sustained crop production.





**Makerere University College of Veterinary Medicine, Animal Resources and Biosecurity has embarked on developing drugs which will help to reduce the country's import bill.**

**P**rof. John David Kabasa is the Principal, College of Veterinary Medicine, Animal Resources and Biosecurity (CoVAB), Makerere University. Innovation and research are what drives the college. Kabasa says the college is positioning itself for the 21st century, by developing for the market vaccines, diagnostic tools and drugs to reduce the country's import bill.

The CoVAB team is also working to integrate digital and Artificial Intelligence in their line of work. Diseases like East Coast Fever transmitted by the brown ear tick as well as Babesiosis and Anaplasmosis transmitted by the blue tick, have become resistant to most acaricides on the local market.

To effectively manage ticks and tick-borne diseases, farmers have to dip or spray their animals with acaricides twice or thrice a week. Apparently, a litre of acaricides costs between sh150,000 and sh200,000, which rural cattle keepers and farmers cannot afford. With ticks increasingly developing resistance to acaricides, the outcry from farmers in the countryside over losses has been massive.

# Developing vaccines for mass market

These challenges have inspired researchers at CoVAB to develop vaccines to address this issue.

## Cost of ticks on economy

In a March 2020 report by the Food and Agriculture Organisation (FAO), the livestock sector contributed 9% out of the 24% total contribution of the agriculture sector to the country's Gross Domestic Product (GDP).

However, the sector is threatened by pests and diseases related to ticks, leading to an annual loss of 70% of the total \$86.3m major annual losses experienced by the country in the livestock sector.

## In numbers

**Sh200,000**

**The price of a litre of acaricide on the local market.**

## Remedy

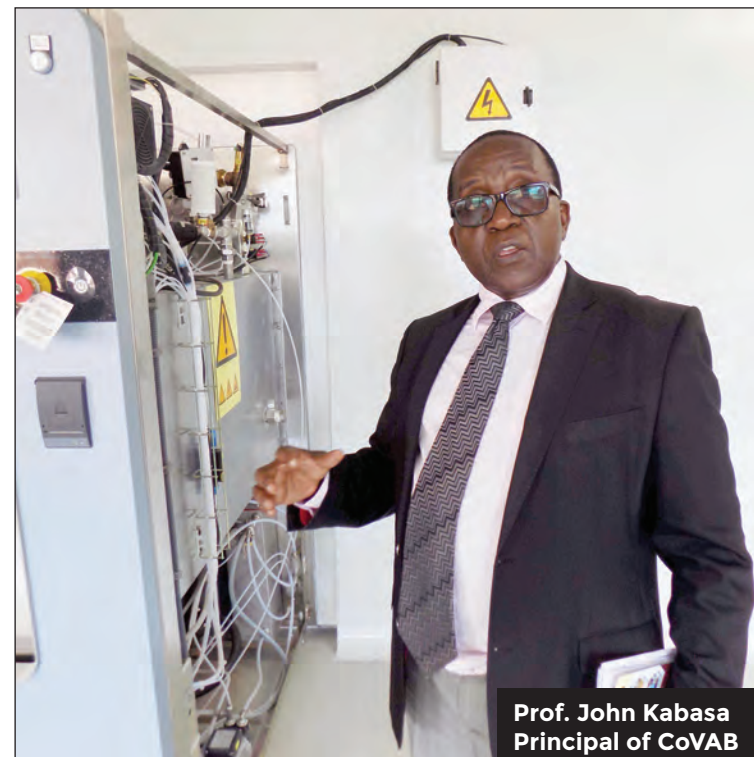
To address such losses incurred by the farmers and the country, researchers at Makerere University College of Veterinary Medicine (CoVAB), Animal Resources and Biosecurity embarked on developing alternative methods of tick and tick-borne disease control. The use of tick tissues to control ticks by immunisation has been used successfully for over 20 years in countries such as Cuba, Latin America and Australia.

The Principal Investigator, Dr. Mbulaiteye-Saimo-Kahwa, together with other scientists from CoVAB started the anti-tick vaccine development research initiative to develop an "anti-tick vaccine" that would work on the local ticks and be integrated into the control strategy of ticks and tick-borne disease.

Though anti-tick vaccines existed in Cuba and Australia, these vaccines were tailored towards ticks found in those countries and not in East Africa.

Ticks found in Uganda include the Brown ear tick (*Rhipicephalus appendiculatus*) found around the eyes and inside the ears of an animal, and is responsible for East Coast Fever





Part of the laboratory

Prof. John Kabasa  
Principal of CoVAB

which can cause up to 100% death in untreated exotic cattle.

The other ticks include the Blue tick (*Boophilus decoloratus* which can be found on the body of cattle and causes bloody urine. The tick that cause deaths in cattle, goats and sheep is locally known as *madowadowa* (*Amblyomma variegatum*) because it is coloured and transmits a disease that causes a cow to rotate around one area several times, before the it collapses and dies, Saimo-Kahwa explains.

#### Project setback

The research project, however suffered a setback due to lack of funds and only resumed in 2021, after receiving support from the Presidential Initiative Fund. The project now has land at Ngoma and clinical trials are set to be rolled out.

“We have a prototype or an anti-tick vaccine candidate which will be handed over to the manufacturer to produce in larger quantities,” Saimo-Kahwa says.

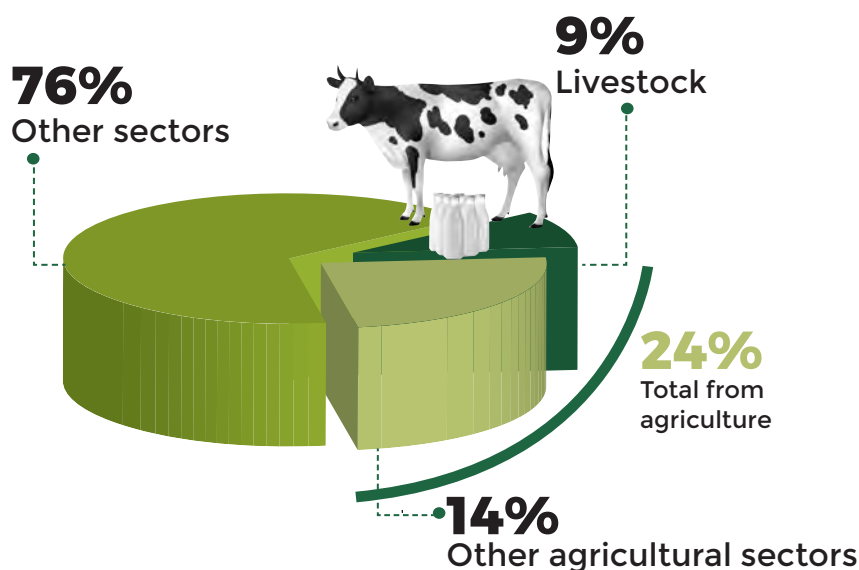
#### Finances

There is need for further funding of the clinical trial to be conducted. Brooks Gerald Musinguzi, the anti-tick project spokesperson, explained that they will need more funds because clinical trial involves different phases of trial.

The phases use increasing number of animals and looking at different parameters, under the supervision of National Drug authority (NDA) in the field before NDA can give them a license.

The process is already underway

### CONTRIBUTION TO UGANDA'S GDP



#### 70%

Tick diseases contribute this percentage of the total \$86.3m annual losses experienced by the country in the livestock sector.

#### RAY OF HOPE

The process of producing acaricides already underway once funds are released, to produce in bulk

once funds are released, to produce in bulk because already a memorandum of understanding (MOU) between Alfasan and Makerere University was signed two weeks ago and Alfasan who have dedicated a line for the anti-tick vaccine production.

Letters to NDA and other regulatory bodies including the National Agriculture Research Organisation (NARO) will be dispatched in the near

future once funds are available to start the clinical trial, Musingunzi says.

Saimo-Kahwa advises farmers to continue dipping or spraying their animals using the correct acaricide and follow the manufacturer's instructions.

She urged the Government to help farmers by supporting research into acaricides, other alternatives, herbal and TBDs vaccines for an integrated management of ticks and TBDs.

### MAK-RIF PROJECT - CoVAB

**Developing a Monitoring System for Quantifying and Mapping antibacterial used in Livestock Farming Systems in Uganda.**

The project provides a platform that will facilitate regulators such as National Drug Authority, Uganda Revenue Authority and policy makers such as Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) to have access to real-time data on antibiotics for livestock in the country.

With a click of a button on the system, one is able to access, review, record and analyze antibiotic licenses and import data to establish quantities of imported antibiotics per year.

The research team has developed an IT based monitoring system with interfaces along the value chain from importers to consumers of livestock antibiotics. They have compiled an inventory of importers, wholesalers, retailers and distributors of antibiotics used in animals, with their geo-locations.



# A new crop of intellectuals

**CHUSS focuses on research and training in critical thinking and writing**

The College of Humanities and Social Sciences (CHUSS) prides itself in being not only the largest, but also a significantly vibrant college at Makerere University.

CHUSS is a composite college made of five schools (Liberal and Performing Arts, Women and Gender, Social Sciences, Psychology and Languages, Literature and Communication) and one institute – the Makerere University Institute for Social Research (MISR) – offering over 37 academic programmes.

Over the last few years, the college has positioned itself as the champion of knowledge in the humanities and social sciences through teaching, learning and knowledge transfer, in line with the university's strategic vision as a thought leader in knowledge generation for societal development and transformation.

The college is focusing on research and training in critical thinking and writing skills, following innovative and well-enriched curricula in the various disciplines.

Prof. Josephine Ahikire, the CHUSS Principal, says key reforms have focused on research and using cohort training, in which groups of 10 to 15 students undertake PhD studies in well-structured manner.

"The arrangement has helped grow the pool of doctorates in humanities and social sciences in a short time and made the teaching and learning process more interactive and vibrant," she explains.

University lecturers at CHUSS are also encouraged to publish and actively conduct research in their respective disciplines. The college is supporting students in their early careers through fellowships that enable them to scale up their intellectual endeavors.

## Key partnerships

The college is also counting on collaboration with key partners to support doctorate students to interrogate critical subjects and contribute to intellectual discourse and



CHUSS principal Prof. Josephine Ahikire

## MAK-RIF PROJECTS

**1** Researchers from the Department of African Languages, in collaboration with public health officials, translated COVID-19 sensitisation messages into six major languages in Uganda – Luganda, Runyankore-Rukiga, Ateso, Luo, Lugbarati and Kiswahili, including Braille for the visually impaired.

**2** Another team of researchers from Makerere, in partnership with several institutions, transformed Ugandan folktales into animated films for educational and leisure purposes. The folktales include: *Njabala* (a central region adaption), *Hidden Riches* (a western Uganda adaption), *Lia and Origa* (a West Nile adaption) and *Opiyo and Odongo* (an eastern Uganda adaption). The objectives of the project included generating cultural content relevant for the educational and recreational needs of Ugandan youth.

**3** A team of researchers documented the immediate consequences of COVID-19 on four urban areas in Kampala – Katanga, Kikoni, Kivulu and Kisenyi. The team also trained 60 local leaders in slums around Kampala in conflict resolution.

**4** Students from the college cleaned different areas in Mukono Town, including the taxi park, Mukono Police Station, Mukono Hospital and the trading centre on February 29, 2020. The students also sensitised residents on the dangers of poor hygiene and sanitation and visited the sick in Mukono Hospital. Such activities help students to connect with the community and be part of future solutions.



Prof. Sr Dominica Dipio displays 'Hidden Riches' animation

## PLANS

The college has increased possibilities of publishing work produced by reviving the Mawazo Journal, a college journal focusing on humanities and social sciences.

Plans are underway to have the journal supported through the college budget. This way, it will cease to be a donor-funded undertaking to encourage academics to write about things that are relevant to the nation.

"Most journals outside Uganda that write about us tend to use a condescending tone. In the spirit of decolonisation, we want to emphasise local content and knowledge as defined by Africans themselves," Ahikire says.

The college is also strengthening graduate training, eliminating bureaucratic delays and promoting group research, which fosters peer learning.

solutions to societal challenges.

Over the years, CHUSS has established solid partnership with key stakeholders such as Andrew Mellon Foundation (New York) which has funded five projects.

In 2017, the Gerda Henkel Stiftung in Germany signed an agreement with the College to support PhD training under the Inter-disciplinary PhD by Research Programme in Historical Humanities and Humanistic Social Sciences. The Foundation has supported PhD training of 30 members of staff and students.

In 2020, the Foundation committed to support 60 PhD fellows for the next six years.

In 2020, the President of the Andrew W. Mellon Foundation, Dr Elizabeth Alexander and the Chief of Staff and Programme Advisor at the Foundation, Julie B. Ehrlich, visited Makerere to establish mechanisms for further strengthening the Foundation projects.

According to Ahikire, the support has greatly increased academic rigour and vibrancy of the college, grooming what she describes as 'quotable intellectuals'. This has raised the profile of the college, with students writing more and participating in conferences globally.