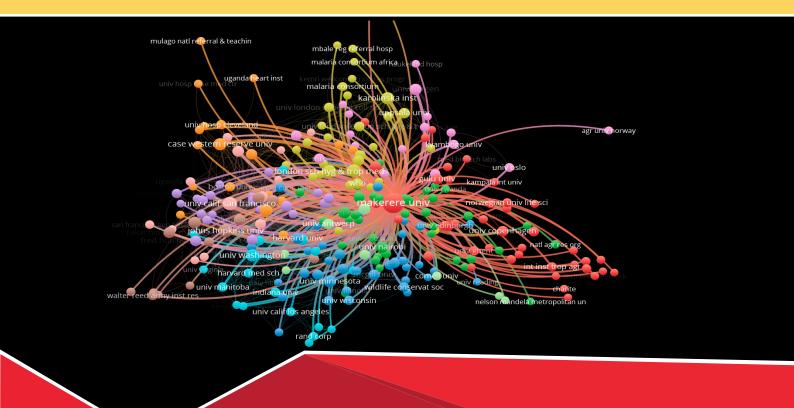


Directorate of Quality Assurance

Becoming a Learner Centered
Research Led University



The Impact of Swedish Research Collaboration with Makerere University, Uganda (2000-2020)















About the cover pages and research network graphs

The pictures on the covers as well as on pages 25, 26, 27 and 28 were generated by VOSviewer, a software developed at Leiden University's Centre for Science and Technology Studies. This sofware is a very useful tool for mapping and visualizing science. From the research data available in the Web of Science database collaboration data is derived to know the institutions that Makerere University has done research with. Other graphs on pages 25-28 show the topics in the research as well the individuals that have done that research.



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The Impact of Swedish Research Collaboration with Makerere University, Uganda (2000-2020)

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Table of Contents

Foreword	2
SIDA: The Biggest Staff Development Programme On The African Continent.	2
Impact of The Sida Support	2
Message from the Director Research and Graduate Training	5
Introduction	10
Background to The Research Funding - A Situation Analysis of	
Makerere University In 2000.	13
Makerere University's Development Strategy 2000-2005	13
Overall Strategy Structure	13
The Year 2000 List of Priorities	13
Costs and Funding of The University's Expansion	15
Gender Mainstreaming	15
Planning for 2000-2005	16
Research In 2000	16
The Change	18
A Decade of Change	18
Interview with Prof. Barnabas Nawangwe, Makerere Vice Chancellor	30
The first phase of SIDA Support	31
Enhancing uptake of Research findings	32
Challenges of brain drain	34
Interview With Prof. Eli Katunguka, Vice Chancellor Kyambogo University	35
Impact of the four phases of the SIDA support	35
Research and its uptake	37
Sida transforms Kyambogo University	61
Phasing out the sida support: the need for a research agency	62
From nothing to Vice Chancellor	62
Embarking On Research on Infectious Diseases in Children	73
The Research Results In Relation To Finding Better Treatment	74
Understanding The Dynamics Of Research Collaborations	75
Other Collaborations and Spin-offs.	77
Inter-University Partnership For SIDA Continuity	77
Advice to Young Academics	79
Pioneering Research At Busitema University	49
Impact of SIDA Support to Busitema University	49
Thoughts As Sida Phases Out	51
Why i Believed in The SIDA Collaboration at Makerere University	53
Continuing Research After SIDA	54
Research Uptake	55 EE
Timely Boost To Phds in Technology	55
Phd Training	55



Promotions	57
Attracting Grants	57
Mapronano Ace Ii	57
Enriching Engineering Education Project	57
Thoughts As Sida Phases Out	58
Mobilizing Stakeholders, Industry, Alumni	58
Applying For Grants	58
Working With Artisans/Small-Scale Industries	58
An Outstanding Partnership With Phenomenal Results	60
Impacts	60
Sustainability	62
Government or Makerere Fostering Further Sustainability	62
Partnerships Arising from SIDA Collaboration	63
What Can Be Done Better?	64
Building Capacity In Urban Crop Waste Management	65
Introduction of an Opponent	67
Phd Public Presentation	68
Banning Buveera	68
Legalizing Urban Agriculture	69
Creating Value Chains	70
Centre of Excellence in Waste Management in The East African Region	70
Product Development	71
Climate Change	71
Enhancing Gender Equity And Research	73
Impact of SIDA on Gender Mainstreaming on PPUs	74
State of Gender	76
Nurturing Research in Maternal, Neonatal and Child Health	80
Collaborations	80
Reduction In Child Mortality	81
Mentorship	83
Spinoffs	83
The Springboard to Attracting a Centre of Excellence - Mapronano	86
Mapronano ACE II	87
Diesel Engine	87
Health-Focused Innovations	88
Drinking Water Test Kits	88
Classical Mechanical Cure Of Hiv/Aids	88
Cancer Treatment Using Contrast Agents	89
SIDA GIS Centre Creates Regional Impact	90
The Start: Meet Dr. Mazzi	90
About The GIS Centre	91
The Demographic Surveillance Site	92

To The Ladies:	92
SIHI: Improving Access to Health Care	93
Impact of Sida Support	94
Spinoffs	95
Transformed For Life	95
Bridging the Gap Between Science and Indigenous Knowledge	96
How SIDA Support Has Benefited Me	96
How i came up with my Phd Topic	96
Challenges	97
Activities	98
Milking of Venom	98
Epilogue: Creating a Regime of Quality Assurance at Makerere University	104
Directorate of Quality Assurance, Makerere University	104
Introduction	104
Background	105
Objectives of the Quality Assurance Component of the Government	
of Sweden Funded Bilateral Research Program (2015-2020);	105
Key Activities for Specific Objectives	105
Key Activities In The Period 2015-2020	107
Implementation of Self-Assessment Exercises	107
Tracer Studies	107
Review of Curriculum	108
SECAT: Student Evaluation of course and teaching	108
Training of Graduate Supervisors	108
Key sustainability considerations for the Quality Assurance program	109
The Course on Graduate Supervision and Mentoring at Makerere University	113
Justification for Graduate Supervisors Training in Uganda Universities	114
Motivation For Graduate Supervisors Training At Makerere	115
Collaboration on Supervisors Training Between Uganda Public Universities	
and Selected Swedish Universities	115
Objectives For The Phd Supervision And Mentoring Course	116
Course Objectives	116
Course Design For Graduate Supervision & Mentoring Instruction	116
Philosophy Policy & Plan Of Supervision	117



List of Abbreviations

ACBF Association of African Universities
ACBF African Capacity Building Foundation

ADB African Development Bank

AIDS Acquired ImmunoDeficiency Syndrome

CAES College of Agricultural and Environmental SciencesCoCIS College of Computing and Information Sciences

CBR Centre for Basic Research

CEDAT College of Engineering, Design, Art and Technology

CHS College of Health Sciences

CHUSS College of Humanities and Social Sciences

COVAB College of Veterinary Medicine, Animal Resources and Biosecurity

DICTS Directorate for ICT Support

DWGS Department of Women and Gender Studies

HIV Human Immunodeficiency Virus

IHCAR Division of Global Health at Karolinska InstitutetICT Information and Communication Technologies

MISR Makerere Institute of Social Research
MNCH Maternal Newborn and Child Health

MUARIK Makerere University Agricultural Research Institute Kabanyolo

MUST Mbarara University of Science and TechnologyNARO National Agricultural Research Organisation

R&D Research and Development

SAREC Swedish Agency for Research Cooperation

SEK Swedish Krona

SGS School of Graduate StudiesSOP Standard Operating Procedure

UGX Ugandan Shillings

UNICEF United Nations Children's Fund

USD United States Dollars

Sida Swedish International Development Cooperation Agency

UPE Universal Primary Education

USAID United States Agency for International Development

VC Vice Chancellor



Foreword

Foreword

Sida: The biggest staff development programme on the African continent.



In 1998, a young African lady, Hannah Akuffo, came to the Faculty of Technology, Makerere University. I was then Head of the Department of Architecture and Dr. Badru Kiggundu was the Faculty Dean. Hannah had come to see the Vice Chancellor, who was not in office at the time, and she was referred to us. She came from Sweden; although she is originally from Ghana. She wanted to know if we were interested in conducting research. This is how we got introduced to Sida.

Hannah explained that Sida, and specifically its research arm SAREC, was set up to fund research in public universities. We expressed interest and agreed to visit Sweden. SAREC was interested in linking Makerere to Swedish Universities to facilitate joint research and training of students. We also made arrangements for Hannah to meet the then Vice Chancellor, Prof. John Ssebuwufu. He too welcomed the idea of Makerere University collaborating with SAREC in research and, in October 1998, Dr. Kiggundu and I were officially invited to visit Sweden.

We met two professors to discuss the modalities of our collaboration. One of them was Prof. Vestbro Dick from the School of Architecture and the other was from Civil Engineering. Unfortunately, Prof. Vestbro passed on in July 2019. Although they were a bit skeptical, the reception was not bad. One of

them said, "Research in Uganda? What research are you going to be doing? You want to begin graduate programmes, including PhDs?" The civil engineers asked Dr. Kiggundu, "So we are going to train PhDs in what? In civil engineering?"

However, Prof. Vestbro was a little bit more open. He had previously worked in Africa, having conducted his PhD research in Dar es Salaam and lived in their slums. As the discussion



progressed into the respective research that had been done by most of us in the room, the professor from Civil Engineering started to have a change of mind too. We later met Hannah and the leadership of SAREC and everybody was convinced that things could move. Sida was then born at Makerere University.

Impact of the Sida support

Sida is the biggest programme in staff development and research that Makerere has ever had in its entire history. It has given a big push to Makerere University as Uganda recovers from years of political turmoil. As you may be aware, some professors fled into exile during the political turbulence. As a result, it is alleged that certain people were made professors to fill the gaps left by those who fled. These were derogatorily referred to as Economic War Professors; but what is more significant is that those staff members who remained here during the political turmoil kept Makerere running. And it is their individual and collective sacrifices that kept the university running and we did not collapse. They did a commendable job.

Nevertheless, even the so-called economic war professors were very few and they were getting aged. We therefore had a new problem in Makerere of a few professors who were already due for retirement and very many young people. There was a very big gap between professors and the young assistant lecturers. There were no senior lecturers or associate professors and even the lecturers were few.

So, the university had to address this problem and Sida came in at the right time. Since inception, Sida has trained over 260 PhDs and very many at masters level too for this university. I think by the time the program ends next year, we will have trained 450 PhDs under Sida. That is the biggest-ever academic staff development program anywhere on the African continent. Sida is also credited with the fact that Makerere is one of the universities on the African continent with high quality academic staff. At the moment we have about 825 of the country's 1,300 PhDs here at Makerere. More than 60% of our staff now have PhDs. By the end of the program, 80% of our staff will have PhDs and everybody else will have a Masters. Sida has made a huge contribution to reviving and pushing Makerere higher.

We produce 3% of all the research publications in Africa. We are also ranked very highly by the Times Higher Education Index in the aspects of quality research and training. This would not have been possible without the Sida support. Of course, we must acknowledge the other development agencies which also came in to support us.

Before Sida came, NORAD was here. The Rockefeller Foundation and the Carnegie Corporation were here too; however, they were not supporting us to the level that Sida has done. So we

cannot thank Sida, the Swedish government and the Swedish People enough for this very generous support. We are sincerely grateful.

As a university and as a country, the vital next question is: What we are doing with the big capacity that Sida has created? We have crafted a new 10-year strategic plan, which projects Makerere as a research-intensive university. At the moment 50% of the research output comes out of the College of Health Sciences, while the College of Agricultural and Environmental Sciences contributes another 25%. This implies that only two of our ten colleges account for 75% of all the research output. We therefore want to make use of this potential developed through Sida to enhance research in the eight remaining colleges.

I am pleased that the Government of Uganda has responded to Sida's pronouncement on phasing out its funding to Makerere University. The government is giving us UGX30billion (equivalent to USD8million) annually, dedicated to research. The university, however, needs more than USD26million (an average of USD20,000 per academic staff) to sustain a vibrant research environment.

All the people that have gone through Sida have got a big responsibility. They should not think that they were supported just for the sake of getting a promotion at work. They must put that knowledge to good use and make sure that this country and continent are free from poverty.

Prof. Barnabas Nawangwe

Vice Chancellor Makerere University



Message from the Director Research and

Graduate Training



Prof. Buyinza Mukadasi, Overall Programme Coordinator Makerere University

The Government of Sweden has supported research at Makerere University through the bilateral research programme since 2000. The current phase of the cooperation agreement has been expanded to include five universities namely, Makerere, Kyambogo, Busitema, Gulu and Mbarara University of Science and Technology.

To-date there have been three consecutive research agreement periods, Phase I (2002-2005), Phase II (2005-2009), Phase III (2010-June 2015) and, currently, Phase IV (2015-2020) with a total support of SEK 756 million (USD100 million). The overall goal of the programme has been to enhance the capacity of public higher education institutions to conduct and sustain strategic and high quality research that will contribute to the development needs of Uganda

and beyond through building a critical mass of independent researchers.

Makerere University and Uganda in general have enjoyed and continue to benefit from the generosity of the Royal Government of Sweden in the areas of human resources capacity building, research, library services/information technology and infrastructural development. This support has been monumental and critical to the realisation of our core functions of teaching and learning, research and innovations, and partnerships and networking. A good number of our staff has received PhD training through Sida funding. I am happy to share that that since 2000 when the cooperation began, over 300 staff have completed PhDs and over 200 have completed masters degrees.

Impacts

The support has greatly improved the research culture of the University. Many proposals are now being funded both in the basic and social sciences and publications have greatly increased. This achievement is partly due to the support from Sida. This support has also contributed to the enhancement of centres of excellence in waste management, health systems research, and renewable energy research, among others.

Together with other development partners, we have been able to improve library services. The library provides up-to-date information, not only to Makerere University but also to the entire country. Internet services have greatly improved throughout the whole university. I invite you to visit our Library as well as other facilities. Makerere University has been able to establish strong collaborations with leading universities, including those from Sweden. We have learnt best practices from these universities and we have also benefited from joint supervision, which has ensured high quality of our graduates.

It is heartwarming to report that the programme has invested heavily in training the University staff to PhD level, in addition to the improvement of research environment. The support has been in the form of graduate research training at PhD and Masters levels, support to supervisors to link with their counterparts in Sweden, conference attendance by PhD students and supervisors, faculty research funds, Independent universitywide research funds, establishment of a Demographic Surveillance Site (DSS) in Iganga and Mayuge districts, Geographical Information System (GIS) lab, Support to Cross Cutting Biomedical Laboratory, ICT Infrastructure development as well as Library resources and Services.

Over the last decade, there has been a surge in research outputs and innovation at Makerere University. This is demonstrated by the increasing number of grants being won by both individuals and research teams; the number of research collaborations with leading research universities worldwide evident from the increasing number of Memoranda of Understanding (MoUs) and research agreements entered into with Makerere University. The University continues to register successes in mobilizing research funds from development partners to support the execution of her institutional development agenda. Sida support has targeted



research and capacity building universitywide in the humanities and social sciences, science-based disciplines, as well as the Library, ICT, Gender Mainstreaming Department and Quality Assurance Division as key cross-cutting themes in all University functions.

Evidently, the research capacity at partner Ugandan Universities has been strengthened; the numbers of researchers with doctoral degrees have increased and national PhD programs have been established. In general, there is still a long way to go to reach the goal of becoming research universities even though some faculties and departments have made great strides towards reaching this goal. The programme will phase out after June 2020. Therefore, it is time to plan how we can strengthen research capacity even more and build strong research environments at the departments.

The program has made phenomenal achievements including the academic, economic and societal impact. With Swedish funding, Makerere University has demonstrated her strong track record in addressing core research issues that impact on our society. In this report, you will find excellent examples of impacts that have already been achieved from research. The program has made good academic impact as demonstrated by the contribution that excellent research has made to scientific advances across and within disciplines. This includes significant advances in understanding, method, theory and application as well as economic and societal impact.

Makerere's research is in addition making an impact in a wide range of areas, for example, through the delivery of cutting-edge technology to support the national economy, addressing the challenges of food security and climate change, and in bringing communities closer together through improved parenting programs.

Connecting with Research Beneficiaries

This report also provides insight into how Makerere University and its partner Uganda public Universities are engaging with research end-users, such as industry, and showcases the social, economic, environmental and cultural benefits arising from university research. Furthermore, it examines how the Swedish government has supported Ugandan researchers to engage with the beneficiaries of their research. There are positive results here too and Ugandan universities and researchers have proactively collaborated with industry, disseminated research findings to the wider public, and provided support for infrastructure and technology to enable academic research to be translated into tangible, real-world benefits.

This report assures and helps to build public confidence that Makerere University is conducting research that is in their interests. The information contained in the report allows us to see and better understand the strengths of Makerere University. In this vein, I encourage the entire university sector to look to those good performers for ideas on how to identify the best ways to engage industry, community and policy makers with their research. Such an approach will only help ensure that local community more broadly achieves the maximum return on

the extensive investment in our universities.

Reflection and Action

In conclusion, this report provides us with an opportunity to reflect on the Makerere's successes and strengths. However, innovation, by its nature, never stays still. The time is right to reflect on what our innovation system should look like in the next decade if we are to retain our position as one of the world's leading innovators and build upon the economic recovery. Therefore this report represents the start of a process culminating in a fresh long-term strategy for science and innovation that will deliver the SDGs, Uganda's Vision 2040, Agenda 2030, National Development Plan III, and African Union Agenda 2063.

We look forward to hearing your views and working with you to realise our vision, as "We Build For the Future"

Buyinza Mukadasi

Professor and Director



Introduction

Introduction

The Makerere University research capacity building program supported by Sida started in 2000 running three phases to 2015 followed by the ongoing phase (Phase IV, 2015-2020). This funding has targeted the creation of research capacity and environment for Makerere University through training at Masters, PhDs and Post Doctorate levels; joint research activities among collaborating partners in Uganda and Sweden; Support to institutional reforms; infrastructural support: (ICTs and Library); Iganga-Mayuge Demographic Surveillance Site; Gender Mainstreaming and Quality Assurance.

Tremendous achievements have been registered involving the creation of an environment conducive to high-quality relevant research. Over 300 PhDs (over 30% of all the current PhDs at the university) have been trained to completion since the start of the program in 2000. The current phase has targeted training another 125 PhDs including 90 from participating public universities in Uganda (Kyambogo University, Mbarara University of Science and Technology - MUST, Gulu University and Busitema University). Curriculum for taught PhD has been developed in Mathematics at Makerere University and 20 students are registered on this curriculum. Other taught PhD curriculum has been supported in three colleges at Makerere University and all participating public universities. More than 200 supervisors at Makerere University and participating public universities have undergone training in quality supervision.

The publication profile of the university has greatly improved during the period of support from 72 in 2001 to over 382 in 2011 publications per year (Bunting et al. 2014). The current output is at more than 1000 publications as per citation indices. Most of the research considered in international citation databases is of very high impact. In addition to improved publication output, the PhD output has greatly improved from less than 20 PhDs graduating per year in 2000 to more than 70 PhDs graduating each year as of 2018. Of most significance in relation to knowledge generation is the tremendous networks that got ignited for the institution. The university is among the top 100 universities in the world in terms of connectivity with other top institutions, according to scimago (an agency that aggregates science evaluation resources).

In terms of equity, the Sida support targeted gender mainstreaming in the institution. This support to gender has moved the terrain to near level in students' enrolment and generated some significant variation in staff ranks. In addition, the support to gender has spurred interest from other agencies like the Carnegie Corporation of New York and the MasterCard Foundation who have offered scholarships targeting female students.



Infrastructural support to the University Library, Information and Communication Technology (ICT) and the Iganga Mayuge Demographic Surveillance Site have generated multiplicative benefits that will make it easy for future increments in the intervention. Some of the infrastructure and equipment to this end is available for use by other people inclined to the purpose of these establishments. For instance the university library is the National Referral Library and National Legal Repository.

The collegiate system at Makerere University was developed as a result of a reform process that was supported in the third phase of the Sida funding. The reforms in Research, Administration and Finance saw the development of the University's Organizational Manual as well her Research Manual. These documents guide all officers of the university in ensuring the provision of quality services to her stakeholders especially students at the university. The quality assurance regime at the university has been greatly impacted with the institutionalization of mechanisms to support compliance to national standards as well international practices. Such mechanisms include self-assessment, tracer studies, tracking of graduate students and student evaluation of courses and teaching. Support in the current phase has seen the inauguration of the University Press with 6 inaugural books in 2019. The Sida support has generated benefits that, in the university's consideration, are beyond what could be expected in such a small span of time. The base for illuminating on this view is from the aspirations that university had in the year 2000 at a time when it was developing its strategic plan for the period 2000-2005. An assessment of the prevailing situation at the time of planning clearly indicated the state of affairs that university wanted to overcome; especially the state of research and that of infrastructure.

However, despite the tremendous achievements outlined in this report, there are still some areas that call for more work, and therefore it is still a work in progress. Of significance are: delays in completion rates of PhD training, an imbalance in funding between the humanities and science based disciplines, inadequate incentives for research and the infancy of partnerships in participating public universities. The inclusion of other participating public universities came towards the second half of the period of review, with inadequate intensity of activities. The collaboration with these universities mainly centred around PhD training, and yet insufficient capacity has been built in these universities as the project winds up. This then raises a level of uncertainty on how these universities will continue on their own in strengthening this training.

That notwithstanding, the impact of Sida is perhaps best told by some of the beneficiaries in explaining how this support has transformed them at both a personal and institutional level. Some of these beneficiaries have gone on to hold leadership positions such as becoming Vice

Chancellors; Prof. Barnabas Nawangwe - Makerere University, Prof. Celestino Obua - MUST, Prof. Eli Katunguka - Kyambogo University and Prof. Paul Waako - Busitema University. This partnership successfully brought these Vice Chancellors and consequently their universities to work together towards enhancing research capacity in Uganda. This publication brings you their voices. In addition are the voices of other beneficiaries including College Principals and Heads of Department.



Background to the Research Funding - a situation analysis of Makerere University in 2000.

Makerere University's Development Strategy 2000-2005

Overall Strategy Structure

Makerere University needed to develop its capacity and performance in order to meet changing demands and increasing challenges and competition.

Main considerations:

The University's institutional development involved a broad range of strategies and activities, from developing Information and Communication Technology (ICT) and physical infrastructure to restructuring the staff. The aim was to expand and sustain the University's overall capacity and performance;

A strengthened University with results ranging from quality graduates in sufficient numbers to impactful research, extension and consulting services, and Makerere University playing an influential role in developing public policy and making significant contributions towards sustainable and equitable social, economic and technological development in Uganda; Major governing parameters for the planning of the University's long term development were: the significant expected growth in student enrolment; the national requirement for building a critical mass in Science and Technology, Research and Development, and human resources; A crucial aspect of the process was the funding of the University's operations and expansion, where the university increasingly derived income from fee-paying students.

The year 2000 List of Priorities

The University pursued a balanced development of its capacity and performance in order to be able to respond to changing demands of the environment. However, due to shortages of resources and the University's critical reflection of the nation's needs, the University laid emphasis on the following prioritised areas:

- (1) Information and Communication Technology;
- (2) Library Services;
- (3) Research;
- (4) Science Based Disciplines
 Agriculture and Livestock Management
 Health Sciences
 Science and Technology
 Environment and Nature Conservation
- (5) Good Governance and Human Rights;

(6) Gender Mainstreaming.

Main Strategic Aspects

Transformation of The University Delivery System

Makerere University in 2000 considered itself a university in transition in a number of aspects. Driven by the 1992 Government of Uganda Education White Paper and national policies of liberalisation, privatisation and decentralization. The university had undergone radical changes in financing and operations.

Up to 1991, Makerere University relied 100% on Government funding for both tuition and living expenses for all its students. In addition, buildings were inadequate and in a sorry state of disrepair and staff were grossly underpaid. In the meantime, the demand for University places far outstripped the available places (only about 22% of the qualifying students got admitted to University). Since 1992, the University had been admitting fee-paying students in addition to Government students.

Within less than 10 years, Makerere University student population had expanded from 6,352 in 1990/91 to 22,000 in 1999/2000. The percentage of private students had grown from 5% in 1992/93 to 80% in 1999/2000 of the total student population. This expansion necessitated a set of structural adjustments encompassing management and academic operations. The University had just transformed the academic from the traditional term system to a more flexible semester arrangement. It had also introduced several new programmes and the whole curriculum in the traditional subjects had been overhauled.

In the area of management, the most visible change was the devolution and decentralisation of powers, which accompanied the faculty retention of more than 50% of income generated (this grew from 12.7% in 1994/95 to 40% in 1999/2000 of the total University budget). This had enabled the University to improve staff welfare as well as administrative processes, carry out the badly needed rehabilitation and expand space through the construction of new buildings.

Challenges of Growth

The transformation of Makerere University over the years leading up to the planning time had not been without challenges. While liberalisation of higher education improved access, it had aggravated inequity. Secondly, the generation of income had not been uniform. Laboratory-based faculties did not generate as much as the humanities. Thirdly, the large student numbers were beginning to put a strain on management and instruction.





Science-based disciplines had been afflicted with inadequacy of laboratory facilities and the difficulty of conducting experiments and fieldwork if they expanded student enrollment or mounted evening courses in order to increase income generation. They had also been confronted with constraints affecting demand such as high costs of science courses, which could not be afforded by the majority of Ugandans.

Costs and Funding of The University's Expansion

The funding situation of the University in 1999/2000 was that UGX38Bn was available for operations; the Government provided UGX23Bn and UGX15Bn came from private sources. The annual expenditure was therefore on average UGX1.8M, or USD 1,000 per student per year. This funding could not allow for adequate investment in capacity increase, such as space expansion, basic equipment, ICT development and increased number of lecturers.

Gender Mainstreaming

The growing graduate unemployment and persistent public demand to relate higher education to the world of work had been one of Makerere University's concerns for quite some time. A series of graduate surveys and those on human resource needs in specific sectors had been conducted. With Rockefeller Foundation support a comprehensive human resource need for decentralised district service delivery had been carried out. The Planning and Development Department with support from Makerere University and also under the Higher Education Management Programme organised by the Association of African Universities (AAU), undertook two tracer studies of graduates in Uganda. These studies revealed that there was still a need for more and better-trained graduates. There was a mismatch in the number of graduates trained in various fields with the needs of the world of work. There were critical shortages in technical fields such as engineering, agriculture and surveying. The graduates of Makerere University were well-grounded in theory but fell short in some practical job requirements.

Sida / SAREC Support for Research Activities

Makerere University/Sida bilateral research collaboration with the theme, Lake Victoria and other water sources had started by the year 2000 supporting the University had made a deliberate effort to make University research relevant to the needs of society. Research activities on health, waste management, social economic and political changes, technological aspects and environmental concerns based on the faculties of Medicine, Social Sciences, Technology and Agriculture were being supported under this program. The program ran from September 2000 to December 2001 aiming at establishing a linkage between Senior Research Scientists in Makerere University and Swedish Universities and build capacity of Makerere University researchers. The program worth SEK 15,000,000 also introduced cross-cutting courses for PhD students, established a functioning laboratory structure and developed cross cutting courses

to support research administration and ICT and offer bibliographic support.

Information and Communications Technology Strategy

Even though explosive advancement of Information and Communications Technology (ICT) in the world had already started driving operations of universities around the world, Makerere University was yet to experience this transformation. Most departments in the University, both academic and administrative, depended on manual systems with minimal use of computers in admission and registration, examinations, students' records, finance and accounting, estates, library management, personnel, office systems, etc. In addition, e-mail use and Internet access was minimal. The lack of modern computer systems made it very difficult for the various sections of the university to cope.

By the year 2000 the University had started the process of developing and implementing an ICT Policy and ICT Master Plan to provide a framework within which administrative departments would increase their ICT capacity and utilization. The university initiated strategies that would enable all departments, institutes, faculties and schools to acquire computers, set up Local Area Networks, support technical assistance and the training of staff. In addition, the university planned for having activities coordinated by a central unit with the necessary support systems.

Planning for 2000-2005

During the planning period 2000/01- 2004/05 the University resolved to focus on the following strategic areas: Teaching and Learning, Research, Extension and Consulting Services, Organization and Management, Human Resource Development and the development of Physical Infrastructure.

Research in 2000

Research was recognised as one of the core functions of Makerere University with further recognition that utilisation of research findings propels national development. However, research at the University was seen to be characterized by inadequate infrastructure and output constraining the development of the university's full research potential. There was a need therefore to strengthen the coordination of research activities, to enhance research skills among staff, and to put in place mechanisms for dissemination and utilisation of research results.

To strengthen research coordination and evaluation, the university planned to establish a policy for research coordination; strengthen the School of Postgraduate Studies, MISR and other research units at Makerere University; facilitate research productivity by staff and





students; improve research funding; develop a research manual including gender and ethics guidelines; develop and regularly update research activity database;

To Increase the utilisation of research results the university planned to strengthen mechanisms of research dissemination; strengthen linkages with research users; publish a newsletter or journal for every faculty; intensify applied research in health and the productive sector; put in place a research agenda based on the identified priority areas; integrate gender concerns in research priorities; institute awards for relevant and successful research; and strengthen the Makerere University Press.

To enhance the quality and perspective of research, the university planned to facilitate linkages with integrated researchers and organisations; establish and strengthen linkages with local functional research centers; and strengthen research infrastructure capacity.

Organisation and Management

Makerere realized that it had been undergoing rapid expansion and complexity in terms of staffing, student enrolment, putting stress on the existing organisation, its management and administration mechanisms. At the same time, an increasing number of institutions of higher learning were seen to be posing competition. The university considered harnessing ICT for better and efficient teaching, learning and research, management and administration.

The university planned to restructure the organisation; support the establishment and development of constituent colleges; establish and enforce a clear ICT policy and master plan; facilitate ICT capacity expansion (network, systems, support services); Fully computerise the University's administrative systems; as well as integrate ICT in teaching, learning, research and services. In addition, the university planned to reinforce gender mainstreaming in administration and management; increase the proportion of women in the staff base; update financial and personnel policies and regulations for gender sensitivity; effect gender-sensitive staff recruitment and retention mechanisms; incorporate gender sensitivity in Management Information Systems; develop and implement guidelines for incorporating gender into different University functions; and increase accommodation for female students in order to promote their opportunities for higher education.

In addition to the above strategies, the university planned to support the development of staff capacity and scaling up of its physical infrastructure. With all this in the background the university sought support from its development partners to move forward its development agenda.

The Change

Support from Sida to Makerere University for collaboration with Swedish universities to build research capacity in Uganda started in 2000. The assumption was that: "Well-trained researchers can pose and pursue questions relevant for poverty reduction, national development in many sectors of the society, and enhanced standard of living."

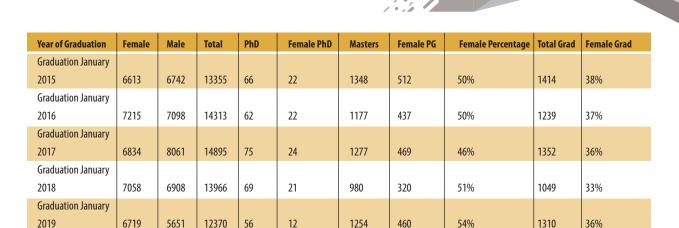
This collaboration began with a theme to enhance the impact of the research "Lake Victoria and other water resources"; and with a slogan: "to support the supervisor to supervise".

A Decade of Change

- 1. Salaries for professors: The most visible and comprehensive change is the salaries of professors at Makerere University that rose from USD 1,000 per month for Full Professors to slightly above USD 2,000 per month. Even though the push for this increment came from various players, the narrative for the forces is embedded in the tremendous changes in capacity of the university as well as the productivity that ensued for the realization of the role of the university in the country's economic development endeavors;
- 2. The number of PhD holders among the staff at Makerere University has increased more than threefold over the period of intervention from 225 in 2000 to 825 in 2019. The PhD productivity from the university increased from 6 PhDs in 2008 peaking at 75 PhDs in 2017;

The graduation trends at Makerere University 2008-2019

Year of Graduation	Female	Male	Total	PhD	Female PhD	Masters	Female PG	Female Percentage	Total Grad	Female Grad
Gradation January										
2008	2502	2864	5366	6				47%	6	0%
Graduation January										
2009	5698	6648	12346	30				46%	30	0%
Graduation January										
2010	6936	6830	13766	39	9	1249	489	50%	1288	39%
Graduation January										
2011	6495	6801	13296	46	11	1106	405	49%	1152	36%
Graduation January										
2012	5149	5873	11022	42	14	1032	386	47%	1074	37%
Graduation January										
2013	5641	6340	11981	60	11	1320	493	47%	1380	37%
Graduation January										
2014	6341	6274	12615	51	11	1196	460	50%	1247	38%

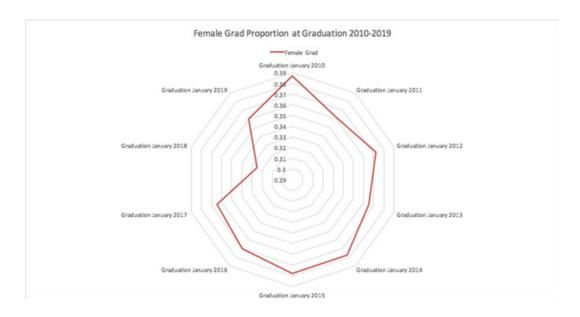


49%

37%

3. The relative numbers of females in academic positions at all levels have increased, although they remain far from equal. In 2008, 3 of the 43 professors were women while 4 of 22 deans and directors were women. Enrolment of female graduate students was 26% in 2000 and had increased to 37% by 2008, miraculously stabilizing till 2018 (going by graduation figures as indicators of successful completion). Enrolment of female undergraduates increased from 25% in 1990 to 46% in 2008, leveling out at 50% (at graduations of 2018 and 2019); thus growing the pool of future women graduate students. The proportion of females in the graduate student population averaged at 37% as measured for the graduation period 2010-2019.

Total



4. From 2000–2008, the largest funders of research at Makerere seemed to be Sida, the Rockefeller Foundation, Nuffic (Netherlands), and the Norwegian Embassy. The University's capacity to mobilise funds has since greatly improved with new funders

- coming on board;
- 5. The number of publications as per web of science (an alternative is scopus) has increased tremendously;
- 6. Notable gains in highly used elements of research infrastructure (ICT, library, laboratories, equipment) and in aspects of institutional culture (eagerness to pursue research opportunities, make more time for research and collaboration, including writing funding proposals, designing studies and carrying them out, analyzing results, drafting manuscripts, and strategizing); Some of the most extraordinary, and surely the most visible advances in research capacity include Information and Computing Technology (ICT), libraries, laboratories, and the Demographic Surveillance Site (DSS) in Iganga/Mayuge, each with significant multiplier effects for beneficiaries across Makerere University, Uganda, and well beyond; For ICT, Makerere budgeted explicitly for recurring costs, including human resources to carry out the tasks, and continues to pay recurring costs for operating the system. For revenue, the University instituted a technology fee for students (\$30 USD for undergraduates and \$50 USD for postgraduates). Management Information Systems for academic records, human resources, and financial systems operate, with varying levels of usefulness.

A University-wide optical fiber backbone linking all the administrative and academic buildings on the four campuses, Computer Labs in all Faculties and Local Area Networks (LANs) have been established in all work areas of academic and administrative buildings (total of over 7,300 access nodes). Student and staff Computer Labs in the University Library.

A total of over 6,500 networked computers for student and staff access as well as Ten student Internet kiosks with a capacity of 165 computers have been established and evenly distributed throughout the campus.

Increase in international collaborations including opportunities for international exposure through academic exchanges in workshops, seminars and joint publications. Collaboration with Swedish University colleagues markedly enhanced supervision, publication in the science disciplines, and preparation of a new generation of research mentors for growing numbers of PhD and Master students, including increasing the proportion of women;

The alliance with Swedish researchers also encouraged Makerere University's adoption of doctoral committees, the option of published papers to meet the thesis requirement, public thesis defenses, and exclusion of supervisors from examination committees;

7. Management restructuring leading to the collegiate system that greatly improved service delivery;





- 8. Improvement in the Quality Assurance regimes;
- 9. Supporting the expansion of the higher education sector through support to participating public universities in Uganda.

Most Significant Research Results over the time of intervention include:

Most Significant Research Results over the time of intervention include:

- A. Environmental protection;
- B. Knowledge of how to improve soil management;
- C. Crop protection systems and measures;
- D. Farming systems for generating biofuel;
- E. Improved water treatment;
- F. Knowledge of how to take care of sewerage fractions;
- G. Reduction of disease-causing waste;
- H. Production of energy and secure fertilizers;
- I. Understanding about re-equipping and re-building of slum areas to improve planning of settlements (includes major contributions for policy);
- J. Roads and infrastructure knowledge for improving the network of roads in Uganda using GIS. This knowledge can lead to more sustainable systems of highest importance to Ugandan development. GIS also helps to standardize digital data for use in projects, e.g. Geological Survey in Entebbe for mining prospects; Competence for highway engineering that is already leading to improved road quality in Uganda; this contributes directly to increasing economic competitiveness. More effective evaluation by Ugandans of how development money for highway infrastructure should be spent, which will lead to better transport infrastructure;
- K. Electrification: Building expertise at Makerere for biomass degassing. Developing methods for the extension of the power supply network in a financially sustainable way;
- L. Developing a new community-based treatment model combining treatment of malaria and pneumonia adopted by; WHO and UNICEF, and by Uganda and other Millenium Development Goal-priority countries as national policy. National policy changes resulting in better treatment of malaria. Optimization of HIV and tuberculosis treatment and co-treatment. Mapping of Human Papilloma Virus (HPV) types in Uganda to guide vaccination programs to reduce the burden of HPV and to prevent cervical cancer;
- M. Reducing violence toward pregnant women and maternal death in Uganda by decreasing a major cause, abortions. Knowledge to reduce depression associated with war and HIV in primary care settings. A fully functioning DSS at Iganga-Mayuge to facilitate epidemiological and other health-research surveys crucial for designing interventions and evaluating their effects.

Problematic areas that remained work in progress:

- 1. Research environment (time, salary, equipment, and seminars) for both PhD students and senior researchers remained most problematic resulting in less than desirable completion rates especially at PhD; Structural problems for academic staff, including inadequate salaries, scarcity of university revenue for research, supervising graduate students without relief from teaching, service (including clinical), and other administrative duties, further burdened capacity development, output, and impacts of research; Mitigation: Makerere University to shorten completion times, including greater involvement of supervisors on proposal development, rapid institutionalization of the 'cross-cutting' PhD curriculum, tighter schedules and rewards for supervision, 'vetting' of proposals, and examination of theses; Delays in supervisors' responses to student work at every stage, and in securing outside vetters for proposals, and in thesis examiner response times, all postpone completion, and discourage some students from ever completing;
- 2. At Makerere University, the lack of a high-level oversight body with authority to drive research and achieve strategic coherence, and link it to a revamped program oversight body to replace the program steering committee;
- 3. Grant management: As central university elements of a system to support units in applying for, managing, and reporting on the use of externally generated funds for research and graduate education, and for managing money and intellectual property, are scattered and inadequate: Makerere University to establish mechanisms for coherent, authoritative, systematic, and transparent management of research funds and for the support of researchers and research managers;

Notable Work in progress! With support from IDRC under the Change Management Program, two grant offices were created; one for CHUSS and the other for CAES. The college of Health Sciences has a functional Grants Office;

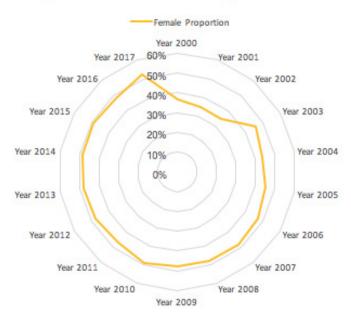
- 4. The incessant gender gap (including unequal proportions of staff and students, grave imbalance in power);
- 5. The need to strengthen monitoring, tracking and evaluation for continued development of research capacity for Uganda's development and reduction of poverty. The continued support to Quality Assurance to guide continuous monitoring and self assessment at the University, including increasing expertise in methods and engagement of researchers and administrators university-wide as an integral and essential part of the research environment. The Directorate of Quality Assurance is organizing resources to meet Ugandan requirements for accreditation, to become an authoritative center for methodology, and developing new



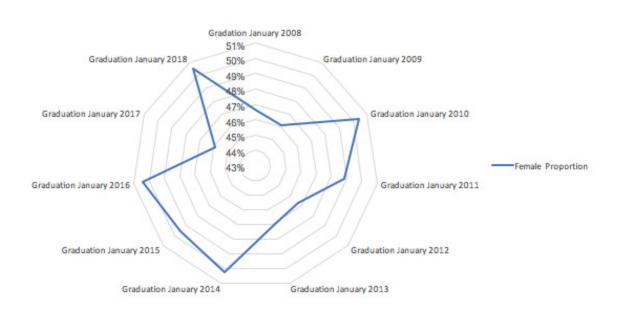
mechanisms in anticipation of the growing demands for data and analysis;

6. Imagination for reward systems: Academic reward systems are not conducive to optimizing the development of research capacity in developing countries. At Makerere University and elsewhere, institutional development is talked about, but rarely is institution-building behavior incorporated in any system of rewards. Similarly, for researchers in more affluent settings who wish to collaborate with colleagues in developing countries, home institution reward systems, especially criteria for grants, publication, and promotion, impinge on collaboration with developing countries, and most particularly for researchers in their most productive years, and not yet close to retirement. Creative additions to reward systems are needed;

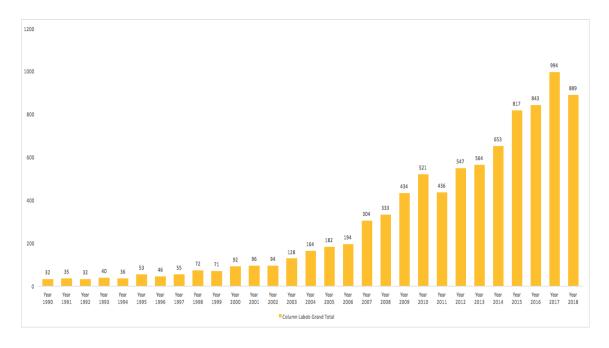




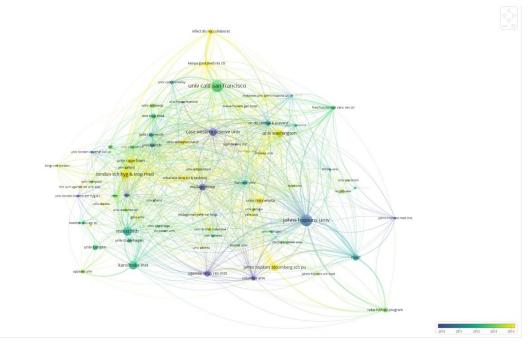
Proportion of female graduates at Makerere University 2008-2018

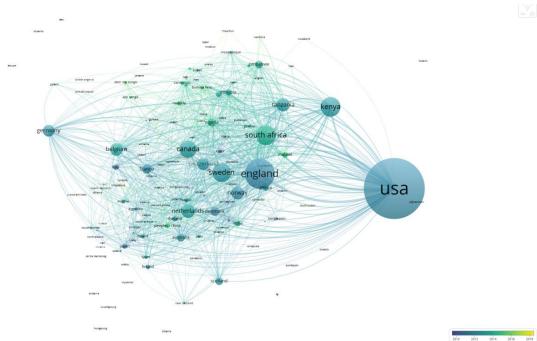


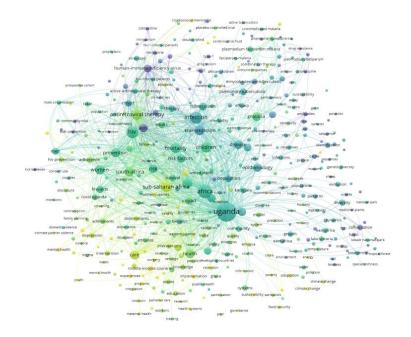
Makerere University Publications in Web of Science 1990-2018



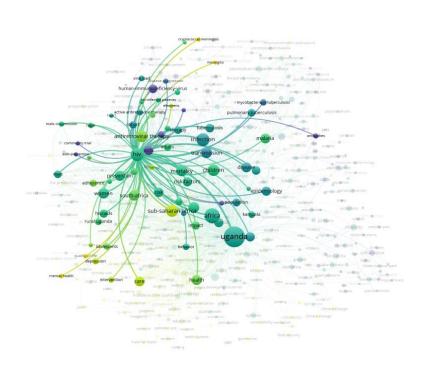
Countries in Makerere University research publications 1975-2019







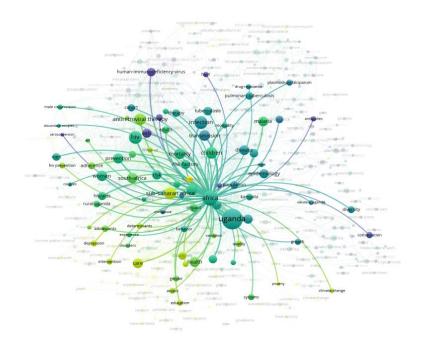






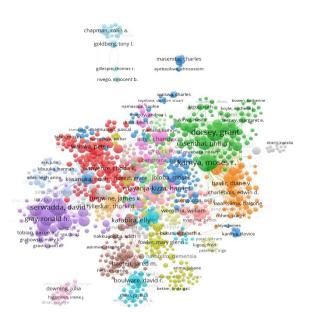




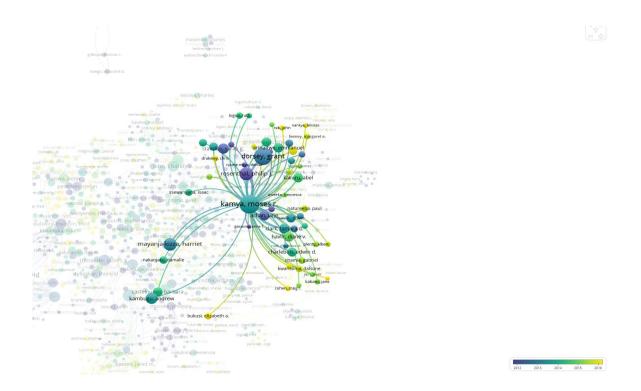


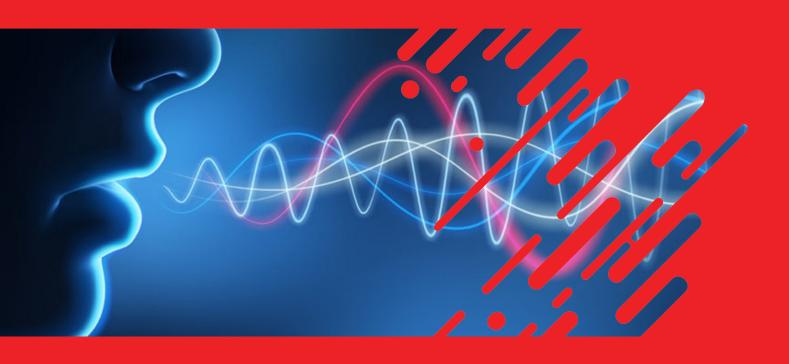






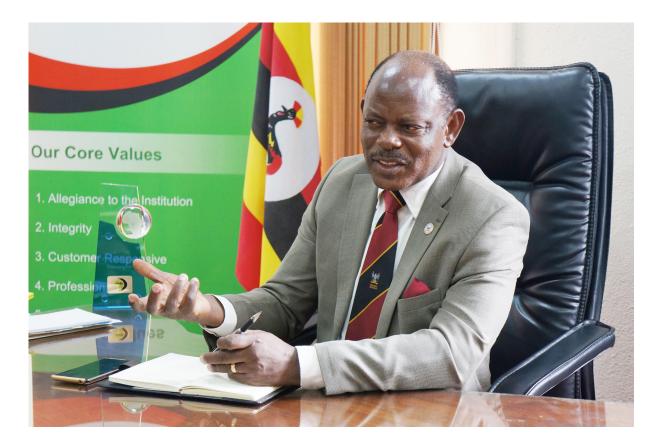






VOICES

Deepening Research At Makerere University, Interview with the VC, Prof. Barnabas Nawangwe



Makerere University has undertaken a lot of world-class research under Sida support. The research at the College of Health Sciences stands out, probably because it is about health. The program in Malaria has immensely helped to develop treatment, protocols and so on. Most of the prototypes used in Uganda and outside Uganda have been developed through this research program.

Regarding the research on HIV/AIDS, other partners came in to support it in a big way later but the initial support by Sida was instrumental. When you think of some of the phenomenal outputs of the research in HIV particularly nevirapine – the prevention of mother-to-child HIV transmission, this is something that is being used world over. However, not many people know that Makerere University and Sida made a big contribution to it.

Additionally, is our contribution to TB and Ebola as well as tropical diseases. There is nobody who has done more research and contributed to the understanding of these diseases than



Makerere University, not to mention the areas of agriculture, especially crop improvement. Take the example of famine that ravaged the Eastern part of Uganda about 15-20 years ago and claimed a large number of lives. Government could not cope because the problem was very big. It sought support from the World Food Programme, which also could not cope. However, our researchers together with researchers at NARO came up with drought-resistant cassava. There have been a lot of droughts in Eastern Uganda in the last 20 years but there has not been a famine. You cannot put a value to that. Another is the Kiira EV. There has been some criticism of Kiira EV; people saying you told us there would be a car, do we have one per se?

The important thing is not whether we are able to assemble that car here in Uganda but the demonstration of the capacity of our people to think at the same level as anybody else around the world. That they came up with this prototype on their own, built the body in partnership with Katwe fabricators and developed a car within Uganda, I think that is phenomenal.

The first phases of SIDA support

We undertook a pilot project where Sida gave us two million dollars within two years for this phase. So as far as the Sida program is concerned, it is actually 20 years because it started somewhere in 1999 and we did that pilot phase for two years. The pilot phase was to link up the professors at Makerere with professors at different universities in Sweden and that became very successful. Sida then decided to implement a fully-fledged programme, hence what we now call the first phase in 2000. I was requested by the then Vice Chancellor; Prof Ssebuwufu, to head the Steering Committee for the Sida-SAREC programme. I was Chair of Phases I and II of the Sida programme.

The first phases were really very much about graduate training at PhD and Masters level. In addition, we engaged in research to build capacity at Makerere University. Phase I was about USD18Million for five years and Phase II was USD20million. Phase I was very successful and that is why Sida returned. We spent the money very well and trained quite a number of people at PhD. The Swedish counterparts were now fully converted. They were the ones who really wanted the programme to go on because they could see the benefits. We were producing students and of course there are benefits back at home when you are producing PhDs. In the first phase, there were about 150 students, a number that grew to over 300 hundred in the second phase. In the third phase, we decided that the steering committee should be headed by somebody else outside Makerere University.

Enhancing uptake of research findings

At the moment we are contributing more than 1,000 publications to peer review journals annually, all in line with the issues affecting development. The question then is: why isn't all

this research being transformed into goods, services, and policies to advance our country's economy faster? There has been a missing link. People have been studying and getting PhDs basically for the purpose of just developing themselves. We have not had the capacity to take the research further into policy briefs, commercialise prototypes into other entrepreneurial enterprises and focus on giving feedback to the communities. In the next strategic plan, we want to address this.

One of the things we are going to do with the money that the government has given us is to set up college grants offices. These will be tasked with applying for grants from around the world and increasing the amount of money available for furthering research findings. Secondly, we shall establish additional business incubation centers. We already have three such centers at SFTNB. CoCIS and CEDAT but need to increase the number.

The incubation centre at SFTNB is actually working very well because they have products. They have people coming out to establish companies. I can now see many foods on supermarket shelves in Uganda which are made by people who have gone through this incubation centre. Our objective is to establish incubation centres at every college and maybe one for the entire university. We want to spin companies out of the research and innovation done here, so that this can be a real engine to drive our economy.

Our stakeholders expect us to be the ones to create the wealth to move the country out of poverty. We therefore need to be strategic in our thinking. We are going to use the money from Government very strategically to create incubation centres that can spin out companies. We have had a few companies come out but unfortunately they are not completely Makerere-owned. We can talk of the Kiira Motors Corporation, where we have shares but the government is the majority shareholder. We have also got the Presidential Initiative on Banana Industrial Development which is becoming a company with Makerere as a promoter. I believe that we shall be good shareholders. We want to spin out many companies from research and student projects. It is because of the contribution of Sida and other development partners that we have been able to develop the capacity to even think beyond publishing to now commercialising research.

The feasibility of winding up support from Sida

The mission of Sida is to help poor people live a better life. We cannot say that the people in Uganda are living a better life. The people of Uganda and Africa generally still need some support. We have made progress but unfortunately the progress is being eaten up by high population growth. The population growth is so high that it pulls down every economic advance that we make. Some people argue that a big population like in China's case can be a demographic dividend. However, it can only be a demographic dividend if we educate our



people. Our literacy rate is 66% while China's is 100%. Everybody in China can read and write. This implies that we still have a long way to go because we must ensure that we move our literacy rate to beyond 80%. We need to have a critical mass of graduate people; people who have obtained masters and PhDs because it is these people that are going to create jobs. It is these people that are going to manage the economy in such a way that it can actually become successful. We have not yet created that critical mass. In Uganda, we have slightly over 1,000 PhDs and 800 of these are all on one hill; Makerere. So you cannot talk of moving the economy forward, if almost everybody who is supposed to be thinking for that economy is on one hill. You need to have a critical mass.

What our partners can do is help us to raise our still small capacity. Using our policy on graduate supervision, we can use our 800 PhDs to train 2,400 PhDs. At the moment, we are recruiting a meager 150 PhDs per year, hence underutilizing our capacity. Many of the Ugandan universities which take up more than 50% of all university students, do not yet have adequate numbers of staff trained at PhD and Masters level.

Makerere University can be supported further to at least create capacity for these other universities, both public and private. If we do not do that, they are likely to graduate a crop of people who have degrees but cannot meaningfully contribute to the economy. I pray that the government and our development partners who really want to change things here can appreciate that. Whereas we are definitely very grateful to Sida, I have on several occasions told the Swedish Ambassador that Makerere still needs his government's support because we are the only institution with the capacity to train for other universities.

International studies have shown, that emerging economies move faster when they have a critical mass of Masters and PhD cadres. That is what has happened in China, Korea, and Malaysia and there is no shortcut. Whether we have oil and other natural resources, we will continue to lag behind if we do not have a critical mass of educated people.

Otherwise, If Sida still insists on phasing out, my view is that we need at least five years to do so. During this period, we shall then accomplish several things. One of these is that students on PhD who will not have completed by next year can complete properly.

Secondly, some of these that have come out the programme can be supported to do postdoctorals, so that they do not get frustrated because there is no research to do after their PhD.

Thirdly, to enable us to build the structures I have been talking about at Colleges and University level, to build that capacity and be able to source for research from the numerous research organizations around the world. So for those three reasons, I would say that even if Sida is determined to go, let them grant us a five-year phase-out period.

The challenge of brain drain

It is a reality that whereas we train and build capacity in the hope that graduates will stay, it remains a personal decision. We would like for people who have had the privilege to be trained using these meagre resources to come back and contribute instead of seeking greener pastures.

The College of Engineering (CEDAT) has been worst hit by this phenomenon. Almost half of the people we trained under Sida left to go to places like UNRA, KCCA, banks, and other organizations or even abroad. Whereas some of them are actually serving the country, they are being underutilized because you do not need a PhD to design a drainage. You need an engineer who has the technical qualifications and is registered to do that. At PhD level, we are training them to be thought leaders for the country and not to do clerical work.

We are putting in place measures to ensure that people who have benefited from these resources remain here and make their contribution. The salary enhancement is a strategic intervention by government to keep our intellectuals here in Uganda so that they can contribute to the development of their country.

I want to pay tribute to Prof. Hannah Akuffo the Ghanaian who became a Swedish. She is a very good example of a diaspora that does not forget its roots. She worked in this organization and took the lead to help Africans get out of poverty, and I want to assure her that Makerere is immensely grateful for her initiative. We want to wish her the best in the rest of her career.

We are also grateful to the late Prof. Vestbro, one of the first professors on the Swedish side who agreed to and saw the potential in our collaboration. We must pay tribute to Prof. John Opuda-Asibo who was the first manager of the programme, for making sure that it took off, as well as Prof. Eli Katunguka who took over from him. We also pay tribute to the other Vice Chancellors, especially Prof. John Ssebuwufu who with foresight allowed very many projects to come to this institution. I equally thank Prof. Livingstone Luboobi and all my predecessors for their leadership.

How Sida Support Has Transformed Kyambogo University, Interview with Prof. Eli Katunguka, VC



Sida support to Makerere University was in line with the Swedish Development policy of identifying universities in countries that had the potential to develop research capacity. So, their focus was largely on developing research capacity with a view of improving the conditions of life of the people through research and research capacity building. They visited a number of countries.

At Makerere, they were of the view that the university could be supported through long term engagement in order to build its research capacity. I came into the Graduate School in 2004 and started coordinating Phase II from 2004 up to about 2013/14 when I left Makerere and continued as Chair of the Steering Committee.

Impact of the four phases of the Sida support

Phase I was a learning phase. We were working with partners in Sweden whom we had not worked with before. The initial thinking was that this was going to be a largely sandwich

programme where members of staff identified for PhD training would spend part of their time in Sweden, and part of their time in Uganda working with Swedish supervisors of their projects. That was found useful because at that time we did not have sufficient capacity to supervise PhDs to completion on time. This is still a challenge in many universities including Makerere much as they have many PhD graduates.

The first and second phases were largely sandwich. This worked very well, I think largely because of the Swedish partners. They made sure that student proposals were well read, approved and supervised. Some of these students finished on time; within three to four years. Towards the end of the second phase, there was an evaluation during which it was discovered that things had not improved as had been expected. There was a proposal from some Swedish colleagues to stop the funding. They said "we have been there and have done so much but do not see the benefits." But the other team of Swedish people said no. This team explained that these problems were the reason Sida came to Makerere University in the first place and that capacity could not have been built in five or ten years. "If we have not succeeded in what we are doing, we need to continue working with Makerere University since they are showing progress, and make sure that we attain what we wanted," they added. A decision was taken that funding should be continued. This led to the third phase. We were happy that they continued the funding. Sida funding was substantial. I do not think any university in Uganda has obtained such funding before.

We continued with this phase and mainly developed capacity for PhD training in selected faculties such as Veterinary medicine, Agriculture, School of Public Health, Social Sciences and Engineering. These were really critical areas. Faculties such as Engineering were at the very bottom, and I think they benefited a lot in terms of building their capacity. We had the opportunity to look at the proposals of PhD aspirants and made sure that the research work they were going to do was in line with the Swedish Development program, which was really alleviation of poverty among communities. That is why agriculture was largely funded because most of our people live in rural areas and their main activities are agricultural. Engineering came on board because it had a role to play in mechanization and working with energy to make sure that people's conditions of life improve.

During Phase III, we trained very many PhDs. We worked with Swedish supervisors and introduced a new form of writing PhDs where we encouraged our members of staff to write papers as they do their PhDs. So you have a PhD dissertation but along the way you also have three to four papers; which was a big boost to the output of publications at Makerere University. It catapulted the university to be ranked second, next to UCT in South Africa because each PhD that was graduating had three to four papers to their name. This was a



very good thing and we encouraged it to continue.

As Phase III was coming to an end, we realized that we had built sufficient capacity at Makerere but other public universities were lagging behind. In all this Sida support, our concept was that when you train in Makerere, you are training for the country because most people who are employed in public universities studied at Makerere. Many public universities had not yet developed sufficient capacity for PhD training.

We therefore agreed to involve other public universities in this Sida support. Students in these universities were required to register at Makerere University and be supervised, hopefully jointly, by Staff in their universities and staff at Makerere. This led to Phase IV. Another thing that came up in Phase IV was the decision by Sida to downscale the sandwich arrangement because it was very expensive. Most of the money went to Swedish universities and yet Sida had by then developed sufficient capacity at Makerere University to train other PhDs. So during Phase IV, the sandwich arrangement was minimized. We brought in a number of institutions including Kyambogo, Busitema, Mbarara and Gulu. Each of them has benefitted from this programme.

Another major impact that has come out is the networks that have been developed between our researchers in Uganda and their counterparts in Sweden. I think this collaboration is going to grow and multiply even after Sida support has ended. We worked on a programme in veterinary medicine with a University in Sweden called SLU and when this work ended, we embarked on new work on issues of animal health. The continuation was a result of that initial interaction we had with them. So even after the Sida support has ended, these networks that have been created will continue working and collaborators will continue applying for research grants from other donors.

Another impact, which may not be validated now, is whether poverty has reduced among the communities where this research was undertaken. Nevertheless, I am sure that there are many technologies and innovations that were developed, which if harnessed, could greatly improve the living conditions of these communities.

Research and its uptake

The Sida support has seen us embark on a lot of remarkable research. I remember the research on cervical cancer based at the School of Public Health. The lady came up to identify that the cause of cervical cancer was viral and I think through that work they have developed a vaccine to protect young girls against cervical cancer. This was one of the spin-offs. The development of the Institute of Renewable Energy at CEDAT was another good spinoff. This is a very good Institute which has started doing work to encourage the use of renewable energy.

It has always been a challenge for researchers to come up with results which are going to be used by communities. Research can be basic or applied. If it is in the lab, then maybe you are coming up with something that may not be applied immediately. But if it is applied research and you are doing work with the communities, because you identify the problem with these communities and then you work on it, the communities should be interested in your findings. The onus is upon the researcher to go back into these communities, disseminate the research findings and cause uptake.

We have tried to involve politicians in the uptake of research findings but they are seldom interested in what we do, as long as it does not benefit them individually. Their main concern is how to remain Members of Parliament. If there are MPs who are concerned about the welfare of their communities, then they can benefit from this. But dissemination and uptake of research findings still remains a big challenge.

Sida transforms Kyambogo University

In Kyambogo, for the first time we had support for about 26 PhDs, which is quite substantial. We also received support for a number of Masters students and for the first time we have about two postdoc students. My hope is that these students will progress to finish their PhDs before Phase IV comes to an end. However, they still have some challenges of supervision. I was talking to some of them whose proposals are yet to be approved five years down the road. That is not acceptable. That means many of them in public universities may not finish, and then universities will be forced to look for money to support these people, especially those who are nearing completion. I cannot see a university supporting someone who is in proposal development after five years. That is not possible. When I got here, I spearheaded the development of the Research and Innovations Policy, which was nonexistent here. This policy is now fully operational thanks to prior my experience developing the same at Makerere University.

Secondly, we developed a Research Agenda which is in line with the National Development Plan and the SDGs. It has been widely circulated among members of staff. Whoever applies for research funds for capacity development or research development is required to use that agenda.

Another thing I did introduce was a competitive research grant and we have given it sufficient money. Last year we gave it UGX2Bn (two billion shillings) but because our consumption was not good, we have budgeted for UGX1Bn (one billion shillings) this year. Under this arrangement, members of staff write proposals, they are vetted extensively and whoever wins is granted money for research. The scientists get up to UGX40m (forty



million shillings) and the humanities get UGX20m (twenty million shillings). This is because research in science can be quite expensive.

We have also had regular training workshops in proposal writing. Recently we had a workshop on budgeting and accounting and these have attracted many members of staff. We have also continued to work with the Directorate of Graduate Training to encourage our members of staff to participate in the capacity building workshops.

Additionally, we have encouraged staff to attend international training workshops, a culture that was not here previously. We are also introducing conferences and encourage members of staff to write papers which they are going to present. We have a conference in Eldoret bringing together a number of universities, and the one thing I realized was that the quality of papers was not good. I have insisted that there must be an initial presentation session for people going to present papers. This session will make it possible for papers to be critiqued, and presenters will be advised on what to improve and how to speak in public. The papers must be well written and the presentations worked on. Initially they had resisted, but this is part of mentorship. We are working together to build the research culture of this institution.

Phasing out the Sida support: The need for a Research Agency

In order for us to successfully phase out the Sida support as has been communicated, each institution needs to look at how they are going to tide over some of the promising students. Not all of them will finish their PhDs on time. By the way, not everybody who starts a PhD must finish it. People fail along the way and they drop off. So those who have not made sufficient progress have to forego the opportunity, much as the intention will not have been achieved. However, if there are some people who are in the final stages for example of data collection, writeup or presentation; these can be supported by the institutions. However, no current beneficiary should be funded again for another period of PhD training.

As researchers working with research institutions, our view and proposal to government is to come up with a competitive research organization or a national research agency. This agency, which I think they are trying to come up with through the National Council for Science and Technology, should receive funding from the government. Researchers would then write proposals and compete for this money. It should be a competitive research grant scheme. Countries such as Kenya, South Africa, and Tanzania all have national research funds, and I think Rwanda is developing one. We cannot afford to lag behind.

Our President is very passionate about research, especially in the sciences. So, the government must come up with a fund where members of universities are able to apply, be vetted as per the criteria set by the management of that body, receive funding and account for the money.

This is what we must do to be able to carry on the work that Sida has done.

It is dangerous for a country like Uganda to receive Sida support for twenty years, develop capacity for research and when Sida goes, nothing happens in continuity. Researchers get demoralized when they do not see any hope in the future so the importance of a national research fund cannot be overemphasised. We talk of South Africa as being a leader in research output and innovations on the continent because there is competitive research funding for all universities. Recipients are then monitored through their national research fund and we must learn to do the same.

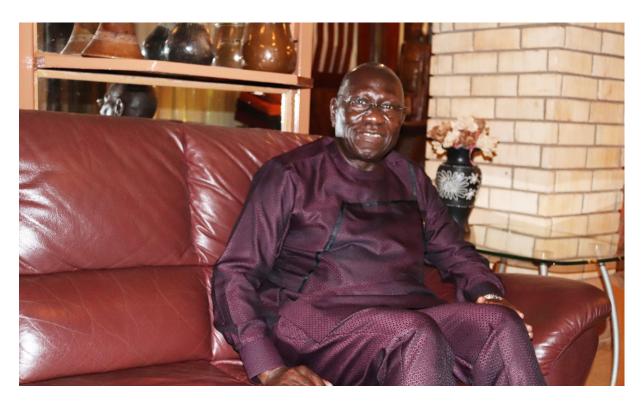
Concluding Remarks

I would like to appreciate the Government of Sweden and the Sida management team. We have had our good Ambassadors in Sweden such as Hannah Akuffo. She is one person who said, "we went to Makerere University because of this. We cannot run out because there are problems. We need to stay and see what we can do. And see that what we wanted to do, i.e. building research capacity for PhD training is achieved." And I think at the end of the day, this has been achieved to a great extent. So, sincere thanks to the Swedish government and to our ambassadors - those who have worked on the project, coordinating it to the success it has been.

The onus is upon all of us to urge the government and ensure that what has been achieved under Sida is not lost. I will use some of the powers given to me as the Chair Council of the

National Council for Higher Education to push for this.

From Nothing to Vice Chancellor How Sida shaped Prof. Celestino Obua, VC, MUST



Academic growth comes by attaining more qualifications and participating in research. After graduating with my PhD, my growth was astronomical. I was never a Head of Department. Immediately I completed my PhD, I became the Acting Dean, School of Biomedical Sciences. After that, I applied and became Deputy Principal. From this, I applied and became a Vice Chancellor. Would I say it was contributed to by the training got in Sida? Of course, it was! And here is how:

To begin with, it increased my publications suddenly. Promotion is based on outputs and publications is one of them. I was appointed Assistant Lecturer in 1998. In 2000 I was promoted to Lecturer. I had already done some research work and published. Before I finished my PhD, I was promoted to Associate Professor and then after I completed my PhD, published and supervised, I was promoted to full professor in 2010. So within 10 years, I rose from nothing to a full professor! That in itself was miraculous. The exposure I got from the Sida project made me realize that there is a lot that one gets when you go through a PhD programme.

The only thing I ever aspired to become was a professor, not a Vice Chancellor. Becoming Vice

Chancellor came along the way and I am grateful for this position too. When I got the position of Vice Chancellor at MUST I wanted to pull out of the Sida programme, but Prof. Joan Kalyango, a member of my research team at the College of Health Sciences agreed to help coordinate the project. Technically she is the one who coordinates my research at the College. She is the one who normally responds to every request from the Directorate. I only sign where the PI is requested to sign. She is assisted by Dr. Moses Ochan, from the Department of Pharmacology. Both of them support supervision of students together with colleagues from the Karolinska Institute. That is how I have managed to run the project without being on the ground. Previously, the involvement of other public universities in the Sida programme failed because I think there was a lack of understanding of the processes in Makerere. So when I went to

Previously, the involvement of other public universities in the Sida programme failed because I think there was a lack of understanding of the processes in Makerere. So when I went to MUST, I had meetings with potential applicants and took them through how to write compelling proposals, and I think we have over 20 students on the PhD programme from MUST, not only in health but in all other areas.

Initiating Sida Phase IV

I was one of those who participated in developing the concept note for the current Sida funding. I was responsible for the health component of this concept note. By then, I was serving as Deputy Principal at CHS.

The difference between the current funding and the previous ones was that this time around, instead of funding programs in Departments or Faculties, calls were made for individual researchers to apply. These researchers were encouraged to write proposals for direct funding. I was again one of those who wrote a proposal for direct funding. My proposal was one of the 17 chosen for funding. So in terms of seeing the current Sida funding develop until I left in 2014, it was really one of those life-changing things because I saw a big difference in the way Sida funding was conducted prior to this current phase.

Previously, the senior researchers/faculty wrote the proposals and were mentors to students. They were not conducting the research themselves; they were supposed to supervise students. So the whole thrust was to support them to supervise whereas this time around, on top of supporting them to supervise, they were themselves allowed to participate in research.

Embarking on Research on Infectious Diseases in Children

The brief title of my project was "Towards better treatment for infectious diseases in children in Uganda." However, the main thing we were looking at was infectious diseases, the mode of treatment, and the emergence of resistance in under-five children. We wanted to find out: does resistance emerge out of the natural evolution of resistance or does it emerge out of





the way we handle treatment whether carelessly or inappropriately? Resistance often comes out of poor stewardship in antibiotic or antimicrobial treatment.

Secondly, there are more players in the health sector today. There is the general government health system, but there are also private players. We know that quite a large number of our people go for the private mode of treatment and that is where they get antimicrobials or antibiotics, sometimes very inappropriately because of the way the business of medicine is being handled.

You come across a drug shop and you are not sure whether that person standing at the counter has any medical training and is capable of dispensing drugs appropriately. Thirdly, we were looking at improving the diagnostics for these infectious diseases, particularly malaria, tuberculosis and HIV in children. We asked ourselves, how can we come up with an efficient and quick way to treat some of these diseases killing children? And then, of course, we want to look at drug use in society.

We have four PhD students engaged in aspects of this research at the moment. One of them is looking at drug use in the community, another at improvement of diagnostics, another at the stewardship of antimicrobial agents and another at how the public sector is handling itwith the aim of seeing whether there are any policy issues that can be arrived at to improve the handling of antimicrobial agents in the private sector. Whereas this is what the PhDs are doing, they are mirroring what the postdoctoral students are doing. The postdoctoral students have also tailored their research around those areas and are taking on the support supervision of masters students too.

We are also partnering with Karolinska Institute, which has been a long-time partner. My co-PI is Prof. Cecilia Stålsby Lundborg and a number of others. Under this project, we have three Masters students registered at Mbarara University of Science and Technology. One of them should be completing this academic year, he is doing pediatrics. Another is in critical care nursing and the third in pharmacology.

However, all their research is within the area of treatment of infectious diseases in children. The critical care nurse is looking at the way antibiotics are prescribed for acute illnesses for children in intensive care. The pediatrician is also looking at antimalarial prescription among children with severe malaria. The pharmacologist is just developing his research topic but should begin collecting data this academic year. The Masters students are progressing well. The challenge has been the PhD students because of some delays. One of these challenges is the requirement for these students to get approval of their research proposals before they

can be registered at graduate school. There have been some long delays in getting ethical clearance. Other students registered on time but then there was the issue of disbursement of funds. Largely I think it was because of the too frequent changes in the SOP. Every year there would be a change which required revising what was previously agreed upon. I do not know how many agreements we have signed back and forth with Karolinska Institutet, which necessitated re-doing the budget.

Research Results in relation to Finding Better Treatment

Research involves reading and re-adjusting as you go along. By the time you settle down to do a particular project, you will have explored what is known, what is unknown and where you think the gaps are. In that process, the work being done now builds on prior work. For example, one of the postdocs is looking at dosage adjustment in the treatment of malaria and innovating on the best ways to monitor the treatment. It is not coming out of the blue but from work that has been done before and where gaps were identified.

This is the same issue for diagnostics. You look at how a disease like TB can be handled to quicken diagnosis because TB is a killer when in combination with HIV. Yes, TB itself kills but when you are immune-compromised, as is the case in incidences of HIV, then it kills faster unless you are put on very aggressive treatment. Equally important to us is how to diagnose before someone is overtly known to have TB.

In children, the diagnosis of TB is very tricky. You therefore need to find molecular ways of making this diagnosis hence the need to improve on diagnostics. We want to go from microscopes and the smear to examining the genetics. We want to find out how we can improve the diagnostics by looking at the genetic markers for this disease.

For those looking at misuse of drugs in the community, the important thing we are looking at is how to sensitise citizens. Some residents have not been sensitized enough to know that you must complete the full dose of the treatment you are given, you must not share the medicines you are given with somebody else and you must not store this medicine for future use in another round of illness. These are practices in the community which have come out of prior studies.

This is also partly due to our health system, which is plagued with shortages of drugs, particularly communities at the lower levels. These studies are going to inform policymakers and the community leadership to better educate people on how not to misuse medicines.

Understanding the dynamics of research collaborations

Collaboration is like developing a relationship. A successful collaboration is one that matures over time. You cannot just strike it off today and say yes, we have done it. It requires a lot of





faith in the input of the other person and the purity of heart not to withhold anything from the partner you are collaborating with. The North-South divide is obvious. It does exist and bridging that gap involves a bit of maturity on your part to recognize whether your partner comes to the negotiation table at the same level as you. Gauging that kind of relationship is not easy.

At the beginning, we did have the North-South divide. Remember we were guinea pigs in this, both Makerere University and Karolinska Institute. Karolinska was shopping for people to work with in Uganda for the first time. Historically Karolinska had been supporting Tanzania and Ethiopia with this kind of relationship. However, the level of interaction at Makerere compared with previous parties was very different. Individuals like senior professors developed proposals that had not been written by the Karolinska people before and when they saw these proposals, they chose to participate.

The decision for the then Faculty of Medicine to collaborate with Karolinska Institute came through Dr. Hannah Akuffo who was coordinating from the Karolinska side. She was the key person who made this partnership successful. She mentioned several institutions that the Faculty of Medicine could collaborate with, including Karolinska Institute, which was the largest medical university of them all. But she did not know who we could partner with amongst the interested persons.

The first professor of pharmacology we worked with was Prof. Lars Gustanston. He was in touch with Prof. Ogwal Oken who arranged their first visit in 2000/1. When Prof. Lars visited, he was not very impressed with what he found at the Department. In my case, he just looked at me and said, "I do not want this man in my group."

Prof. Ogwal then introduced me as the only person in the Department of Pharmacology and that if he did not want me then there was no project. I think they went back, considered and agreed to the partnership. They then got two other people to join me that year. From the Ministry of Health, they got Jesca Nsungwa Sabiiti, then Winnie Tumwikirize who was an ENT. It was not easy handling that.

The important thing for me was to work with a person who had in a way rejected me. But in the end, by the time I finished and defended my thesis, Prof. Lars came to me and said, "Dr. Obua, I am very sorry, I was misinformed about you from the beginning." So the maturity I showed was that I did not mind much about what he thought about me. Even when I went to Karolinska for the first time, he opted not to directly supervise me. He gave me somebody else whom he thought was very bad. But the way we synced with this other fellow shocked

him. And that is why of the group I was the first to complete my PhD. The others completed one or two years after me.

Managing when you know that that gap existed required serious pulling back on my side by showing him that we have the capacity even though we may be poor on the ground, in the sense that the infrastructure we have is not what is in Karolinska. That is why I requested in my PhD to have a lab developed at Makerere University. Indeed, I think of all the people who were on a PhD program, it was my program that had capacity building as an initial concern. So we utilised their expertise to set up the High Power Liquid Chromatography lab at the Department of Pharmacology. It is used for measuring blood levels in the body. We actually brought on board their technical lab fellows to come set up this lab and the lab can do anything now. You can detect any drug using it. This was a great spinoff. Many other people have since then done their studies through this lab.

Other collaborations and spin-offs

Together with Prof. Lars and other supervisors, we applied for the Swedish Institute grants. One of them was between Prof. Lars and I, the other one was a grant for a three-year study that we conducted here at Mulago in partnership with Baylor College of Medicine Uganda. We also had a PhD student from Karolinska who was conducting the investigation as part of her studies. But we were also carrying out research here in the HIV clinic at Baylor College, investigating the cross-reaction between Rifampin which is used for treating TB and Rivaroxaban, which is a key drug in treating HIV. These two drugs interfere with each other and yet children who have TB and HIV have to be treated. So we were looking at whether it affects the emergence of treatment, whether it suppresses the other drug so that viral clearance is not effectively done and so on. This was another direct spinoff from the partnership.

We also had EU funding where we partnered with people from IHCAR, Prof. Stefan Peterson and Prof. Thomson. We wrote an EU grant, titled "Accessing Medicine in Africa and South Asia-AMASA. We partnered with Karolinska Institute. At Makerere it was Prof. Paul Waako and I, from South Africa we partnered with the University of Western Cape and in Asia we had the Indian Research Council. This was a five-year project basing on our partnership with Karolinska Institute. The second EU grant was also with a number of Universities in Europe but also including the Karolinska Institute. We were looking at the barriers affecting women undertaking research at PhD level in Africa.

Inter-university partnership for Sida continuity

We know that no funding lasts forever. Nobody ever imagined that the research support we have been getting from Sida would last forever. It means that we must develop a strategy



for sustainability. It is something that we should have come up with way before. If we do not manage the process of the scale-down of the Swedish support, then we are totally guilty. It is not only a Makerere problem but a Ugandan one as well.

Strategically Makerere coordinates this program but a number of public universities have been beneficiaries. My view is that Makerere should have found it necessary to call some form of strategic meeting between researchers and the leadership in these institutions to either build on what we may have thought of as a sustainability program or develop one before 2020 comes around. We need to put our heads together and say, 'the Swedish taxpayer has caused the following development in the country, people have individually grown through the support, institutions have developed with the support, how can we build on the gains that have been made?'

As institutions, we must look at what the core pillars of a university are. While academic advancement is good, research tends to be strategic where it is meant to solve current societal problems and prevent future recurrences. We have been able to solve a number of problems in health, engineering, arts, social sciences and the like. We can only make gains of what we have achieved if we continue to build on the research ecosystem that we have developed over these 15-20 years.

There are lots of well-wishers out there willing to fund solutions that have impact and solve problems in society/the world. The results of some of the research done in Uganda today can be applied elsewhere in the world. As universities, we must continue to do research and mentor young researchers to become better. My thinking would be that the best way to build on these gains is to continue doing what we do best, which requires money that is out there. I have won grants coming to between USD20-30million ever since I left Makerere University for MUST. So there is money but it requires us to sit and partner. Sida has for once brought public universities together through this last funding. We need to build on that and continue to partner with each other. We are already doing so in many other research projects.

We must show that as universities we have the capacity to work with each other and apply for grants. It is true Makerere is older and much bigger, but Makerere must allow growth in other universities. My thinking would be that if Makerere has led in a particular grant application, it should ask another university to take the lead in a subsequent application and support it.

That is the way to build on the gains that have been made.

I visited Lira university recently and I told them the same thing. I went a step further and gave them a two-weeks training on grant writing. I told them that we were working with them now but also building their research portfolio because when you are partners, you build each other's portfolio and make reference to it in subsequent applications.

It is going to require us to put our heads together. Otherwise, it is going to remain a Makerere thing and the national growth that we have seen in the development of research in the country is going to go down.

When we write grants with Western universities as partners, they serve as our mentors. They support us by indicating that they will mentor us. That is the way to build on these gains. We have been able to train PhDs and postdocs across these universities with supervisors from Makerere and elsewhere.

We should, therefore, have a tracking mechanism. That will be the only way for us to identify researchers who have conducted particular studies and engage them. If you want somebody to be part of a proposal, we contact that person so that we can continue utilizing the money which was spent in training them. We have to hold the hands of those we have trained and continue to engage them. People who have undergone rigorous training should be brought on board to continue doing what they were trained to do. Let us keep this tracking and recording of what they have done, then utilize it for purposes of helping them.

Advice to young academics

Student life at university is premised on the fact that you are an adult. Secondly by the time you are doing a PhD you are a mature adult. Students must learn to respect the opinion of their mentors, irrespective of the differences they may have. Respect your mentors and cultivate friendship. That's why today, even though we started off on very rocky ground with my supervisor as explained above, we are probably the best of friends now. I showed him a side he never expected, I never fought him. I respected him and still went to him to solve my problems.

Secondly, do not keep things from your supervisor. You must be truthful to them and respond in time. There are students who think that they are doing their supervisors a favor by responding. If you are given work to do and told to return it in a week, bring it in three days instead. The important thing for any study is that there is a time limit and this time is controlled by you the student. When you hear a student complain that "my supervisor does not respond," it means the supervisor is taking a cue from the way you behave. Finally, be grateful to the people who have funded you.



Pioneering Research At Busitema University Interview with Prof. Paul Waako, VC



Busitema University started working with Sida in 2015. Of course, there is always some lag, and this is an issue when an institution is just a sub-grant recipient. When the grant is forwarded to Makerere, it takes some time for sub-grantees to be supported and get on board. And that's why Sida has been experienced longer in Makerere University than in Busitema.

Sida support covered the areas of; PhD and Masters training and in terms of institutional development looking at issues related to Gender, HIV/AIDS and some bit of Quality Assurance and Graduate Training as well as boosting capacity of graduate training at Busitema.

Impact of Sida Support to Busitema University

PhD and Masters Training

As a result of discussions with the Sida program, we agreed that we need to start research-based training at Postgraduate level with Masters and PhDs. Busitema is a young university

and you can potentially impact in Busitema easily in various areas. Graduate training in Busitema started about three years ago as part of the policy.

One of the foundations we based on was the fact that we had many staff on PhD training, and these staff could interface with the other staff to make sure that they developed programs. This opened our thinking to postgraduate training as being critical to the advancement of our institution. Busitema now has over 10 PhD programs currently undergoing accreditation. We have had both students and staff benefiting from the program. Overall, we have over 10 PhD students who have either undergone or are still undergoing training and about 150 students on Masters programs. So, it is a wonderful thing. Some students and staff from Busitema were trained in the earlier phases although it wasn't expressly indicated that Busitema was benefiting from that phase.

Policy development

In addition to staff and students, the rest of the community has benefited from the Sida program especially in the areas of policies. A number of policies have been developed with support from Sida and they have contributed to the institutional capacity and influenced the academic life at Busitema University. These include; the HIV policy, which has helped to streamline and draw attention to HIV in the university and provide avenues for handling HIV, the gender mainstreaming policy and the policy on graduate research and innovation.

Research and Publications

We had really diverse projects but broadly speaking, we had projects in the Faculties of engineering, science and education particularly Mathematics and Physics and some bit of agriculture. Those are the faculties which came out prominently under the Sida program. We have benefitted from the research experience of those who have come back after training. Everybody who gets a PhD comes back and supervises Masters students. There have also been a high number of publications; these have doubled between last year and this year 2018/2019.

Collaborations

Of recent, the number of collaborative projects between Makerere and Busitema staff has increased. Busitema has a Memorandum of Understanding with Makerere University outside the Sida arrangement and this has promoted a number of Makerere's people, who are supervising staff in Busitema. These have come to Busitema as external examiners to contribute to the academic life and some have come as visiting lecturers. These are rising out as a community of researchers that has been established by this collaboration.





We also have linkages in Sweden which we generated as a result of Sida. There are some projects we have applied for in collaboration with Swedish counterparts.

Thoughts as Sida Phases out

Sida support has been very critical in filling the national gap. As you know, our economy may not be able to commit money to research and yet it is really vital for the development and transformation of people.

As young universities, we are now welcoming back these staff in the faculties to start teaching to start on the research life and our expectation was that at one point, there would be a follow up program to support new graduates. So, the phasing out isn't timely for us at all because it cuts the story short midway, unlike Makerere where they have been for close to 20 years. I hope that we can continue discussing with Sida, of course, there are new areas which we can look at such as supporting the supervisor to supervise and strengthening capacity. We could also get support in the form of postdoctoral training to help retain these staff that have been trained.

For institutions such as ours that are located upcountry, the loss of staff is extremely real. If these graduates who are now coming back don't receive adequate support, they could go away. I think one, is to continue advocating to Sida to see if it can consider some form of support to ensure that we keep these people in a research environment.

Of course we have the government support, our government should not sit back as well, and it should come on to see what we are engaged in. And to encourage the private sector to support research and innovations because in Uganda the private sector has not played a big role in research. So I think those are the three things which should help us.

Overall, Sida has been a wonderful program. It came to Uganda at a time we needed it most and of course it is their right to decide when to phase out even when we still love them and we would love for them to stay as long as possible. However, we just want to thank them for the contribution they have made to the development of science in this country. It has been enormous and it has been the foundation of many initiatives in this country. I think in my lifetime in academics, this has been the biggest contribution to academia. I benefited from Sida as well because I supervised about four students in the Medical School while I was still a Member of Makerere University staff.

In the Medical School, I was Head of Department Pharmacy and Therapeutics from 2004 to 2013 and so I participated in Phase II and III of Sida. That Department was really brought to where it is today by the Sida program. When I joined, we had two PhD holders including myself. I think I left 6 PhD holders who graduated from Sida. So, to be fair, Sida did quite a

wonderful job. I don't think it is easy to find such a friend like a Sida. And when I left Makerere for Busitema I participated by seconding students to join the program here.

I joined Busitema University in 2014 and served as Dean of the Medical School in Mbale up to this year when I became Vice Chancellor. We published a paper with Prof. Hannah Akuffo in 2014 on Doctoral Education and Institutional Research Capacity Strengthening: An Example at Makerere University in Uganda (2000–2013). It is such a wonderful story of the Department of Pharmacy and Therapeutics that is published in the journal of doctoral education.

I owe what I am today to the contribution Sida has made in my life. Sida has left a mark in my academic career and I am really grateful to Sida.



Why I Believed In The Sida Collaboration At Makerere University Prof. Stefan Swartling Peterson

Associate Director, Health Section, Programme Division, UNICEF



I was asked in the initial days to become the Coordinator of the collaboration in the health field from the Karolinska Institute side. I oversaw, during a ten-year period, the collaboration to some extent as a supervisor, researcher but also as a troubleshooter and facilitator of the overall collaboration in the health field.

The challenges in the world today are increasingly global and that means we need to work together across the globe. If you take antibiotic resistance for instance, it is not something that one country alone can solve and that is why you need capacity and collaborations in all countries around the world, if you truly want to tackle this global health problem, since bacteria travel aeroplanes. And that is why it is important to have knowledgeable people working together in both Sweden and Uganda.

Obviously, there is an element of capacity development on both sides. How do you work together to tackle a big problem? So, that can extend across a number of areas.

Antibiotic resistance is one such area but Non-Communicable Diseases is another. For instance, how are you going to tackle these epidemic diseases as it were, of high blood pressure and diabetes which affect both Sweden and Uganda? I think this collaboration has raised capacity on both sides; Sweden and Uganda, and positioned researchers in both countries in international networks whereby they have the contacts and the capacity to tackle such issues.

I had the opportunity to spend three good years at the Makerere University School of Public Health. There was a lot of outstanding research. I particularly want to point out the research in mental health because mental health was not on the radar when Prof. Seggane Musisi suggested that it should be considered as one of the areas of collaboration.

He assembled a team of very competent young Ugandan researchers who really brought out new areas and contributed to putting mental health not only on the Ugandan, but also on the world scene.

I would say that mental health and often its magnitude had not been recognized. What I learnt from Elly Okello for instance is that depression among the Baganda is not considered a disorder, it is about thinking too much. Consequently, you do not go to a health center if you are thinking too much. You go and talk to your friends, which might be effective, but if you have severe depression, that approach might be ineffective.

Continuing research after Sida

If you have the capacity, and by capacity I mean knowledge, contacts and networks, the challenge that remains is to raise funds competitively and be part of making processes and real contributions. That is the way to continue this. International networks are important, but so is linking to policy makers nationally. Obviously a very important point here is that the government should have a research budget line even if it is small because all countries that make advances in these fields put government money into research.

Secondly, I think that as researchers we need to link to policy makers and programs also and go out to policymakers and ask what the problems and issues are. We can then make ourselves useful in that context.

The other way is to put the research findings into practice. Publishing them in a nice journal is only one step. But it is actually when the research findings reach the people, or when they make a difference in policy and practice that we should be happy. So, go out with your





research capacities, and engage in what we call implementation research with policymakers and practitioners.

Research uptake

I would like to say that we are partly to blame, because we have these ideas and research questions, which we think we will share with policymakers and practitioners and eventually get them excited about our findings. But when you think about it as human nature, chances are high that policymakers and practitioners will be more interested if you started by asking them what their problems are, and what troubles they face in implementation. This can then be a good basis for research and then we can go back to them with the answers.

It all hinges on how we involve or not involve policymakers in formulating the research questions. That's part of what we call poor research uptake. I am currently the Chief of Health Section for UNICEF globally, based in New York and proudly an Honorary Professor at the School of Public Health, Makerere University. I hope to come quite often and make a contribution.

Working with DSS

As an individual researcher, you would also like to have nice ideas from the population base. The idea of having a research site, such as the Demographic and Surveillance Site, is that some of the data and some of the infrastructure should already be there for you to come and use, and some of the questions you may not need to ask. For example, if you are interested in studying women between 20-30 years, rather than go knocking on doors to find them, with DSS you should easily be able to go out and look for people or individuals and where they live. This will vastly increase the kind of research you can do. That is the comparative advantage of a research site. I encourage researchers in Makerere and beyond to make use of the Demographic Surveillance Site. What I am also encouraging researchers to use this facility at an early stage when they have the research idea.

Timely Boost to PhDs in Technology Interview with Prof. Henry Alinaitwe, Principal CEDAT



The Sida programme started around 2000/2001 and a few members enrolled largely for PhDs. The Faculty of Technology then was one of the first beneficiaries. Sida was meant to improve the supervision capacity of the Senior Lecturers but also in the process be able to produce PhDs.

PhD Training

The target was members of staff who had PhDs, so that they would build capacity and in turn be able to supervise PhD students who would then complete and take on the same mantle





and supervise other students. In the last 19 years more than 45 PhDs have been produced from the Sida program in Technology alone.

Promotions

Quite a number of people who received PhDs and then later supervised students have been promoted over the years. People who were initially Assistant Lecturers are now Associate Professors and Professors. People who were previously in those positions as students are now the Heads of Department, Deans, Principals and even Deputy Vice Chancellors in some other Universities. I'm personally a beneficiary of Sida support. This support has immensely helped the technology sector.

Attracting Grants

As a result of the improved capacity we have improved our visibility as well. Our partners have also collaborated with colleagues on a number of projects.

MAPRONANO ACE I

The Africa Centre of Excellence in Materials, Product Development and Nanotechnology (MAPRONANO ACE II) is headed by one of the beneficiaries of Sida support; Dr. John Baptist Kirabira. He was actually one of the first students under Sida who built capacity and has now been promoted to the rank of Associate Professor and am sure in a few years if not months, he will make full Professor. He worked along with other partners to submit a proposal which was evaluated favorably and culminated in a World Bank funded project to the tune of USD 6million for a period of five years. He is one of the great examples.

Enriching Engineering Education Project

I have personally been running the Enriching Engineering Education Project funded by the Royal Academy of Engineering, UK since 2015. The objective of the program was to enrich engineering education by looking at the curriculum, changing the way we deliver programs as well as offering basic training in some components of teaching and learning. We are also looking at issues of research translation and curriculum formulation.

The project has so far been running for two two-year phases, and we are hopefully going to secure another phase. We have so far received funding to the tune of USD 410,000 over the two phases and are collaborating with the University of Dar es Salaam and Moi University in Kenya.

Sida Phases Out

Sida has been supporting African countries like Ethiopia and Tanzania our neighbours for a long time. So, if the funds are still available, my plea would be that, Sida still continues to support us until we reach maturity. Uganda is still a developing country and for us to sustain ourselves as academia, when need to have a strong industry base who are able to sponsor some of these things in the country. We cannot think of weaning ourselves off, when we don't have financial support.

Mobilizing Stakeholders, Industry, Alumni

We can do our part and try to mobilise our stakeholders, industry partners and alumni so that they support us to sustain innovations and research. However, we still need a strong industry base which we don't have at the moment. In developed countries like the US you have well-established industries, that are capable of sponsoring their own research activities. Academics attached to these industries can easily influence the award of research grants to universities from their big savings or earnings. Our predominantly small and medium scale companies on the other hand cannot afford this mode of funding.

As an example, at our recent celebration of 50 years of the Faculty of Technology and Margaret Trowell School of Industrial and Fine Arts, we invited our stakeholders, industry partners and alumni and were able to get some support for research from the industry to a tune of UGX 470million. However, UGX 470million over a period of two years compared to the Sida support is small.

We also formed an alumni association as a way of drumming up support for activities. We hope that together, we shall be able to do a few things here and there.

Applying for Grants

The other option is for us to keep looking out for opportunities. There are many opportunities which are posted on various platforms, that we keep on applying for. At times, other organizations like the Royal Academy of Engineering as I mentioned earlier may offer some support. People need to look at those opportunities that are advertised and then compete for them because funding is competitive.

Working with Artisans/Small-Scale Industries

The purpose of the Innovation Systems and Clusters Programme is to bring together people who are in the industry and have similar interests in either the products or production process so that they benefit in coming together. It's akin to forming a SACCO which is technically





supported by the academia.

People out there face challenges in the production processes, but when they come together with the academia, we try to find solutions that can be tested and improved upon.

To date, we have been able to work with about 70 such associations in different areas such as Katwe, Kayunga and Luweero. We have worked on innovations such as maize shellers, pineapple driers and recently I was contacted by someone who wants to develop a dryer for silver fish (Mukene). Previously they used to dry the fish on the ground, which would affect the quality because they would become gritty. The innovation is a solar dryer that dries Mukene off the ground without mixing it with sand. This mode of drying also preserves the taste.

The clusters were partly funded by Sida and other funders like UKAID and the Presidential initiative.

Uganda is a developing country and whatever resources we have should be put to good use so as to benefit the public because, ultimately, they are the primary beneficiaries of what we do. This will help Uganda to improve from a third world to a middle income country or even better.

I would like as a Ugandan and Makererean to thank Sida for the support they have consistently given to Makerere and Uganda as a whole and over a long period of time. Some of the 45 PhDs we have trained are from other universities like Busitema, Kyambogo and Mbarara University of Science and Technology.

Some of the beneficiaries have gone on to man initiatives. For example, the Vice Chancellor for Busitema participated in the Sida programme, while the Vice Chancellor for Ndejje was a beneficiary. He was not a student but benefited by supervising students on the Sida programme. This means that Sida contributed to his growth which enabled him to become the Vice Chancellor.

Sida has therefore done a lot. When you sit back and think what would we have done without Sida maybe Technology would only have only a few PhD holders. But now we have many and that capacity is doing quite a commendable job.

An Outstanding Partnership With Phenomenal Results

Interview with Prof. Tonny Oyana, Principal, CoCIS



I will use two adjectives to describe what this partnership has yielded; outstanding results and phenomenal.

Impacts

Human Resource Training

The first area that I really see with the biggest impact is in the Human Resource Development; the training of Masters and PhD students. When you have capacity, you can do many things. So Sida has built our human resource capacity in research, teaching and community engagement/partnerships.



Knowledge Transfer/Exposure

The knowledge transfer between Sweden and Uganda has tremendously improved. If you look at the recipients of this funding, we sometimes want to measure every metric, however when a human being is exposed, there is a lot they bring back home. The sandwich programme has given people great exposure and visibility. The number of people coming to sign MoUs is a great indicator of success and there is increased and deep interest in Makerere University. We are in excellent shape because of the funding from Sida.

Networks

There's a primary consequence but we also have secondary consequences. Many of these people who have gone through the program have created numerous opportunities. If you talked to them, you would learn that this collaboration led them to a network, and the network led to research opportunities.

Publications

In terms of real research metrics, if you look at the number of papers published, the number of grants, the number of promotions, I'm sure that when you analyse the numbers before and after Sida, you will find that they have either doubled or tripled. So I look at that as the mark of a very successful partnership.

Wireless Project

Specifically, under Integrating ICT-based support in Research, Teaching and Innovations, the Wireless Project has changed connectivity and enhanced networks but if you factor in productivity, students are now talking to one another; you find them congregated around hotspots. Implementation is approaching complete coverage of the University. As such, the flow of communication and information between projects has significantly improved. Implementation has saved Sida close to UGX 1billion in data costs previously added as separate items in individual project budgets.

Training

We have 28 Masters students training in new areas such as; Big Data Analytics, Artificial Intelligence (AI), Internet of Things (IoT), and these areas are the core foundation of Industrial Revolution 4.0. So they are already contributing to the present and the future. We are now uniquely placed as a university to outcompete and become a regional hub for the Industrial Revolution 4.0.

Spinoffs

In terms of spinoffs, we have developed sensors for air quality monitoring and collecting weather information. We have automated some processes, for example if you look at our Data Science and AI Lab, we are able to monitor and evaluate crop diseases like cassava mosaic disease.

I would argue that the spinoffs or start-up companies, especially in IT that are created along the Ntinda, Bukoto and Kamwokya belt are directly related to Makerere University. This is the second axis of our research and innovations; and people should look at this because it could easily evolve into a big thing. Ntinda, Bukoto and Kamowkya are a hotbed for IT research and innovations and could easily become the technology city exploding with very successful companies in the future, followed by Nakawa and Bugolobi.

Sustainability

Networks

The networks that have developed between Makerere and our partners in Sweden will go on because they are both personal and professional; they don't need money. People are working on various projects outside Sida.

Excellent Facilities

We have developed excellent teaching and learning as well as research facilities over the period of the Sida collaboration, which can be used for growing pipelines for research and knowledge. These facilities can be used to continue the Science, Technology and Innovation development. Visits to and use of these facilities can be arranged at either the full or subsidised cost or even free of charge for aspiring secondary school STEM-based students or talented primary students who are excited about science.

How can Government or Makerere foster further sustainability?

Research Policy

The idea of consolidating our Research Policy in Makerere would help. Firstly, those who have been trained can benefit from a very good policy of research. Secondly, Makerere can build a robust infrastructure. Yes, we have Graduate Research Training infrastructure but I think we can give it more strength by making sure the Directorate has the resources they need to succeed.

For example, I don't see why Makerere cannot start to give internal development grants to



early career faculty or faculty who are promising. I already see that the Deputy Vice Chancellor (Academic Affairs) has launched capacity building among leaders so that they can carry on the mantle. These are promising signs of Makerere trying to make sure that the good work and the excellent foundation that has been laid by Sida is built upon.

Partnerships arising from Sida Collaboration

Public Universities

Partnerships among Public Universities have arisen as a result of Sida support. I have friends, colleagues and scientists that I am working with from Gulu University, Mbarara University of Science and Technology (MUST) and Busitema University. Some of them come to use our labs at the College of Computing and Information Sciences (CoCIS).

North-South Collaborations

Our colleagues in Stockholm, DSV (Department of Computer and Systems Sciences) are exploring ways of continuing this collaboration through resources coming from Stockholm University. And other PIs will tell you the same; that the Universities are trying to find other means of funding. We are going for European grants together, where they are the lead and we are co-partners.

We have also sent students to Stockholm University. Last year, they gave us ten PhD places in Computer Science. All these opportunities are outside Sida.

Global players

Some of this research has been going on in the community. There is a strong community engagement agenda that has come up between the University, Industries and our communities. As a result, other donors have shown interest. Google for example has funded one of our PIs; Dr. Engineer Bainomugisha, to the tune of US\$1.3million. He is a Sida beneficiary and PI of the Building Research Capacity in Innovative ICT for Development for Socio-economic Growth in Uganda project.

We also have Huawei coming into play and are seeing more global players coming in to enhance this partnership.

Government

First of all, we are translating results into policy which is very useful to improve health, education and other thematic sectors. One of the biggest things in Uganda is automation and many of our graduates are going to form start-ups that develop smart mobile applications to automate the work that is out there.

I think that Government, Industry and Universities now understand each other a little better because previously, the bureaucrats and academics were working in isolation but this collaboration has acted as a facilitator to start a dialogue.

What can be done better?

Institutional Research

The Planning and Development Department should conduct institutional research particularly looking at the absolute impact and objectively give us solid data. Every year, we aggregate our data through annual reports, but somebody should look at it critically as a study.

One of the things I see if Sida is parting ways with us is that they can fund a systematic scientific study, specifically looking at impact, so that we can compile that information as a record of history, lessons learned and to give a knowledge template to future partners. This will inform other partners that if they stay longer just as Sida did, they will get solid benefits and impacts on science and society.

Early Mentorship

I would encourage that instead of waiting for the Uganda National Examinations Board (UNEB) to give us grades, we should engage excellent science, humanities and social sciences students in Primary School so that we are able to track them. In Secondary School, we can invite them to visit the campus, sit in lecture rooms and visit operation theatres in Mulago so as to gain first-hand experience and bring their dreams closer. Makerere can play a huge role in pipelining STEM. We have in the past pipelined community engagement but we need to pipeline science by engaging Primary and Secondary Schools, so that these things that our students are studying are not so abstract. We can take it to them in their everyday language and they can visit us during their school holidays for STEM camps.

Building Capacity In Urban Crop Waste Management

Interview With Prof. Elly Sabiiti, Caes



The interaction with Sida started with the Urban Crop Waste Management Project. Actually we first met Sida officials in 1999 when Prof. Hannah Akuffo paid a visit to Makerere University. I was Dean Faculty of Agriculture when we first interacted. She was looking for areas where Sida could develop collaboration with Makerere University. It was their first time to venture into Uganda and so they were looking for areas where they could make an impact. They had supported PhD training or capacity building in Sokoine University of Agriculture, Tanzania for many years and they wanted to expand to Uganda.

In Makerere they had already discovered through research that some Faculties did not have any PhD programmes. These included the Faculties of Medicine, Technology and Social Sciences. In our Faculty, they found that we had PhD programmes but they were also looking for a project that was crosscutting, whereby a Social Scientist, somebody in Medicine and somebody in Science and Technology could take part. I was staying in Katalemwa Estate at the time and we had a problem of the stench from garbage. I thought that I could write a concept about this.

Whereas we had PhD programmes in our Faculty, I also argued that our capacity was limited

and so we wanted to build more capacity to do research. In addition, we did not have many students on our PhD programme. There were few Professors and Senior Lecturers and yet to conduct research and properly supervise, you needed to have reached these levels. The other categories of academic staff could not reach these levels because there were no publications; we did not have funds to be able to do research. So that is when I came up with this idea of research on Urban Waste, because of its impact on health, nutrient drain from the production areas and alternative use of the waste. Back then, peels from bananas and potatoes, sugarcane tops, and all those crop residues were left as waste in the markets and were causing problems of hygiene, disease and so on.

Sida bought the idea and in 2000, they gave us the first grant. They were eager to see how multidisciplinary our research would be.

Impacts

Capacity Building

By the end of the research after 15 years, we had a total of ten PhDs, implying that we built capacity in research. Eight of these PhDs were specifically in waste management, one did social economics in soil conservation and management practices in hilly areas, and the other did work in rangelands; unfortunately, this one has not finished. Basically ten PhDs were funded and nine completed.

We have a big capacity for waste management research in this country. The trained PhDs have done quite a lot of work in terms of consultancies, writing policy briefs for Government and analysing composts that have been produced by various sources. The Government had a project on Clean Cities in 10 districts, and they were using our staff to do the analysis of the quality of the compost. The biggest impact of all this support is that these PhDs are all still with us at the college. There has not been any staff attrition.

Staff Promotions and Recruitment

As a result of our research, the staff got promoted. The highest now is at Associate Professor level, having risen from Assistant Lecturer. Others who were previously not part of our staff got recruited and are now Lecturers and Senior Lecturers.

Gender-Responsive Research

In terms of gender balance, our research project was actually the best. Five women and five men were trained as a result of this project. This was one of those projects that actually increased the capacity of women in our Faculty.





Influencing Research-led Status quo

You have heard many times that Makerere is a research-led University. It all originated from this project. Prof. Nawangwe who has been championing this was the Dean, Faculty of Technology when there was no PhD research then. But now there are so many PhD holders in that unit.

Improving Graduate Supervisory Capacity

Staff are now supervising MSc or PhD students. We, the Principal Investigators, also improved our supervisory capacity. The Graduate School now had money to train us on how to supervise better.

Our service delivery in terms of time spent in supervising students to completion has improved.

Influencing Policy On Publications

The interaction we had with supervisors from Sweden improved our skills and attitudes towards supervision. At Makerere University we did not emphasize the need for publications. The emphasis was more on the student finishing and submitting their thesis and then defending it.

However, the Swedish Universities emphasised publication of each objective and chapter into a paper because of the payment attached to each paper, on top of your salary.

So the culture of promotion was brought in. We started by saying that you must publish one paper for a PhD before your thesis is accepted for submission. That influenced policy in the University. Later on, we moved to two papers per PhD. Senate and Council embraced this and it is now a big policy and we are happy about that. The impact of that research changed academic policy from thesis to publication.

Nevertheless, payment for each paper published on top of one's salary is not the case at Makerere and that has been our area of contention; published papers are only a basis for staff promotion. However, this position does not benefit researchers like me who are already Professors.

Introduction of an Opponent

Another policy we introduced as a result of interaction with our Swedish counterparts was the introduction of an opponent when you are defending your PhD. That opponent during viva voce has nothing to do with your examination but is knowledgeable. After you have presented, the opponent is given almost an hour to interact with you and prove that you are

the one who did the research. A supervisor will in most cases not give a hard time to his/her students but the opponent brings a fresh perspective. The opponent is now a policy at PhD level.

PhD Public Presentation

Another impact on policy that this research had was the public presentation of your PhD. This is when all interested people within and outside the University are called to come and attend the viva voce. The public listens, asks a few questions and goes away. Thereafter, you are left with your examiners.

Both these policies have benefitted the communities because they now know what we are doing. I can go and attend a public presentation in social sciences or medicine to pick knowledge, which was not the case before. The public is also made up of students who after they have listened are inspired to enroll for PhDs after completing their undergraduate or Masters programmes.

Banning Buveera

One of our colleagues wrote a paper on the impact of plastic bags; locally known as buveera, on the economy and he was called to present it before the Parliamentary Committee. It was actually the basis for the total banning of buveera when they saw the impact. Technically the information was provided but all that remains is the political will. That paper clearly showed how much the country is losing in terms of environmental damage, but our politicians and business people do not see that!

Collaborations established

North-South

Because this research was so flexible, we had so many professors from Sweden in different fields who visited and stayed with us for a week or more. We would also go to various universities in Sweden and that created a huge capacity on research which we are depending on. When I want to do research, I simply send an email and request for partnership.

In my case, we secured a collaboration with Canada where one of their best Centre of Excellence in Waste Management's staff came to Makerere and gave us more advice on how to set up our own Centre. We are still connected. Sida did not confine us to working with Sweden only, and so we have collaborators from all over the world and in the region.



The networks are big and this is why Makerere is getting ranked highly because people were working together. We thank Sida for this flexibility.

Government

The Kampala Capital City Authority, KCCA, has always been involved in our activities. Additionally, whenever we held our Annual Review Meetings, the Government represented by Ministers of Education, Finance and many others would come and attend, so they were aware of what was happening. We therefore became better networked with Government and KCCA gave us all the support.

Later on, while I was conducting a different research with partners from South Africa, America, and India, they allowed me and my team to film urban agriculture and these clips are online. It was because we had a long-term collaboration with KCCA that we were able to film these facilities, otherwise it would not have been easy. This shows the huge impact of that research and Sida support, which exposed us to new areas, people, institutions, thinking and a better way of doing things.

Nurturing Grant Writers

There was an aspect termed as small grants attached to this project. These allowed staff who were not part of the main project to apply for funds to do research and gain experience. Many of those who started with these small grants are now big grant owners. Therefore, the research was inclusive.

Legalizing Urban Agriculture

We also held workshops with the nearby communities. The late Ssebaana Kizito who was the Mayor of Kampala City Council then, was so cooperative with us and we were able to even have urban agriculture legalized because of our research in waste. The Authorities saw the value. That was a big breakthrough. Previously, urban agriculture was illegal

Spinoffs

MSc Students

We also had some MSc students but these were not the main focus; the main focus was PhDs. We used to have a fund as part of the project called self-enhancement. As a Principal Investigator, I would get money to do my own research from the PhD Students' work. I would then be able to work with an MSc student to train him/her in order to do my research. And so

we came up with a number of approximately 10 MSc students.

Supporting Self-funded PhDs

There were those staff who were doing PhDs funded by other means. We partially contributed to funding some PhDs in the Faculty whose research was relevant to our project.

Creating Value Chains

As a result of this research, there are so many people who got involved; they saw value in waste. When we started this project in 2000, we were getting banana peels free of charge from Wandegeya Market. When we sensitised the farmers and communities around about supplementing their livestock with banana peels, suddenly you could not get free banana peels.

Through this project, we trained people on how to clean banana peels and not mix waste with plastics. And so a bag of banana peels started being sold at UGX500. We were competing with farmers and all of a sudden, people with trucks came looking for banana peels. It became an informal industry on its own; if you go to Wandegeya, Mulago – around the roundabout, there are several women whose job has been to trade in peels to make a living.

When you go to Kiteezi, people came to appreciate the value of recycling plastics, newspapers and they turned it into a business. So very many young people, especially women, got so involved. That was a very big impact! We started with free banana peels and as the demand increased and people became more aware, the price rose to UGX500 and at present, I think a bag could easily go for UGX20,000. I once watched a TV programme where a woman who said she was a single parent testified to having educated her two children up to university level, bought a plot of land and built a house through proceeds from selling banana peels. What more impact can we ask for?

Sustainability/Continuity Plan

Centre of Excellence in Waste Management in the East African Region

Our most celebrated form of sustainability has been the establishment of the one-of-a-kind Makerere University Centre of Excellence in Waste Management in the East African Region, based at the Makerere University Agricultural Research Institute Kabanyolo (MUARIK). This Centre was established in the spirit of absorbing 10 PhDs that we had trained so as to continue our research in waste management.





We applied for a house from the University which we have since transformed into a Laboratory with basic state-of-the-art equipment to conduct research. Students at undergraduate and MSc level are doing their short-term research projects. We are yet to reach PhD level. The university is going to give us a full-time technician to manage that equipment.

In addition to championing research in waste management, the Centre is going to conduct product development, train staff, partner with Government Institutions and the Private Sector. We did not plan to establish this center initially but it has arisen as a result of the research we have done.

Product Development

Our research produced a lot of innovations but these have not been turned into products. That component is lacking. It needs to be funded. Scaling up or turning the science into products remains undone.

- i. One PhD discovered bacteria that enhance degradability of organic matter or waste. The idea is that these bacteria are too few. So if you can multiply them, you would use bacteria to degrade all the biodegradable materials.
- ii. Another PhD student came up with a formula of mixing banana peels with grass and some concentrates that produced the highest milk yield. That formula needs to be scaled up. We are talking of turning banana peels into pellets; pellets have a longer shelf-life than peels.
- iii. Another candidate came up with a method of mixing mulch with other components and found that a certain combination would produce the best yields. Instead of physically using mulch, you would now use machinery to produce these products. Additionally, instead of carrying bulky sacks of mulch, you would only need to carry one small sack.
- iv. We are producing biogas but we are looking for ways of packaging it into small 5litre containers for easy purchase and distribution. Currently it is manufactured in the biodigester and with time, it escapes.

Climate Change

We have new emerging challenges in the form of climate change. At that time nobody was talking about climate change but it is a new priority. It has led to outbreaks of diseases in crops and livestock. In agriculture, we are developing new varieties of crops that can tolerate the new vagaries of climate change; drought, funding and the like.

Sustainable Theme

Everything we are working on now is sustainable, for example research and development.

There are seventeen new Sustainable Development Goals that have been set. We need to see where we can contribute. There is a new Strategic Plan that has been developed for Makerere University which has incorporated these goals. Of course, agriculture, food security and nutrition are key, and in our case the environment, where we are faced with issues of degradation.

Summary

Sida has been a unique sponsor. I have not seen a partner like Sida. They do not have so many strings attached, if at all. We have been allowed to develop our priority areas and they select which ones to fund as opposed to other donors who come with their priority areas. The uniqueness of Sida is that it has been a long-term supporter of our research, which I have not seen in any of our other donors. I really commend Sida for the sustainable funding they have given to us. I have been here for more than 30 years and I have not seen a mode of funding as unique as Sida's. This long-term sustainability in allowing Universities to focus on what they want to achieve and Sida's flexible model should be recommended to other donors.

When Sida started out, it was only at Makerere University. Later on, they decided that they could also build capacity for Gulu University, Kyambogo University, Mbarara University of Science and Technology and Busitema University. They even went ahead to support other chartered private Universities.

Sida's intention in coming to Uganda was to build capacity and they have achieved it.





Enhancing Gender Equity and Research

Interview with Assoc. Prof. Consolata Kabonesa, School of Women and Gender Studies, Makerere University



My first engagement with Sida was in 2005 while we were working with the School of Social Sciences. I got a project to work on Gender and HIV in Kabarole District, and then I did another project on Hoima District. I later on went back to Kabarole District and disseminated my research and they were really very happy; researchers rarely go back to the communities to disseminate their findings. I have actually gone back to Hoima again recently and collected more data, this time using my own funds. I want to look at what I collected before through the years and be able to do an analysis of what is going on with Gender and HIV in as far as perceptions are concerned.

In particular, I am looking at the response to use of condoms and whether they think they are at risk of getting HIV/AIDS and if they are at risk, what they can do; can they abstain? I want to be able to analyse all this data together so that I can go back to Hoima and disseminate these findings and thereafter publish my articles.

The findings so far show that there is no change in as far as perceptions are concerned, although there has actually been a lot of sensitisation. However, sometimes when sensitization stops, people go back to their regular behaviour. Way back I had found out that people were very scared of HIV/AIDS and at that particular time in Kabarole they were using the sound of the drum, which symbolises danger. Back then, the sound of that drum on the radio was effective in changing people's behaviour. However, since they stopped using the drum, they went back to their usual lifestyle.

I also found out that although quite a number of people thought they were at risk, they did not take this as reason enough to do whatever was required to protect themselves; the thinking and action did not match. And so that's why we will probably see that there is an increase in HIV/AIDS infections because the thinking is different from the behaviour.

Additionally, I found that as far as students and the youth are concerned, there is no longer fear of contracting HIV/AIDS because of the medication that is readily available on the market. Actually, the young girls told us that they are more afraid of getting pregnant than catching HIV/AIDS. Their thinking is that when you get pregnant, you will be discovered very fast and then you will have your baby to take care of. However, as far as getting sick (of HIV/AIDS) is concerned, the symptoms take some time to mainfest and secondly, there is medication. So those are the kinds of issues that I looked into.

I am actually grateful for the first portion of Sida funding that I received because it enabled me to go back and see what was happening in Kabarole District where I had done the research for my PhD. This support also made it possible for me to add on another district; Hoima. Back then, I had one student that I was co-supervising with Prof. Grace Bantebya and Margareta Espling my colleague in Sweden, and he completed. Unfortunately he left the University and went to work elsewhere.

Impact of Sida on Gender Mainstreaming in PPUs

Firstly, we had students we supervised. We have also used the funding it to build capacity of the staff who in addition to earning PhDs have gained experience in supervising students. We can confidently say that we have got a lot of experience through that work as well as collaborating with our colleagues.

Secondly with Sida, we developed a research course; Gender Focused Research Methodologies, which has actually been taken by a number of Graduate students in Makerere, including those on the NORHED programme. The course introduces students to the use of gender in their research and we can proudly say that we have supported students outside the Sida programme.

Within this School, we are almost completing the development of a curriculum for the Taught





Gender PhD Programme. This Programme should be able to roll out in the next academic year. This was done under Sida Phase IV. We also currently have a PhD by Coursework in the School. We have also taught in the PPUs namely; Mbarara, Kyambogo, Busitema and Gulu. At Gulu University, we have actually taught them how to mainstream gender in the functions of the University. We have gone through research, curriculum, and gender budgeting as well as Training of Trainers. We want to ensure that they have the skills to do their own training when we leave these institutions at the end of the programme. So we are making sure that our members of staff in these institutions have the necessary knowledge and skills to be able to do that.

As far as knowledge is concerned, we are also developing a Training Manual for use in Universities, which they can follow or go ahead to adapt to their own use. It looks at areas of curriculum development, research, general understanding of gender and gender mainstreaming; it is quite detailed.

We were also able to raise sensitization on Gender. This is one area which is very difficult because the students are many. We went to the five institutions and met with close to 500 students. We went through what gender is, what their understanding of gender is, issues of sexual harassment, and so forth. We supported Gulu University to have their own sensitization on women and leadership. The students actually organized a meeting where they learnt what leadership is and how they can actually become better leaders.

Another unit that we have worked with is the Gender Mainstreaming Directorate at Makerere University. We co-sponsored the development of the matrix on gender equality by the University Committee on Gender Equality. The matrix looked at what is required, what the University can give, what the issues are, and what the University can do about them.

Gender and Equity Budgeting

In Makerere University, we trained staff in Gender and Equity Budgeting. This is a requirement by the Government of Uganda in the Finance and Management Act of 2015. By that Act, all Government institutions are supposed to budget from a gender and equity perspective. So as far as the Sida programme is concerned, we have done our part; we have raised awareness and some skills in Gender and Equity Budgeting in Makerere and other PPUs. What remains is for the Management of these institutions to implement these guidelines.

Gender and Equity budgeting will ensure that women have support for leadership training and mentoring within the budget for the next financial year. That budget may also support programmes for students from hard-to-reach areas as well as students with disabilities; to ensure that they have the support to go around or the technology they need to be able to read and write their papers. The budget can also cater for creating awareness in the University of Gender Issues, sexual violence or working on polices that support Gender issues.

And so Gender and Equity Budgeting will look at different categories of women, marginalized groups, and vulnerable people especially women and youth; who are the majority of our students. We recently had a case where a first year student reported with barely any necessities but received support from well-wishers. So there should be a fund that can support such students when they report so that they are able to settle in properly. We look at all those categories, their needs and how the university can help them so that they are put on committees, where their voices can be heard as they put forward their issues.

Scholarly Writing

When it comes to Scholarly writing, we have built significant capacity. One of the things we made sure to do was train our PhD and Postdoc Students on scholarly writing. We worked with our colleagues in Sweden to make sure that students gain command in this skill. We also realized that there is a need for skills in quantitative research and we have also made preparations to conduct that training.

A number of people have been promoted because of papers they have written under the Sida programme. Others have been made coordinators and a number of us are on different committees. For example, I am also an external examiner for Mbarara University of Science and Technology. This has been as a result of my close working relationship with them on Sida. Additionally, I am doing a review of competitive proposals for members of staff at Kyambogo University. This has been as a result of my close work with them on Sida. I am also a Member of their Committee on Gender Mainstreaming, where we had to come up with the criteria to select members. It is very important for us to build capacity for other institutions because we want to make sure that Gender Mainstreaming is not only in Makerere University.

Another impact that we see ourselves bringing on board is extending support to PhDs and Masters students on other programmes. We have made sure that students in the Sciences come on board. We have students from Technology doing housing, students from Industrial Design who are looking at the use of beads and a student from Agriculture who is also on our programme for the Masters. We have made sure that both Sciences and Social Sciences benefit from our Masters and PhD programmes and in so doing, we can be able to mainstream gender in the other areas as well.

The State of Gender

In Makerere we can say that we have trained quite a number of people as far as gender is concerned. However, training in gender and changing the attitudes of people are two different issues. We do not expect people to change their attitudes immediately; it takes time because





we are changing people's behaviour. Remember that these people have been brought up to this level in a different setting and all of a sudden we are telling them that gender is important and we need to do things in a new way. It requires patience from us. We know that Makerere is doing quite a lot in as far as addressing the gender issue is concerned particularly in the area of sexual harassment.

However, there is also the issue of funding for the programmes that have to do with gender. This has to be brought on board. This will entail making sure that the Gender Mainstreaming Directorate gets their budget, so that they can be able to work on issues of gender mainstreaming in the University. We are still low on implementing that.

I know Management thinks very highly of gender. In the current call for RIF, they emphasized that issues of gender should come out, which is good because with that condition in place, people should be able to publish and get promoted.

The other issue has to do with Administration. Women need to be seen more in Administration, not just by making the allocation but having them in place so that they can raise the issues. We know that men's issues differ from women's issues. It is only a woman who can clearly articulate the issues that constrain a woman in the university. And so we need to see more women in Administration and the University should be able to do something about that. In that regard, we were able to work with the Gender Mainstreaming Directorate to train women in the University in leadership. We actually trained close to 160 women and we are going to continue with them this semester so that in future we can see more women contesting for leadership positions. Women need mentoring and if the Gender Mainstreaming Directorate is given funds, they can be able to run programmes to ensure that more and more women are actually supported to get into positions of leadership.

And so I should be able to say that Sida has done a lot for us in terms of capacity building, hardware and equipment. We have labs that were supported by Sida throughout the University and in particular, one of the Internet Kiosks is housed by the School of Women and Gender Studies. This support has benefited both students and staff, and ensured that we run our programmes as well as supervise students in a proper way.

Spinoffs

Since I began working with Sida, I have had a three-year project supported by Austria on Gender Budgeting. It started in 2012 and I have since been able to complete it. I have also been on the Water is Life project which I also completed. I didn't have money for research but I had a student whose training I supported. So some of these projects did not have funds for research per se but we published.

I am currently working on Waterspout, which is a programme looking at water safety particularly in arid areas. It is a programme running in South Africa, Malawi, Uganda and Ethiopia and so it brings quite a lot of people from France, South America, Ireland and England together in a big network. We meet on an annual basis and there is a lot of networking in the process. I have also worked with a lot of Universities, and served on a number of Committees within the University.

As a team within the School of Women and Gender Studies, we have conducted a large research in eight Districts on Male Involvement in Agriculture. We got interested in that research by one member of the Swedish team from the Headquarters in Stockholm. So far we've done the analysis and we are now going to sit down and start developing papers. This research has been done in Amuru, Dokolo, Isingiro, Jinja, Kabarole, Luwero, Hoima and Serere.

We have also looked at Responses of Communities to Gender Based Violence in about six Districts from all over the country. We have also sent the research to the technical person for analysis and we should be able to write articles out of that.

We have conducted research on Gender and Local Economic Development; on how gender is being mainstreamed in about eight Districts. We are also currently analyzing this research. And so by the end of all our research, we should be having more than ten articles coming out from the different themes.

We have also worked on a book manual with about 16 chapters from the postdocs, staff at the School of Women and Gender Studies as well as Gender Mainstreaming Directorate. And so Margareta Espling is coming in October 2019 and we are going to be able to finalise that book. We think that it should be out in the middle of January 2020. We are also going to work on articles for the students so that we can have special journal publications before we complete Sida Phase IV.

Sustainability beyond Sida Phase IV

As researchers, we are going to continue looking for further funding but are also saying that our Universities should take over. We thank Sida that has been with us and built capacity, and now we see that the Government has come in with a fund to support our research and innovations.

However, as the ones who come up with the budget, we need to incorporate all these activities like training, developing manuals and so forth, so that they are funded from our budgets.





Conclusion

Thanks to Sida's support, we have trained quite a number of students in the University. On this current phase alone, we have trained eight PhDs, twelve Masters and five Postdocs. When you add this number to the students trained in previous Phases, that is a great achievement, because all those PhDs are going to train others. And so Sida has done quite a lot for us and we are really thankful to the Government and people of Sweden for their support. We hope that we are going to be able to raise the funds to continue this good work and appeal to the Ugandan Government to come in and support us further.

Nurturing Research in Maternal, Neonatal and Child Health Interview with Assoc. Prof. Peter Waiswa, MakSPH



I have been involved with Sida for 12 years and it actually started while I was working as a Doctor in Iganga District. Karolinska and Sida asked me to support the starting of the DSS. I didn't have any formal role but as a District staff, I was helping them get to know the area, people, and secure an office. On the technical front, I was helping them with issues to do with Medicine.

During that process, they interested me in a PhD opportunity at Makerere University, which I joined later in 2008. My PhD idea which was Maternal Neonatal Health and later,

that is how the Centre begins, with a PhD idea. I enrolled with two other colleagues for a PhD at Makerere and Karolinska but one of them dropped out. I finished my PhD in 2010 and later I continued working with colleagues both here and at Karolinska.

My PhD project was an intervention in the DSS. There was a project called Saving Newborn Lives using the DSS platform funded by Sida but with additional money from Save the Children/The Gates Foundation.

Collaborations

That work brought us into a closer collaboration with the Ministry of Health and partners including; Save the Children, WHO, UNICEF and others. The death of mothers and new-borns



is a big issue and ours was one of the first studies and so there was a window of opportunity in terms of policy because Government wanted evidence and we were generating evidence that has interest both ways.

So we worked with Government influencing their policies and staff. Along the way, we got partnerships in Sweden, Europe, the US, Uganda and Africa. Later we took this work to the INDEPTH Network, which is a network of DSS sites, and started research on Mothers and Newborns, which was not being done prior.

Sida actually gave us some money to bring some countries in Africa and Asia to do more work on Mothers and New-borns using the DSS platforms around the world. So you could actually say that two units emerged; one at Makerere which is the Makerere University Maternal, Newborn and Child Health Centre of Excellence, but there is also the INDEPTH Network Maternal New-born Child Research Group which is across the world, not just in Uganda. There are over 30 sites (DSS) that are members in over 20 countries in Africa and Asia. This was mainly because the gap existed not only in Uganda but also in Africa and Asia. Our research efforts in this area would turn out to be very important.

Along the way we had to find new ways to continue because projects, just like any other funded activity, come to an end. The Saving New-born Lives project ended in 2010 but we continued applying for additional grants. We got grants from WHO, again from The Gates Foundation, European Union, Comic Relief, UNICEF and many others.

Impact

Reduction in Child Mortality

Before even I came on Board, Malaria, Pneumonia and Diarrhoea were killing people so much. But it was research from Makerere and work with others that changed the world and came up with new models of treating people, children, diarrhoea, new anti-malarials and the like. Right now Uganda has reduced child mortality by over 60% and a lot of it is a contribution of that research, which also informed the rest of the world.

Actually Stefan Peterson says he wouldn't be in his job at UNICEF without having been to Makerere. Incidentally, although I was his student, I was his referee. UNICEF had to ask me to write a reference letter of what he has done here (at Makerere) and why being here has helped him to be important.

New Culture

For us going to Sweden brought a bit of new culture; people to work with but also this whole

trend of publications, working with teams, mentorship, presentation, engagements and things like that, which brought out the richness. On the contrary, you can study at Makerere all your life and all the people you know are from Makerere; the value addition in this case is so limited. You need the bit from people who either have resources, more networks, other ways of work, and for many grants, you need a collaboration.

Postdoc opportunity

And so I was personally able to get all that and later I did a Postdoc; I was actually the so-called First Sandwich Postdoc at Karolinska and Makerere and that was around 2011. The Postdoc was actually enabled not with Sida money but with a grant we brought in from the European Union. Once in a while we could use Sida money for travel and related things. This was an opportunity that we continued to explore through collaboration, research and publications.

Networking

I had supportive supervisors who introduced me to their networks and I reciprocated by introducing them to my networks. So it is a win-win and I think the whole collaboration has been the same. It's not just that Uganda needs Sweden. Sweden equally needs Uganda and very much so.

Research Groups

Later we got additional funding from Save the Children and we decided to open a research group, since the research here had grown. We contacted people that we had been working with in teams. Most of our work here has been about what we call Implementation Research or Development Research - how to improve delivery of services, and over the years, we have built large partnerships and fora in Uganda and around the world.

Dissemination/Capacity Building

When we formed the Makerere University Maternal New-born Child Centre of Excellence, Save the Children gave us some money to recruit one or two staff. The funding also supported the running of conferences which was good because nobody gives you that kind of money.

We are now a large group; we have a website, we publish a newsletter, it used to be every two weeks but it's now every month. Interestingly most readers are in the US, UK and then Uganda. For us this has been so important because people around the world are always waiting to listen to stories and work happening and so they pick up our pieces and even use them more.





Our Centre is linked to other Centres at Johns Hopkins, Harvard, London School of Hygiene and Tropical Medicine, UNICEF Headquarters and that has helped us to amplify our research; they are always eagerly waiting for new findings. As part of capacity building, we have been able to have a Centre Coordinator, Communications Specialist and other staff. Most of the money for these activities comes from Grants.

Mentorship

We have also been able to mentor young people to do research in Maternal and New-born and Child health and so now there are many; mostly self-funded, but sometimes we fund others for their dissertations.

We also have several people doing PhDs. I have about four or five PhDs on the same but around the world you could say that there are many more.

We also receive interns not only from Uganda but also from Harvard and Johns Hopkins. We currently have one from University of Michigan. We always regard hosting them as a great opportunity and we tell them to write a blog or two so that they give something back. And also if they can, we ask them to write a paper. That helps us to grow the global network.

Spinoffs

There have been lots of spinoffs but most of them are staff. One thing we've just embarked on is trying to trace relation to SDGs; how far has Uganda come? That is work that the Ministry of Health and the world needs and is very interested in. So they are always knocking at our doors asking for this data and reports.

We have built the largest network of Neonatal Units in the East; at Jinja, Iganga, Kamuli and Bugiri Hospitals but also at lower level Health Units. Iganga was actually in the news recently; there was a mother who gave birth to five babies on 25th August 2019 and all survived because we have built the capacity of the health workers.

We recently refurbished Entebbe Hospital and have just won a new study called OMWaNa (Operationalising kangaroo Mother care before stabilisation amongst low birth Weight Neonates in Africa), which featured in the Newspapers of 26th August 2019. The study will be conducted in Entebbe, Masaka, Jinja and Iganga.

Our work has informed rollout of Maternal Neonatal Health programmes in Western, South Western and Northern Uganda. So this has all been impact coming from here.

Challenges

We do a lot of things which just end abruptly because we are not able to take them up; we develop prototypes and they die. The Administration needs to always look out for projects which have potential, support that work, and actually own it by putting in place support structures. Short of this, we stand the risk of these projects collapsing.

We also need to do more to strengthen interpersonal and interdisciplinary collaboration. I have always said this; the richest part of Uganda is Makerere University but people don't know. One Professor or Senior Staff or even Junior Staff has collaborations with hundreds of people around the world. These are the best in their areas not just in those countries but the world. There is no better strength than these networks and we need to make the most of them.

Students are a huge resource that is greatly underutilised at Makerere. I teach in Sweden but the first thing they give you is the profile of the student. We need to make our students like the University and market us.

I was in a big meeting at the World Bank and they said 'No, you don't talk about Makerere. You don't need to market. The only problem with Makerere is the guys are too busy...' The system can solve this 'too busy' thing by recruiting more skilled people to support the researcher. However, the image is there; everybody knows the University.

We need to be more strategic in broadening our impact in the region and Africa at large. The only way we shall achieve this is by collaborating with other Universities in more meaningful ways and not just projects.

Continuity after Sida

The UGX30billion that the University Management secured from Government is a good starting point. We need to look for more. Other institutions can give us that kind of money. However, we need to think about the problems that we are trying to solve, especially at a regional level. We need to go and read strategic plans of most of these funding institutions. What are their priorities? The SDG agenda is here. What role is Makerere playing? Can we harness that? Can we turn that into a regional fund? There's the academic arm of the East African Community. How do we engage with the community to solve problems?

So we need to identify what the regional issues are and what Makerere can contribute to that and how we can have meaningful collaborations with other universities. If we can do a PhD with Karolinska, why can't we do it with Moi? I think that is where we need to be moving. Stefan Peterson is a Swedish Professor that used to sit in the School of Public Health and



actually built the Sida Collaboration in the College of Health Sciences. He is now the head of Health in UNICEF in the whole world but still has Makerere University at heart. We recently gave him an appointment as a Visiting Professor. We should look out for more of these powerful people and give them appointments. They will make very good Ambassadors of Makerere University.

Finally, we need to dig up information and show what Makerere is doing; how it is impacting lives and society. Can this be a series we come up with? There is so much work going on in the College and in the University.



The Springboard to Attracting a Centre of Excellence – MAPRONANO

Interview with Assoc. Prof. John Baptist Kirabira, Sida/MAPRONANO ACE II



When we look at Sida support, we had the sandwich kind of training; we trained in Europe and in Uganda. In Uganda we were working with local materials based on our natural resources. Whereas we did not have equipment to do our research at home then, in Europe we did and we got that exposure on which equipment to use. We interacted with those European professors and we kept networking with them in most of the activities.

Nowadays when we write these proposals looking for funding, we bring them on board, because some funding calls for North-South collaboration. These networks have really helped us to advance our work. The exposure hardened us and we found our spaces. Sometimes when you have done everything in one country; what is commonly known as in-breeding, you



do not get exposed to other things. This can build up fear and the researcher may not be keen on emerging opportunities. Our exposure has really helped us to realize that although our partners have better infrastructure and are in bigger economies, we are not very different in terms of academics. This gave us morale to move on.

Spinoffs

MAPRONANO ACE II

One of the achievements as a result of this exposure was that my team and I wrote a proposal to the World Bank, for the African Centres of Excellence. We wrote the proposal in 2015/16 and were able to attract the Africa Centre of Excellence in Materials, Product Development and Nanotechnology (MAPRONANO ACE II).

It was very competitive to get that money because they were looking at many issues; the team, the collaborations to be pursued, the intended output and the quality and presentation of the proposal. I attribute our success to all these skills that Sida invested in us.

We gave a lot of reference to our Sida project while writing the proposal. One of the assessors had known about our Sida activities and this gave him confidence during our assessment and the final judgement he made.

The Centre is a loan to the Government of Uganda worth USD 6 million. The way we operate the Centre is Unique. Sida's mode of operation was that you would get a grant, use the money and account for it before requisitioning for more. Here we do the same, the only difference being that the results earn you money. We were given seed funding worth USD 1.1 million in 2017 to start off. We have an activity plan against which we are measured, and that is how we are going to operate. Our objective is to absorb the entire USD 6 million sum. We have now finished year two and have started year three. It is a four-year project ending in 2021/22.

Diesel Engine

As a Centre we work with Departments at the College of Engineering, Design, Art and Technology (CEDAT). One of the things we have done, is to develop a diesel engine. We are working with a small-scale artisan whom we had previously worked with to develop a steam engine. We were generating steam by burning used oil, similar to the days of the industrial revolution. We however realised that this could not go far since nowadays the intention is to reduce carbon emissions. We therefore opted for an internal combustion, single-cylinder diesel engine, which we have been testing for some time.

We have attached a student to work with the small-scale artisan and reverse engineer the prototype so as to give a concept and also optimise the operational parameters. We have tested it on a pump as well as on a machine that separates rubbish from soil and it works very well. However, we still need to come up with specifications so as to ably answer all questions about the engine's performance.

There are many people in Uganda who have tried to develop cars but the engine is imported. When you have an engine you can do many things. You can pump, shake, etc. We thought if we could make an engine by ourselves, it could be a contribution towards the industrial development. We plan to exhibit this engine and attract partners. We need sustainability for project continuity.

Health-focused Innovations

Pregnancy test kits

We are also partnering with a number of Departments such as Physiology and Medicine in the College of Health Sciences (CHS). We have tried to develop diagnostics such as pregnancy tests and these are now simpler to do.

Drinking water test kits

We are also developing a kit to test drinking water for contamination.

Classical mechanical cure of HIV/AIDS

One of the PhD students we are working with is looking for a cure of HIV/AIDS using the classical mechanics approach as opposed to quantum theory. What we are trying to do is: from the simple physics, if you have a particle and you vibrate it at its natural frequency, it will burst. So we are trying to advance that kind of simple concept into a solution for the cure of HIV.

What we are doing at the moment is computation before we can go into testing on real blood. The first challenge we had was to be able to vibrate that particle at its natural frequency and this is something which nobody knew.

The first thing we did was to manipulate existing microscopes so that we see that image of HIV, which we achieved. And from physics, you know frequency is related to wavelength and velocity. So we have designed the antennas, transmitters, etc. that we can use to target the virus and kill it. But in the process, you must be careful not to kill other cells. So we are also working on modules of separation and isolation.





Cancer treatment using contrast agents

Another student is working on the use of iron oxide as a contrast in MRI. Iron oxide is readily available and abundant from the iron ore deposits in Uganda. We already have contrast agents on the market but these have a number of issues which include; nausea and vomiting after use, toxicity to organs such as the kidneys while others are said to cause Parkinson's disease.

So we know that iron oxide is not only magnetic but also neutral. We want to use it in the form of nanomaterials; very small particles, as a contrast agent. These developments are ongoing.

We have a number of students doing research in nano technology because it is one of the big things we are doing.

Sida GIS Centre Creates Regional Impact Interview with Dr. Lydia Mazzi Kayondo



My PhD was funded by Sida. I studied at Uppsala University for some time and then Blekinge Institute of Technology (BTH). My PhD was in GIS. I came up with a data structure that would support road maintenance. It can be used by the Uganda National Roads Authority and the Road Fund among others, to prioritize road maintenance. I was recently involved in a consultancy that wants to build a database to that effect and their call on me was because of this PhD.

Promotions in Makerere are based on academic qualifications. After completing

my PhD, I was promoted to Lecturer, and following some publications and supervision of students, I was promoted to Senior Lecturer. Effective August 2019, I became a substantive Head of Department.

Before then, I was the Principal Investigator of the Sida GIS project focused on upgrading the GIS Centre into a state-of-the-art facility in collaboration with colleagues from KTH Royal Institute of Technology and Lund University in Sweden. My short tenure so far as Head of Department is linked to the PI position, because it is during this time that I have managed to further the collaboration with our Swedish counterparts. I have managed to line up a series of activities at the Centre, organize workshops as well as trainings that have allowed for networking with different organizations that are doing GIS. We have consequently brought in some consultancies under the GIS Centre. It is this experience that puts me in a better position in this role. I have learnt how to build teams and compete favourably for grants. We



have competed for funds mainly to conduct capacity building.

Under maintenance, there is a lot of geospatial data that decision makers have to be guided by in order to know the conditions of a certain road in relation to other roads. Condition varies from the physical look of a road to other engineering measurements of certain performance indicators. So I built a database where the data used in prioritizing road maintenance can be structured, so that decision making is by a click of a button. I have shared it with UNRA and sections of it are being used by different people to make decisions about roads.

About the GIS Centre

The main role of this Centre is to offer specialized GIS training to undergraduates, graduate students and also the industry. This Centre is universitywide. Postgraduate students who have some background in GIS training are encouraged to come for additional training at this Centre. The facilities can accommodate about 40 students. At the GIS Centre, users have software and GPS equipment at their disposal. We are currently waiting for GPS devices that will arrive anytime.

For instance, we have held specialized training in different GIS aspects for staff from KCCA and the Ministry of Lands and Physical Planning. With Sida's support, we have tried to conduct trainings that have supported the Centre. We have also developed short courses that are still undergoing approval by the university processes. Some of these courses were already in existence but have now been improved while others are entirely new. We advertise these to many industry professionals interested in specialized training. The funds we generate are used for general maintenance and buying consumables for the Centre.

In addition, we respond to calls to offer training services, research and collaboration within Uganda, Nairobi, Kigali and all these keep us going. The other organizations we have worked with in these countries include the Uganda Red Cross Society and the Regional Centre for Mapping for Resources in Development (Nairobi). Recently, we were a big facilitator at the Advances in Geomatic Research Conference 2019, hosted in CEDAT. Many of the pre-conference workshops were conducted at the Centre. This is an international conference coordinated by the Department of Geomatics and Land Management that happens every two years. Because of the Centre, we can ably train our Masters students who are our main beneficiaries. We see the Centre remaining dynamic even after Sida support.

Many of the staff at the Centre are those who have specialized in GIS within the Department of Geomatics and Land Management. In addition, we have staff from CoCIS, Geography and Geo-informatics that we work with to support the training as and when the gist is within their area.

Some of these staff have done postdocs under Sida funding. The gist of the whole upgrading was to gain exposure to Swedish counterparts who are also in the same field. Lund University in particular also has a GIS Centre. Some of the courses we offer were initially developed and facilitated by colleagues from KTH and Lund University.

The Demographic Surveillance Site

The DSS is one of the Sida funded projects in Iganga and Mayuge districts. Through this project, we have built capacity in the Iganga-Mayuge population surveillance studies. Initially, the relevant offices were trying to map mortality rates in Iganga and Mayuge using ordinary maps. We trained them in the use of GIS knowledge in order to produce dynamic maps that can be changed at the click of a button. This is one of the major things that has happened. The project has also sponsored various staff to go for conferences. They have published their work, networked and harnessed opportunities for collaboration.

A Message to the ladies

When it comes to gender, I know that I have been very controversial. Many times, some kind of concessions are extended to women in order to promote them. I think women can continuously get to the top if they stay true to themselves. If you keep thinking that 'no I am a woman, this will be simplified for me', then you may fail to perform when you get to the top. On the contrary, if you get to the top as a result of your hard work, then we shall realize your true potential. You will even perform better because you attained that position based on your competence.



SIHI: Improving Access To Health Care

Dr. Phyllis Awor, Director, Social Innovation in Health Initiative (SIHI) Hub Uganda, MakSPH



I lead the Social Innovation in Health Initiative (SIHI) hub in Uganda, hosted by Makerere University School of Public Health. I am a medical doctor, a health systems researcher and an innovations leader. I have a Master of Science in International Health through the Erasmus mundus program, where I was based at the Universities of London, Copenhagen and Bergen. After my Masters' studies, I came back to work to work on a research project at Makerere University School of Public Health. Here I met Prof. Stefan Petersson (from Karolinska Institute, coordinator of the health support program funded by Sida) who encouraged me to start my PhD studies and he later became my supervisor.

In 2012 I undertook my PhD studies, as a collaboration between Karolinska Institutet in Sweden, Makerere University and the University of Bergen in Norway. My research focused on innovative approaches to improve the management of fever in children who seek care in the private sector, in rural Uganda. This is because all our annual surveys consistently showed that more than half of all sick children in Uganda obtain treatment at private sector clinics

and drug shops. We therefore took the WHO/UNICEF recommended strategy for integrated Community Case Management (iCCM) of malaria pneumonia and diarrhea in children, which is for public sector community health workers, and piloted this approach within private sector drug shops. The results of this research were positive. We exponentially improved the quality of treatment of malaria, pneumonia and diarrhoea in children at drug shops, when we introduced the iCCM training, diagnostic tests and appropriate medicines at this level. I am currently completing my postdoctoral program, also with funding from SIDA.

Impact of Sida Support

My PhD research has contributed to the evidence on how to work with the private sector to improve how they treat sick children. We showed that empowering drug shops to manage fever in children correctly, directly contributes to increased access to health care as well as timely access to health care for children, through the private sector.

Secondly, my PhD research work was identified by the Social Innovation in Health Initiative (SIHI) as a strong example of an effective, scalable and innovative intervention for improving access to health care in low and middle income settings. I now lead the SIHI hub in Uganda, which conducts research on innovations countrywide, and provides capacity building for health innovators, implementers, policy makers and other stakeholders.



SIHI is a global network of institutions and individuals whose mission is to transform healthcare delivery through the use of community based health innovation and research. In Uganda, SIHI was launched in 2017. Sweden is one of the largest contributors to this initiative globally.

Our research has informed and contributed to changes in policy at national level, which now allow drug shops within communities to carry out rapid diagnostic tests for malaria. My work has also informed a program by the Ministry of Health where they are training drug shops to





use these diagnostic tests. This has inadvertently increased the number of health workers that manage malaria cases at the community level in Uganda.

My PhD provided me with the tools I needed to step out and make a difference, which has helped me in my work, especially at SIHI.

Spinoffs

I am now an independent child health researcher in Uganda, and I mainly conduct operational research – to provide the best options for improving the health system and health care delivery. For example, I manage a 1.5 million dollar severe malaria operational research project in Uganda, in partnership with Swiss TPH and with funding from UNITAID.

Secondly, as Director of the SIHI Hub in Uganda, my PhD and postdoctoral research have enabled me to pass on research, and project management skills to other health innovators. Since I completed my PhD, I have supervised 8 Masters' students and currently co-supervise 3 PhD students. Through SIHI, we have supported over 10 health-based innovations through training and capacity building, and I shall continue to support the research function within the university through the expertise I have acquired through my PhD training and postdoctoral research.

I have also been able to build research collaborations within and beyond the health sector in Uganda.

Transformed for life

I learned the importance of professional integrity during the time I spent in Scandinavia. The importance of meaning what I say and delivering on my word were strengthened, as well as early communication once I realized that a target might be getting off track. I also learned the importance of financial integrity, both in the workplace and at home. These are values that will stay with me for the rest of my life.

I would like to appreciate the support that I received from the Swedes, that has enabled me to transform my life and make a big difference in my country as well. Without this support I would never have been able to develop my career and implement all the projects that I am now in charge of. So thank you very much.

Original Interview by Andrew Byaruhanga, Trade Promotion and Communication Officer, Embassy of Sweden

Bridging the Gap between Science and Indigenous Knowledge Interview with Okot David Fred,

Sida-sponsored PhD Student



When Sida came in, I had just received my provisional admission letter to the PhD programme but with no funding. Sida support has been very helpful for me. I didn't want to stay in the field working for long as my interest is in research. So when Sida picked me up, I was very grateful. Under Sida support, I have been able to nurture my interest in research.

How I came up with my PhD topic

Earlier on when people were returning to the villages after the Kony war, a survey by the New Vision then showed that at least 40% of the resettling population suffered from snakebites every two months. It was too much! Afterwards the Retired Bishop of Soroti region was bitten by a snake and they tried to treat him but he died. That was so intriguing for me because I used to see some people treat these snakebites using local remedies.





This gave me the idea to get this information and formalize it. The other problem was that those who offered such treatment did not disclose their regimen. So that birthed an idea for me to crack this so that people can start to use the natural products without hiding this information. Besides, the witch doctors claimed to treat snakebites but scientifically we cannot rely on spiritual things.

So we went to the herbalists in Central Uganda who work under an association called the Traditional Medical Practitioners (TMPs). These do the treatment without using spiritual methods although some have a spiritual bias. Although we found these TMPs in Central and Mbale regions, we did not find them elsewhere in the country. We only found individual herbalists who are known in the particular villages to treat snakebites.

In the event that you are bitten by a snake, they will not let you accompany them to the bush to see which plant they pick. So that formed the first objective of my PhD. We didn't want to lay claim to this knowledge but wanted them to come forward with it, and let the scientific world prove which herb treats snakebites.

Our first priority was to determine the single treatment; which one plant had the ability to treat snakebites. Some of the herbalists pick a variety of plants and mix them up, which makes it hard to determine the chemistry of the treatment. So we managed to get that one plant for that specific snakebite. We completed this first objective in the Karamoja, Teso and Serere regions, with some preliminary studies in Kitgum. We have already written an article in this regard which we shall submit for publication.

Challenges

The herbalists were not forthcoming with the information. We had to use our University IDs to introduce ourselves as researchers. We also had to get approval from Uganda Wildlife Authority (UWA) in order to carry out the venom extraction from snakes.

To help convince the herbalists we assured them that we could prove which of the plants work as treatment for snakebites, based on scientific studies on animals.

We also had a challenge with venom. There is no reported lethal toxicity of venom from all the poisonous snakes of East Africa and Uganda in particular. And although anti-venom is produced in South Africa, the lethal toxicity of venom varies from country to country. Additionally, according to my preliminary research, the lethal toxicity of venom for the same species varies according to location, feeding and age of the snake.

So whereas we import the anti-venom from South Africa and it works generally, the level of toxicity of venom in East Africa has not been tested. Unfortunately, this is not within the scope of my PhD.

Our private partner Kavumba Recreation Centre did not have some species like the spitting

cobra. This species is very dangerous to keep owing to the requirement of glass cages. Our private partner also doesn't keep puff adder, which has highly toxic venom. We also tried to track the black mamba in Lake Mburo National park but were unsuccessful.

Activities

Documentation

We have since proved through experiments in the lab that some of the plants actually work as treatment for snakebites. We have not gone back to disseminate this information to herbalists as yet because in science, we need to first find the active principles in the plant.

We can however give them information that the crude extract tested using the ethnopharmacological survey works. The herbalists use either warm or cold water to perform what we call aqueous extraction. And so we followed their procedure; how they pick the plant, clean it, pound it, make the fluid, the mode of administration, whether it is oral or intravenous through incisions made on the skin with a razor blade.

Following their procedure, in our case using animal studies on laboratory mice and rats, we discovered that the method actually works and we have called the Local Council Chairpersons and informed them accordingly.

The ethnopharmacological survey has therefore been done and documented for North Eastern Uganda.

Milking of Venom

We have been able to acquire venom by milking snakes, processing it and testing its lethal toxicity; the minimum dose which kills 50%. This has been done for only one Ugandan species; the cobra, particularly the forest cobra and Egyptian cobra, because these are so wild and aggressive. We shall then proceed to the vipers.

Supervision

I have a supervisor from Germany and two from the Department of Chemistry, Makerere University.

I also have as part of my Doctoral Committee, faculty from the Department of Pharmacology, CHS as well as a Pharmacologist and Toxicologist from CoVAB.

My research has generated a lot of interest from these Departments and they regularly pass by the Chemistry Lab after work hours to see how I am progressing. I have really liked their cooperation and interest in seeing whether I will achieve my objective.





Impact

Previously, the Department of Chemistry had a freeze dryer that had only been used to process samples of plant extracts and saliva. Through innovation, we have been able to prove that this piece of equipment can be used to process venom. This is a breakthrough and we have opened the door for processing venom using locally available equipment.

Processing of venom cannot be done outside the country. It was always going to be very difficult for approval to be given for venom to be to be taken out of the country. My work in South Africa was only on plant extracts with authorizing letters from Entebbe. The samples I was carrying were already tested in Pharmacology for their potential in neutralizing venom. I had to ensure that the plant samples could work before carrying them out of the country for further analysis.

While in South Africa, I managed to isolate pure compounds in crystal form from the plant extracts. We now had to get the structures of the active principles in the extracts.

When I came back to Uganda, I contacted my supervisor in Germany at the University of Potsdam and sent him the crystals. He ran further tests on the crystals and found them to be very good. Upon further analysis of the crystals, we shall publish that work.

I am happy with the cooperation from the herbalists. I have informed them that the plant extracts have worked and thanked them for sharing their indigenous knowledge.

One of the methods I used to obtain information was watching YouTube videos. There is one article from the 1970s that talked about milking of venom by making the snake bite into something. That paper was not available for me to read the specifics but by reading the abstract and combining that information with what I had seen on YouTube, I was able to approach UWA and inform them about my research objectives and conviction that it should work. I asked them to give me an expert to help catch the snakes. The Director then wrote me a letter of introduction to the Authority's Research Section where I linked up with someone from the Snake Rescue team. I then gave him some more materials to read and links to a few YouTube videos to broaden his knowledge.

I then requested Sida for funding to purchase two vials of antivenom from South Africa, each at a cost of UGX 520,000/=. This was precautionary because it was a novel trial. We then consulted the medical doctors and upon assurance that we had the anti-venom, they agreed to treat us in the event of any snakebites. That trial was very terrifying. UWA gave us approval to conduct this research for five years and availed all the snake handling equipment that we needed. We also had to carry the black stone for precaution.

That first trial really gave the impression to the owner of the reptile village at Kavumba Recreation Centre in Wakiso and the Uganda Wildlife Authority that this kind of research can also be done in Uganda. We now have a good working relationship with the private sector and UWA. My supervisor was equally impressed that processing of snake venom could be done in the Laboratory at the Department of Chemistry.

With this knowledge, I then went ahead to the field to start engaging the herbalists because I knew I already had the capability to conduct analysis.

Sida also gave me transport and equipment; a fridge for storing the venom and the portable cold chain for collecting samples from the field.

As a Chemist, I have also gained extra skills in the handling and processing of venom. We now have readily available dry samples of venom. This is heat resistant and so can be stored at temperatures ranging from 5 to 10 degrees Celsius. I have also trained my research assistants and they have gained confidence in handling venom and conducting the animal studies in the lab. So we can lay claim to having the first processed venom using our facilities at Makerere University.

Spinoffs

When I was in South Africa, we first analysed the plant in total and we did sequential extraction. We then together with the Professor in essential oils realized that the plant extracts contained an essential oil. I then extracted the essential oil from three plants and analysed them for one month at no extra cost and the results are ready. That will constitute the third publication.

We have further extracted some more samples of essential oils using our labs in the Department of Chemistry and we are going to test the biological activity and anti-venom potential of the essential oil. When we ascertain the biological activity and chemical constituent of the essential oil, that will form the basis for another powerful fourth publication.

Sida's Input

The beginning was not easy. As a student under the locally trained PhDs project, I was not eligible for funding for foreign travel. However, I was not going to be able to satisfactorily complete my research unless I did further experiments on the plant extracts I had obtained because those facilities were not available in East Africa.

I therefore shared my aspirations with my employer Gulu University who agreed to fund my air ticket and with that in hand, I contacted the Overall Sida Programme Coordinator Prof. Buyinza Mukadasi who then came up with a cost-sharing arrangement between Gulu



University and Sida; the bigger portion being covered by Sida. I then used my salary to cover the extra costs of my stay in South Africa.

Way forward

The documentation has only been done in North Eastern and some parts of Eastern Uganda. There is no official reported cases of death arising from snakebites; victims usually receive treatment in the villages and there is very scanty information in the hospitals.

Secondly the ethnopharmacological survey in North Eastern Uganda only gave the names of the plants used to treat snakebites in the local languages. Other people in the Central and Eastern Uganda do not know the names of these plants. There is a need to do the survey and testing the potential of those plants to treat snakebites in other parts of the country. When we conduct the survey, we also put the names of those plants in the local language and the types of snakes whose bites it is used to treat.

We also need to sensitize the herbalists not to hide this information. Much as it is their source of information, by disclosing these plants we could scientifically prove which of them is the best remedy.

We need to advise the policy makers to encourage the populations to preserve these plants. They are few and some of them are slowly getting extinct. We have identified three different species that can be grown commercially and if this can be encouraged, we can preserve the plants. At the end of my PhD, I will have to compare which plant works best then we select which one to promote.

As a Chemist, I am supposed to get the chemical components of these plants and publish

them. With funding, this will be possible. We can make herbal formulations.



EPILOGUE

Creating a regime of Quality Assurance at Makerere University



Epilogue:Creating a regime of Quality Assurance at Makerere University

Vincent A Ssembatya,Director of Quality Assurance,
Makerere University

Directorate of Quality Assurance, Makerere University

Sub-Program Title: Strengthening Quality Assurance Initiatives for Relevance and Optimal Productivity at Makerere University and Partnering Public Universities (PPUs)

Introduction

The Directorate of Quality Assurance which was set up in May 2007, has the primary responsibility of providing leadership in prescribing, controlling and implementing quality standards at Makerere University. The university has a Quality Assurance Policy and Framework (approved in 2007) that guide the activities of the Directorate and the Quality Assurance regime in the university.

In its current strategic plan (2008-2018), Makerere University recognizes Quality Assurance as one of the key crosscutting themes to be embedded in all its activities.

The university has in place a council committee on Quality Assurance and Gender. This committee has recently been restructured with the mandate for ICT to be handled by a separate committee of the University Council. This committee is charged with the responsibility of ensuring the smooth implementation of the Quality Assurance policy; the eleven-member committee is also responsible for the Gender and ICT policies. The Directorate of Quality Assurance provides the secretariat to this committee which meets quarterly.

The University operates a Quality Assurance committee system: College Quality Assurance Committees (mandated to develop quality standards and promote a quality research culture in the ten colleges); The Board of Research and Graduate Training (mandated to handle research related matters); Library Quality Assurance Committee (mandated to develop Quality standards and promote Quality of Library Services); and the Administrative Quality Assurance Committee (mandated to promote the University Quality culture within the administrative units). The College Quality Assurance Committees were launched by the Vice Chancellor in 2015 and are partially operational; with some colleges more rigorously pursuing the activities of the committees (for example the College of Health Sciences and the College of Computing and Information Sciences).

Other colleges still largely depend on their college boards and administrative offices to handle activities of Quality Assurance. In such situations, many of these activities are legacy in nature (external examination, peer reviews, committee assessments) and have not integrated innovative mechanisms that drive modern universities. The majority of these colleges count on the Directorate of Quality Assurance to support these new mechanisms (Tracer Studies, Employer Expectation Surveys, Tracking, Monitoring of Teaching, Computation of ratios, alignment of learning outcomes with inputs and processes, etc) from the center and this puts stress on the lean Directorate.

Background

The mechanisms to facilitate the implementation of the QA policy among others cover the Quality of: curriculum; students; staff; research resources (research labs, equipment); research support environment and the whole spectrum of inputs.

Objectives of the Quality Assurance Component of the Government of Sweden funded Bilateral Research Program (2015-2020);

The overall objective of the Quality Assurance Component is to: Strengthen the Quality Assurance Regimes of Makerere University and Participating Public Universities in Uganda for the improvement of teaching and research outputs in those institutions.

The specific objectives of the Quality Assurance subprogram are:

- 1. To improve supervisor-student relationship by developing personal and professional transferable skills by 2017;
- 2. To enhance the quality of graduate training by facilitating the review and development of taught PhD programs by 2020;
- 3. To increase the completion rates of graduate students to 80% for PhDs and Masters by 2019;

- 4. To ensure compliance with established quality assurance standards and best practices in graduate teaching learning, and research by 2020;
- 5. To create a consortium for public universities for sharing higher education quality Assurance best practices by 2016.

Key Activities for specific Objectives

Objective 1: To improve supervisor-student relationship

by developing personal and professional transferable skills by 2017;

- a) Training of Administrators on quality enhancement in administration of graduate programs and research;
- b) Training of members of Quality Assurance Committees in quality enhancement in the university provisions;
- c) Set up a State of the Art telepresence facility for training of supervisors and administrators on graduate training,

Objective 2: To enhance the quality of graduate training by facilitating the review and development of taught PhD programs by 2020;

- a) Development of curriculum for PhDs with a taught component in four colleges;
- b) Review of existing PhD and Masters Programs in two colleges;
- c) Conduct Tracer Studies on graduate programs;
- d) Conduct employer satisfaction surveys for agencies that employ graduate students;

Objective 3: To increase the completion rates of graduate students to 0.2 for PhDs and 0.5 for masters by 2019;

- a) Develop and enhance compliance mechanisms to the existing university policies and procedures;
- b) Training administrators and supervisors on developed graduate tracking systems;
- c) Continual maintenance and upgrading of the graduate tracking systems;

Objective 4: To ensure compliance with established quality assurance standards and best practices in graduate teaching learning, and research by 2020;

a) Quality enhancement training in supervision skills for supervisors of





- graduate students;
- b) Assessment of training and research performance for compliance to quality standards at National, Regional and International (best practice);
- c) Level institutional performance against regional and international best practice through benchmarking;

Objective 5: To create a consortium for public universities for sharing higher education quality Assurance best practices by 2016.

Key Activities in the Period 2015-2020

Implementation of self-assessment exercises

The Quality Assurance Self-Assessment 2017 report was completed after a successful self-assessment exercise that covered 2016 data; Outputs of this report were presented to the University Management on July 4 2017. Feedback was given and a detailed report forwarded to Management for further action;

A breakfast meeting is planned for May 9th 2019 to present the detailed report to top management of the university and chair of council. This meeting will update the University Management on policy implications of the undertakings in Quality Assurance. Breakfast meetings are now routine activities utilized as for between QA and Management.

A report on agreed actions from the self-assessment feed into policy proposals from the University Management to Council. Achievements include:

- a. Improvement of staff:student ratios from 1:28 to 1:22 with a target of 1:20;
- b. Merging of the evening and day academic programs;
- c. Improved supervision on PhD programs;
- d. Commitment to focus on graduate programs (in the new strategic plan);
- e. Improved monitoring of teaching activities;
- f. Commitment for research outputs per academic staff;
- g. Securing more research funding from government (up to UGX 30 Billion);
- h. Government taking over the wage bill;
- i. Improved tuition fees for graduate programs;
- j. Setting up of partnerships for provision non-academic activities by the university.

Tracer studies

The 2018 Tracer study focused on the 2015 graduates. The 2019 Tracer Study is underway and focuses on the 2016 graduate. In the period of the current funding two studies have taken place with a third one underway.

Information on the challenge of the 13,000 graduates of Makerere University on finding employment out of an average of 4000 degree jobs advertised has been illuminated. Self-employment becomes a focal point after the findings of this study.

Employer expectation surveys have been done in complementation to gain feedback into the curriculum development and review exercises at the university.

Review of curriculum

The major review was completed in March 2017. The university council approved all the reviews after due consideration by the Senate and the Quality Assurance Committee. The reviews included the development of taught PhDs; The PhD in Mathematics is now accredited by the National Council for Higher Education. Other taught PhD programs are in several stages of development;

- a. PhD in Mathematics;
- b. Phd in Higher Education already running;
- c. PhD in Management;
- d. PhD in Information Systems;

The support to development of taught PhDs was extended to participating public universities. Each university identified such a program to be supported. The Directorate worked with these universities individually on developing the curriculum on these taught PhDs. The PhD at MUST in Biomedical Engineering has been submitted to the NCHE for accreditation. Busitema university is still working on the PhD in Materials Science while Gulu University is working on the PhD in Applied Tropical Entomology and Parasitology.

To be completed: CHS: A PhD in Public Health will be developed;

Three of the four PPUs are developing taught PhDs and are at different stages:

- a. Busitema Universtiy A PhD in Materials Engineering;
- b. Mbarara University of Science and Technology A PhD in Biomedical Engineering;
- c. Gulu University A PhD in Applied Tropical Entomology and Parasitology.

SECAT: Student Evaluation of Course and Teaching

Initially co-funded to develop an ICT based system on evaluation. The system is fully functional





and reports accessible online.

Seven semesters (last three academic years) have been evaluated with online auto generated reports. Teaching has generally improved with evaluation with minimized complaints. The university now co-funds this activity.

Training of Graduate Supervisors

More than so far trained from Makerere University and PPUs; 75 trainees in 2019 and 75 in 2020. The program will be institutionalized in 2020 when the certificate becomes a requirement for supervision. The curriculum will be submitted to Senate in 2018/2019. The PPUs will be encouraged to follow suit with institutionalization.

Graduate progression tracking (to propel completion rates); The online system is functional at www.gradtrack.mak.ac.ug; Modifications have been made on the program and the data updated. As of April 2019 with over 3000 students registered on the system;

The research output at Makerere University have also improved as per most recent data that was collected in January 2017. These figures have indicated convergence towards the target of 0.5 publications per staff per year; the college of Health Sciences has already attained this target with 3 publications per staff per year. The challenge remains with the bias in the publications with Medical fields carrying about 43% of the total volume of publications.

Factors that have locked up the optimal production of knowledge outputs at these universities still include challenges in supervisor-student relationship, compliance to set regulations and inadequate preparation of students for research.

The Quality Assurance subprogram will progress with efforts to minimize the hurdles along the research and graduate training terrain at Makerere University and participating Public Universities in Uganda. Focus will be on enhancing supervisors' skills through training, curriculum review to improve the preparation of students and reinforcing tracking mechanisms to ensure compliance with set regulations. All these activities will be extended to the Participating Public Universities.

Key Sustainability Considerations for the Quality Assurance Program

The Directorate of Quality Assurance which was set up in May 2007, has the primary responsibility of providing leadership in prescribing, controlling and implementing quality standards at Makerere University. The university has a Quality Assurance Policy and Framework (approved in 2007) that guide the activities of the Directorate and the Quality Assurance regime in the

university.

In its current strategic plan (2008-2018), Makerere University recognizes Quality Assurance as one of the key crosscutting themes to be embedded in all its activities. The Directorate was established in 2010 with an initial budget of 30 Million Uganda Shillings. The Directorate was part of the funded programs in the Sida Phase III program (2010-2014) in its formative stages. The program successfully progressed to the Sida Phase IV funding (2015-2020);

The key elements built to sustain the Quality Assurance Program at Makerere University are the following:

1. The University Policy on Quality Assurance;

2. The Administrative Unit: The Directorate of Quality Assurance;

The current structure of the Directorate of Quality Assurance is embedded in the university administrative structure. Its total establishment is 11 people; the current number of staff on the ground is 6 of the 11. The Director of Quality Assurance is a member of the both Top and Central Management of the University providing an opportunity to participate in key decisions of the university.

3. The Committee Structure of Quality Assurance;

The university has in place the council committee on Quality Assurance and Gender. This committee is charged with the responsibility of ensuring the smooth implementation of the Quality Assurance policy; the ten-member committee is also responsible for the Gender policy. The Directorate of Quality Assurance provides the secretariat to this committee which meets quarterly. The committee has six (of the ten members) members as substantive members of the University Council. The current chair is Hon. Daniel Fred Kidega a former speaker of the East African Legislative Assembly (EALA).

The University operates a Quality Assurance committee system: College Quality Assurance Committees (mandated to develop quality standards and promote a quality research culture in the colleges); Board of Research and Graduate Training (mandated to handle research related matters); Library Quality Assurance Committee (mandated to develop Quality standards and promote Quality of Library Services); and the Administrative Quality Assurance Committee (mandated to promote the University Quality culture within the administrative units). The College Quality Assurance Committees were launched by the Vice Chancellor in 2015.

4. The routine Activities of Quality Assurance;

The University Quality Assurance Policy and Framework of 2007 guide the activities of the Directorate. The activities of the Quality Assurance Directorate include:





- a) Ensuring the development and maintenance of high quality academic programmes;
- b) Development of mechanisms to motivate high quality and competitive research;
- c) Ensuring an effective external examination system;
- d) An effective student admission, assessment and progression process;
- e) Ensuring a high-quality support environment for staff and students for effective teaching, learning, research and knowledge transfer partnerships.
- f) Contributing to the formulation of the university quality assurance enhancement policies and practices; to their implementation and monitoring across the university and where appropriate with collaborative partner institutions.
- 5. The requirement by the National Council for Higher Education for Universities to have effective Quality Assurance units to keep a check on compliance to National standards stipulated in the Quality Assurance Framework for universities;

6. The need for compliance to Regional and International standards;

Submitting data to external agencies like Times Higher Education and Clarivet Analytics, Quacquarelli Sigmunds (QS) and US News. Makerere University data needs to pass the tests by these major houses and this becomes a mechanism for international benchmarking. The Quality Assurance Directorate is the central unit connecting these international agencies for benchmarking and best practice. The need for the university to stay competetive and maintain international visibility is good motivation for sustainability.

7. Supporting collaborative efforts for high quality standards in the country. This activity includes support to the Public Universities in Uganda and affiliated institutions of Higher Education in Uganda (The Makerere University Business School, Nsamizi Institute of Social Development, The Army Senior Staff College Kimaka, etc). The university is considered best practice in the Quality Assurance.

The sustainability of the activities funded by the Government of Sweden will be achieved by integrating these activities in the routine activities of the university. This will be achieved gradually and with increased human and financial resources. However, key competing elements continue challenging the sustainability of the program. Such include:

- 1. Financing amidst the competing elements in the university budget and low tuition or low levels of inputs. The current appropriation of funds from Government on Quality Assurance stands at around 0.25% of the university budget. The component funded by Sida provides an equivalent of 0.2%; in total adding up to 0.45% with inevitable funding gaps. A commitment of 1% of the university budget would go a long way in bridging these gaps.
- 2. Human resources; currently the Directorate operates with 6 of the established 11

positions. Regardless of the current human resource level, the demands to the Directorate are very many considering the size of the university and the expectations of the country;

Exit Strategy

The ongoing support from the Government of Sweden has helped in nurturing the culture of Quality Assurance; with the inculcation of the systems and illuminated on possibilities of future programing of activities of Quality Assurance.

Strategies for mechanisms funded under the Research Collaboration;

- 1. Integrate into routine activities: Mechanisms that will be integrated include:
 - a. Tracer Studies:
 - b. Training of Supervisors of Graduate Students;
 - c. Curriculum Review;
 - d. Graduate Tracking.
- 2. Development of Supervisors Training Manual;
- **3. Phase mechanisms into routine activities.** Such mechanisms will begin off in a staggard manner (say every other semester instead of each semester or cover a proportion of the university each time they are implemented); Such activities will include:
 - a. Student Evaluation of Course and Teaching (Once a year or 50% of the colleges each semester;
 - b. Employer expectation Suverys (Once in three years);
 - c. Self Assessment (Once every three years);
 - d. Student Satisfaction Survey (Once in a student lifetime)

4. Offloading some activities under the collaboration with Public Universities:

- a. Activities under participating public universities will (hopefully) be taken over under partnerships between any collaborating universities. Such activities include those in (1) with the exception of tracer studies. Notably these activities were in the formative stages and so these universities will have a bigger task integrating them in their routine activies as most of these universities had not formented these units to maturity;
- b. Makerere University will continue to invite Participating Public Universities to the training of supervisors though the participants will be advised to meet the cost of travel and contribute to the training costs;
- c. Participating Public Universities will take over activities that they fill comfortable with e.g. Tracer Studies, Gradtracking, SECAT, Plagiarism checks, self assessment, etc. The Quality Assurance Directorate will provide support where called upon even though the PPUs will be expected to use their funding for such requests;
- 5. The travelling between collaborating institutions in the West and those in Uganda will





phase out as the binding MOUs between these institutions will have expired. In the interim video conferencing is being utilised under the supervision training and travel is being minimised;

6. The Development of taught PhD has benefitted a lot from the collaborative efforts in various ways. The expertise from Swedish universities was tapped into emensely in the case of Mathematics. In addition to the curriculum development, various professors participated in teaching in the initial stages. This activity will not proceed at the same pace in the case where capacity had been absent before the implimentation of the project.

In such a case, of an absent discipline (e.g. nanotechnology, artificial intelligence) the university will have to seek assistance from other Development Partners for human resource and facilities. Such has been the case in the development of the World Bank supported Centers of Excellence at Makerere University in Onchology, Plant Breeding and the one of Nanotechnology. Another such example is the PhD school in Social Sciences which has been funded by several bodies.

The Course on Graduate Supervision and Mentoring at Makerere University

Makerere University's Strategic Plan (2008-2018) recognizes quality assurance among three vital crosscutting themes to be embedded in the university's academic and administrative functions. This is currently enhanced by Makerere University–Sida collaboration through support of the sub-project "Strengthening Quality Assurance Initiatives for Relevance and Optimal Productivity at Makerere University and Public Partnering Universities" from 2015 to date. This facilitation has enabled the Directorates of Quality Assurance and Graduate Research and Training to enroll and train close to 150 academic staff in Graduate Supervision and Mentoring. Participants were initially drawn from Makerere University and since 2017 from Busitema University, Gulu University, Kyambogo University as well as Mbarara University of Science and Technology; hereafter referred Public Partnering Universities.

The specific objectives guiding the quality assurance subprogram are:

- 1. To improve supervisor –student relationship by developing personal and professional transferable skills by 2017;
- 2. To enhance the quality of graduate training by developing professional and transferable skills by 2020;
- 3. To increase completion rates of graduates to 80% for PhDs and Masters by 2019;

- 4. To ensure compliance with established quality assurance standards and best practices in graduate teaching, learning and research by 2020; and,
- 5. To create a consortium for public universities for sharing higher education quality assurance best practices by 2016.

The supervisory course is aligned with objective 4: To ensure compliance with established quality assurance standards and 6 best practices in graduate teaching, learning and research by 2020.

Specific activities for its fulfillment include:

- i. Quality enhancement training in supervision skills for supervisors of graduate students;
- ii. Assessment of training and research performance for compliance to quality standards at National, Regional and International (best practice);
- iii. Level institutional performance against regional and international best practices through benchmarking

Justification for Graduate Supervisors Training in Uganda Universities

Supervision of graduate students involves a process of interaction between a student and a supervisor(s) guided by institutional regulations. From the choice of a topic to completion of a dissertation/thesis, a student needs a supervisor's guidance, mentoring, inspiration, support for academic growth, knowledge in research methods, access to appropriate materials, networking as well as evaluation for quality output.

Whereas some students' exhibit academic independence; others display high levels of dependence in their expedition of research. Supervisors therefore need skills to devise strategies for steering students to completion. Besides, increased graduate enrollment and programs has resulted in overload, supervision backlogs, inefficiency, leading to stakeholders' continuous complaints. However, supervision in Uganda universities remains largely a pedagogy learnt through self-initiatives hence individual experience.

Currently, there is no university in Uganda with formal teaching on supervision of graduate students. However, experience has proved too slow a "teacher" to rely on with increased calls for timely completion. In view of the above, several supervisors are self-taught, drawing much from inbuilt and cumulative experience over time. In such a context, a novice supervisor could be a frustration in a student's academic progress. One's approach is to supervise as he or she was supervised which could be detrimental to academic progress of the supervisee.



In a nutshell, the art of graduate supervision can be daunting if attempted without adequate preparedness as is often with some supervisors.

Experienced supervisors may equally irritate supervisees. The mismatch may arise from failure to recognize their roles in retarding a student's performance. This could be unintentional or by default. Experience could equally be blurred by inadequate supervisory skills. The supervisor may be oblivious to cardinal undertakings that improve supervision. In sum, experience per see may not be a panacea to successful supervision hence the urgent need for graduate supervisors training in universities.

Motivation for Graduate Supervisors Training at Makerere

University Makerere University has over 600 supervisors. While the Directorates of Quality Assurance as well as Graduate Research and Training had in the past conducted training of graduate supervisors for enhanced performance, more effort was glaringly required in view of increased graduate programs, enrollment and research based supervision (RBS) against traditional based supervision (TBS). As noted above, these trainings were neither periodical nor institutionalized. Besides, many of the PhD students enrolled at Makerere University are staff who should be prepared to supervise; as such, when well supervised, would themselves be good supervisors.

The above shortcomings are buttressed by a mid-term evaluation report (2010-2013) of Swedish collaboration which strongly recommended the need to improve the pedagogical skills of the supervisors at Makerere University. Makerere University is further challenged by its set target to graduate over 120 PhDs per year with a current enrolment of about over 600 PhD students. For this reason, enhancing graduate supervisors' skills through training would enable the university realize this noble undertaking. Constraints enumerated above had compromised potential for Uganda universities to graduate enrolled PhD candidates in time; with about 50 PhDs (out of 600 PhD students) graduating each year by 2015.

Collaboration on Supervisors Training between Uganda Public Universities and Selected Swedish Universities

Improving throughput in graduate training became a major focus in the Sida Phase IV intervention; with Key activities targeting graduate supervisors (through pedagogical training), students (through monitoring progression), curriculum (through taught PhDs) and the general operating environment (institutional reforms).

Considering the flagship status of Makerere University in the Higher Education sector, each of the interventions above was extended to participating public universities through support from the Research Collaboration from Sweden. The Swedish universities identified for this purpose were Uppsala University and the Linköping University in Sweden. Training of Supervisors had been a tradition (and still is). The following distinguished trainers were identified from the two Swedish institutions:

- 1. Asa Kettis, PhD. Head Division for Quality enhancement, Uppsala University;
- 2. Katarina Andreasen, PhD. Associate Professor, Uppsala University;
- 3. Rut Anna Bjuremark Professor in Higher Education Pedagogy, University of Linköping;
- 4. Henrik Viberg, PhD. Associate Professor, Department of Organismal Biology, Unit for Academic Teaching and Learning;
- 5. Geir Gunnlaugsson, PhD. Educational developer, Uppsala university

Objectives for the PhD Supervision and Mentoring Course Course objectives

By the end of the course, participants are expected to:

- I. Identify, critically reflect on and independently assess the aims and the design of current research education in the light of historical, national and international perspectives, as well as legal matters;
- II. Make further use of peer networking in view of the faculty and interdisciplinary experiences gathered and shared between and among the national/international supervisors working in higher education;
- III. Analyse and display in theory and practice your understanding for supervisorstudent relationship and the dynamic character of supervisory meetings, with considerations taken to ethnic, ethical and gender related aspects;
- IV. Benefit, in terms of growth and support, from the communicative and situated training offered for approaching different supervisory situations;
- V. Compose a written statement on your philosophy of supervision, e.g. to discuss and to share what, in your opinion, makes for good doctoral supervision;
- VI. Reflect on the ideas of research education at the department/ division and, if possible, to identify a supervision policy formally/informally shared;
- VII. Design an individual action plan using the statement made on your philosophy of supervision and the ideas on research education and doctoral supervision at



- the department/ division; and,
- VIII. Draft an individual action plan using the statement made on your philosophy of supervision and the ideas of your department/division on research education and doctoral supervision.

Course Design for Graduate Supervision & Mentoring Instruction

The course is largely based on the participants' willingness to tell and share their personal experiences from either a supervisor or graduate student perspective. Lectures and seminars are mixed with practical exercises, group discussions, and presentations.

Criteria for course completion:

- i. Active participation at the scheduled meetings on campus.
- ii. Assignment 1: Participants were to compose an individual vignette using the perspective of the PhD supervisor or the doctoral student and later bring to class for analysis and discussion.
- iii. Assignment 2: Participants were to compose a statement on their philosophy of supervision, as well as the department's view on research training (supervision policy) and draft individual action plan. Submit copy in PingPong. They were to share reflections in a small-group context on campus.
- iv. Assignment 3: Participants were to pay a supervision observation visit at a department/division of their choice. The purpose was to subject the supervisor-student interaction to study. Afterwards, observational perceptions were to be shared orally in a small-group context on campus.
- v. Assignment 4: Participants were to read a free-choice book/ article and write a review on their reading experience. Submit copy of the review in PingPong.

This was to be shared with the other participants face-to-face in a small-group context on campus. iv. Active participation during all scheduled campus-sessions After completing all course assignments in an acceptable manner the following would apply: Completion gains a participant a Course Completion Certificate!

Philosophy, Policy, & Plan of Supervision

The aims of the homework assignment are:

1. To give you an opportunity to reflect on and write your own philosophy of

supervision. What is your major concern as a doctoral supervisor? What is your view of the supervisor student interaction in terms of expectations and needs? How do you approach doctoral students in terms of supervision? See "Doctoral Supervision Guidelines.

- 2. To stimulate you to probe into explicit (and if possible, implicit) guidelines on supervision and research education at faculty-level, and above all, departmental level. Any policy to be identified on how to deal with strategies and issues related to doctoral supervision and research education?
- 3. To get you started drafting your own action plan in view of Items a and b. These items may serve as a point of departure for subjecting your supervisory behaviour to change (if desired) and/or for dealing with policy-related strategies and issues at departmental level. The latter would concern how to add further value to supervisory and educational matters using a bird's eye perspective.

Remarks:

Regarding Item 1, trainees were provided with several opportunities to share their experience during the course and to discuss the characteristics of good doctoral supervision. Given their disciplinary background and supervisory experience, they were given opportunity to state their individual philosophical foundation for how a doctoral supervisor may act.

Examples of questions: What skills of a doctoral supervisor do you think would be worthwhile to bring out? What skills would be inferior? How would you characterise good and bad supervisory behaviour, respectively?

Regarding Item 2: Consideration was made of the fact that participants perhaps already had a clear picture of what are the views on doctoral supervision and how research education is managed at the department. In case they did not, or if they would like to nuance the picture further, they could have a go at setting up a meeting with a senior doctoral supervisor (e.g., professor, docent, study director), or director of research studies, to address the procedures or strategies currently in use.

Once again, they were given plenty of space to come to terms with their own point of departure, as seen in relation to the perceptions and experiences provided at the department.

Examples of questions: What styles of doctoral supervision are you able to identify at the department? Why these and not others? How is the individual study plan dealt with in practice? Do the doctoral supervisor and the doctoral student usually draw up a 'psychological contract' or sharing agreement? If so, what would be embraced?





Is there any departmental policy for how to deal with issues related to doctoral supervision? What is communicated implicitly or tacitly (`Walls have ears´)?

Regarding Item 3: Focus was on drafting an action plan. An action plan presupposed readiness to make changes, keeping in mind the participants' own desires and needs, as well as the regulatory framework and working conditions provided. Many a time, it came down to their trying to identify the prime movers in terms of decision-making and how to get to the bottom of things.

Examples of questions: What would you like to try to change, modify or improve in your supervisory practice? Correspondingly, what would you like to achieve at the department in terms of trying to promote good supervision and research training? The above items are to be accounted for in writing. On the whole, the statement should comprise no more than 3 pages (A4 format).

Ugandan Costs:

Costs covered

- 1 Per diems for participants from other participating public universities;
- 2 Materials preparation by trainers;
- 3 Refreshments during the training sessions;
- 4 Travel to Sweden for 3 prospective trainers to attending training sessions in Upssala University.

Swedish Side Costs

- 1 Salaries for trainers
- 2 Allowances for trainers:
- 3 Travel costs:
- 4 Indirect costs (coordination);

Challenges

The class size for training is not more than 35 for each training requiring two sessions. A maximum of 70 supervisors can be trained each year.

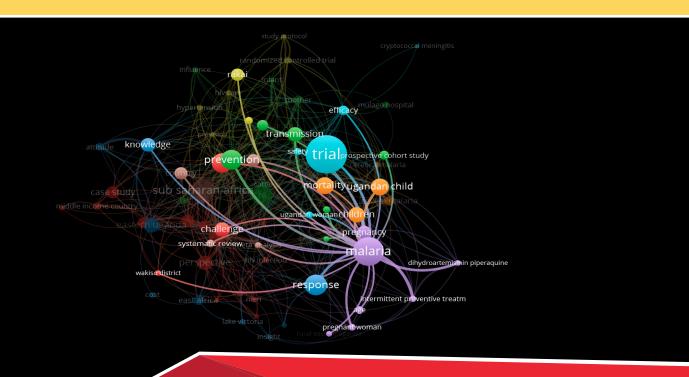
The total number of supervisors (at Makerere) is more than 600. This mode can only cover about 50% of all supervisors. A mitigation is to cover the supervisors involved with the Sida supported students and scale out later under institutionalisation;

The duration of each training session is limited by the availability of the trainers, most times confined in one week for each session; in addition this timing coincides with semester academic activities. Summer time training would have been more convenient and provide lengthier periods of interaction;

Institutionalization

- 1 Training for supervisors will be a requirement by the university once a critical mass (80%) of the currently available supervisors have undergone training.
- The East African School of Higher Education and Development will run the supervisory and mentoring program in conjunction with Quality Assurance beginning with a period of overlap with the current intervention in preparation for complete takeover after the 2020.
- Participating public universities will arrange individual take over strategies, which may include collaboration with the East African School of Higher Education and Development (at Makerere University) in the initial stages.







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