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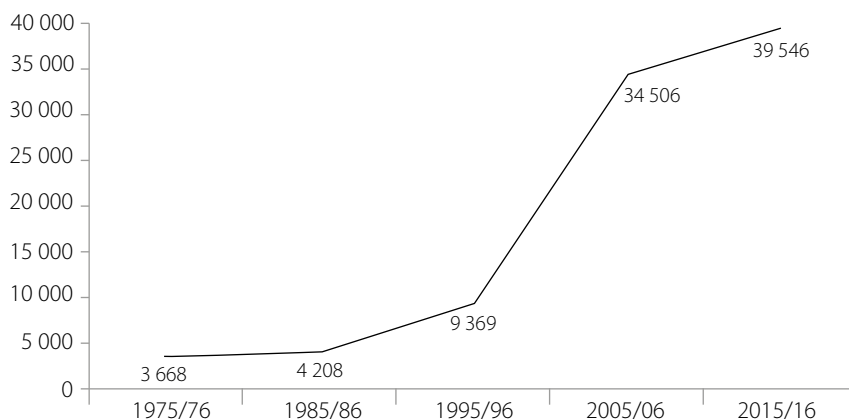
Sustaining research excellence and productivity with funding from development partners: The case of Makerere University

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Introduction

Makerere University was established in 1922 as a technical college with an enrolment of 14 students who were all male. In 1949, the university became a University College affiliated with the University College of London, offering courses leading to general degrees of the University of London. This affiliation lasted until 1963 when the university became one of the three constituent colleges of the University of East Africa, alongside the University of Nairobi in Kenya and the University of Dar es Salaam in Tanzania. Makerere University became an independent University in 1970 by an Act of Parliament of the Government of Uganda.

Makerere University had a student population of about 32 000 students as of June 2018, having grown from an average of 3 700 students in the 1970s, 4 700 students in the 1980s and 10 000 students in the 1990s. Figure 1 presents the trends over the last 40 years. The stretch in enrolment had its pinnacle in the 1990s on account of massive education reforms in the country that ushered in universal primary

Figure 1: Student enrolments at Makerere University, 1975–2015

education, leading to a surge in enrolment in primary and secondary schools. The reforms in primary and secondary education made these levels of education more accessible through the introduction of universal primary and secondary education. Alongside these reforms was the liberalisation of higher education (HE) in Uganda, providing for admission of self-sponsored students in government-supported institutions, as well as the introduction of private universities. A new Act of parliament was promulgated in 2001, providing for the creation and regulation of universities and other tertiary institutions in Uganda (Republic of Uganda 2001). This resulted in a growth in the number of universities in Uganda from three universities in 1989 (Makerere University, The Islamic University in Uganda and Mbarara University of Science and Technology) to more than 40 in 2018. Enrolment in universities in Uganda grew from about 10 000 students in 1990 to more than 185 000 students in 2015.

Makerere University has about 17% of the enrolment in all universities in Uganda, and about 53% of the enrolment in public universities in Uganda (NCHE 2006). From a time when the university was the only one in the country for a period of over 60 years, this represents a tremendous interest in HE provision by other actors. Initial interest in providing higher education came from faith-based organisations such

as the Catholic church, the Anglican church and Islamic organisations, which established universities run by the respective umbrella bodies.

With the introduction of new universities, Uganda's HE system became more diverse and complex, partly due to the growth in the number of public and private institutions and multiple stakeholders with diverging interests; this occurred in the context of the increasing realisation of HE as a key driver in economic development. The introduction of the National Council for Higher Education in 2001 to regulate the HE sector was an essential move by government to have a coherent mechanism of provision of HE training amidst the complexity that had emerged. The regulatory body put in place statutes for a quality assurance framework, largely specifying quantitative requirements for setting up universities, in addition to accrediting curricula at universities. The regulatory body made only minimal mention of research in universities in the range of criteria for regulating universities and other tertiary institutions.

In the reforms that ensued with regard to the devolution of the provision of HE, Makerere University experienced severe perturbations. First, it was to cede human resources, not necessarily through formal arrangements. Such a formal arrangement would include secondment of top administrative staff to start off universities, a cost-neutral arrangement amongst government-funded institutions. An alternative arrangement would involve mentorship from an existing institution, hosting an office of a new university for a couple of years. No such arrangement would work with non-government-funded universities. In the case of such institutions, more aggressive mechanisms were employed, for example offering higher remuneration packages or otherwise attracting human resources away from Makerere University. In any of these scenarios, Makerere University was to let go of vital human resources, since the new universities often sought productive ones as well.

Second, Makerere University had to succumb to duplication of its curricula through non-formal arrangements by informal cooptation of individual members of staff. Such duplication in curricula would lead to a reduction in the numbers of potential students seeking admission

in key disciplines at the university, in turn affecting the research capacity in those disciplines.

Third, the university became a victim of smear campaigns in a *zero-sum game* of recruitment; for a new university to attract students, an existing university must lose students. The current HE situation in Uganda is characterised by very erosive primary and secondary education systems. Of the population of pupils who join the first grade of primary education (about 2 million pupils), about 30% will complete the last grade of primary education (the seventh grade); only 5% of these pupils will make it to the last grade of secondary education (senior six), from whom universities draw their enrolment. The current net enrolment in higher education in Uganda is below 10% (much lower than the sub-Saharan average of 16%) and, strangely, quite comparable to that of the nations within the East African community.

Whatever is holding back HE enrolment is doing so harmoniously across the East African region. The growth of universities in Uganda, therefore, is heavily stifled by the inefficiency of the delivery pipeline that begins at the first grade of the education system, and even earlier in early childhood development, which is largely considered to be for the rich and operates mainly in urban settings in Uganda.

Even though many upcoming universities knew that attracting students was to be a tall order, they also realised that getting qualified academic staff to work in their institutions was even more difficult. The only comfort was that since there were no students, the question of hiring was irrelevant. As such, this tailspin plunged these institutions into some form of inertia. It does not seem, as it stands, that it is a lucrative business to set up a new university in Uganda. The whole university system seems to be massively connected; a radical reform from the norm is very risky due to this connection. Such a connection has raised questions around the purpose of the HE system, the trade-off between private and social returns and, most importantly, whose responsibility it is to fund that system. In various forums, private universities have issued an outcry for government to appropriate funding to defray the high cost of their investments. Many of these universities have clearly stayed away from science, engineering,

technology and mathematics (STEM) educational programmes. Most of them have glaringly avoided investments in research.

Repositioning to a research-led university

Makerere University took a stand during the strategic planning period from 2008 to 2018, to reposition itself and focus more on research and graduate training, having realised that most of the new and upcoming universities had no capacity for scientific research. Besides, research seemed only to make sense within the framework of government agencies. Even though Uganda was receiving a lot of foreign direct investments, most of those agencies were deploying ready-made solutions emanating from research done elsewhere. There was neither a need nor a compulsion for local content in research. In addition, at the national level, there was a lack of a National Research Council, or a comparative framework with overarching responsibility and capacity, to propel the generation of research for national development. Makerere University realised that it could leverage its ambient position and human resource capacity to recast its efforts to areas where the other universities had limited access. In addition, it made sense for the university to train a pool of academic staff that would potentially be hired by other universities. Leading up to the planning phase of 2008–2018, there was evidence of a growing interest from development partners to support research at Makerere University.

Makerere's strategic choices for the period 2008–2018 not only led to increased graduate student enrolments (initially), but also to increased research outputs (see Table 1). The number of PhDs graduating in a year increased from 30 in 2009 to 75 in 2017 (see Figure 2). In addition, there was a significant increase in the number of research publications by academic staff, as indexed by the Web of Knowledge database, up from 325 publications in 2008 to 944 in 2017 (see Figure 3); this doubled the rate of publications from 0.32 publications per academic staff per year in 2008 to 0.64 publications per academic staff per year in 2017. The National Council for Higher Education (NCHE), in one of its instruments for regulating universities and

tertiary institutions, expects academic staff at universities to publish a minimum of one such publication every two years. Research productivity is considered the distinguishing factor between universities and other tertiary institutions that the NCHE regulates. Universities that do not publish are considered glorified high schools. This requirement is one of the dichotomies associated with research, as there is no explicit funding formula that considers the number of publications from the universities. As such, there is no explicit consequence to an already accredited university if it fails to comply with this requirement. This would work best if a university risked losing part of its funding by failing to produce the requisite number of research publications; equivalently, universities would motivate more research by passing part of the publications-generated funding to individual researchers as incentives.

Table 1: Makerere University performance statistics, 2009–2018

Year	Students	Staff	Publications	Staff:student ratios	Publications by staff	PhDs awarded
2009	34 850	1 362	430	25.6	0.32	30
2010	33 112	1 130	495	29.3	0.44	39
2011	33 470	1 236	461	27.1	0.37	46
2012	37 137	1 236	546	30.0	0.44	42
2013	41 122	1 256	554	32.7	0.44	60
2014	42 508	1 398	639	30.4	0.46	66
2015	38 586	1 405	788	27.5	0.56	62
2016	39 546	1 420	819	27.8	0.58	75
2017	31 802	1 470	944	21.6	0.64	69

Makerere University maintained the top share of academic staff with PhDs in the country for the period that ensued. The number of staff with PhDs increased from 469 in 2008 to 790 in 2016. While complying with the requirements of the national regulating body, the university fared quite well within the local region as far as research was concerned. The attention paid to research, and associated scientific knowledge generation, attracted a lot of funding, especially from the OECD countries. The Ugandan government also realised that the numbers of students from its neighbouring countries were increasing, attracted by the high rankings that Makerere University

was receiving and so their numbers within the universities in the country were increasing. This influx of students too was a new source of foreign income. As a result, the government was willing to listen to the aspirations of the university, backed up by evidence of its improved performance.

Research productivity at Makerere University: Key policies

PhD degrees for lecturers

Since the year 2000, Makerere University has had a requirement that every lecturer hold a PhD degree. The only exceptions are the clinical medicine disciplines and those lecturers who were already serving in the university system in 2000. The School of Law had argued for a similar exception to this requirement, but this was denied. For the medicine discipline, it was successfully argued that a PhD was not a requirement for the medical profession and that insisting on this requirement would hurt the university by limiting access to the practising physicians, who would otherwise offer service in the medical school. In the ensuing years, it has paradoxically emerged that the most prolific publishers are the non-PhD staff in medical disciplines. The medical disciplines contribute more than 45% of the research output in Uganda. No similar evidence exists in any other disciplines in the university.

The NCHE has modified the requirement for a PhD in universities to allow for the hiring of registered PhD students who are progressing normally. The modification to the PhD requirement was compelled by the difficulties of attaining a sufficient number of PhDs. It is estimated that Uganda has about 2 000 PhDs, amidst a requirement for over 10 000 PhDs (UNCST 2011). The current PhD deficit is over 8 000 PhDs. This deficit cannot be covered with the current production rate of about 100 PhDs per year (Makerere contributes 75% of the country's production).

This new development, however, is likely to alter the trend at which PhDs have been acquired at the institution. This is one of the dichotomies associated with harmonising requirements for running universities, especially those funded by government. The NCHE is

Figure 2: Number of PhD graduates at Makerere University, 2008–2018

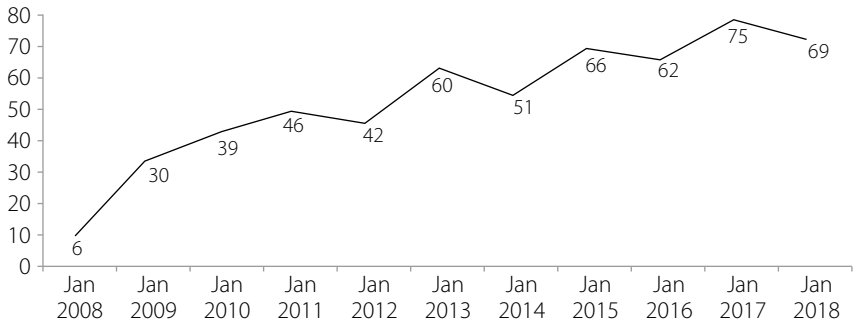
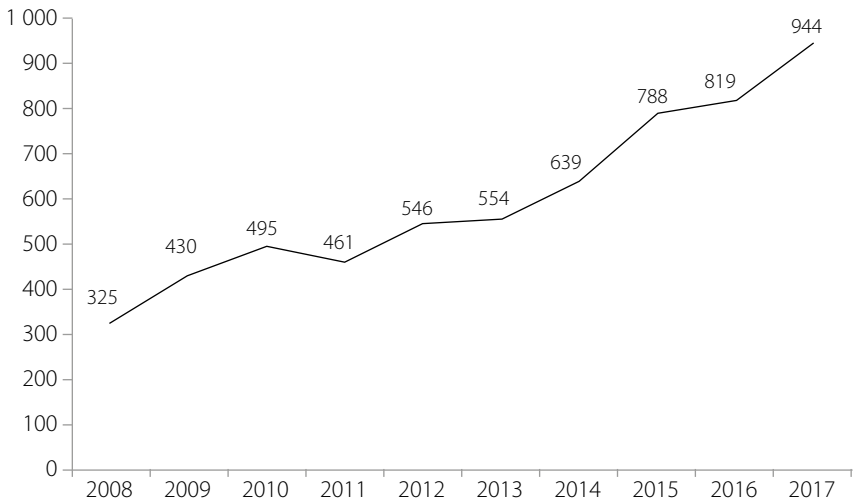


Figure 3: Makerere University research publication output



Source: Web of Knowledge database (2008–2017)

often forced to lower standards to accommodate all universities under its purview. Setting high standards tends to cause a retraction in the capacities of the majority of the universities. For the bigger benefit, however, this requirement could have been a necessary gambit in the growth impasse associated with the higher education sector.

Staff appointments and promotion policies

The Makerere University appointments and promotion policy requires academic staff to publish a set number of publications (in peer-reviewed journals) for appointment or promotion to the different categories in the academic staff establishment. The university runs five distinct ranks for its academic staff: assistant lecturer, lecturer, senior lecturer, associate professor and professor. Moving from one rank to another has distinct requirements and attracts several incentives. For instance, to be promoted from lecturer to senior lecturer, one needs three publications, whereas five extra publications are required to move to the subsequent level, in addition to teaching experience and service to the community. The promotion policy is one of the fundamental drivers in motivating the production of publications, as promotion carries monetary incentives.

The appointments and promotion policy requires the supervision of graduate students to completion (a varied mix of masters and PhDs) for senior academic positions in the university establishment. For instance, to be promoted to the level of associate professor, one is required to have supervised at least one PhD student up to completion. This is in addition to other requirements such as publication in peer-reviewed journals. Only senior lecturers may supervise PhD students. The supervision requirement has supported the acceptance of supervisory roles by academic staff for more than one reason. Ironically, it is not directly financially lucrative to supervise students as very little extra pay is associated with the effort that goes into the activity. In addition, the completion rates at PhD level are at about 6%; there are no guarantees and one could easily end up with empty hands. In the case of Uganda, graduate training is currently broadly for fee-paying students. In the 1980s, and before, all university education was free. Students now struggle to cover costs amidst increasing costs of education. The cost of a PhD in Uganda averages around USD 50 000. It is not surprising that students will opt for PhDs that offer the best opportunity for timely completion, as well engagement after the doctoral studies. Quite often development funders avail scholarships in chosen areas of study.

Publication output production from PhD theses

At Makerere University every PhD student is required to publish two research publications in peer-reviewed scientific or scholarly journals (or at least have these papers accepted for publication) before they can graduate.

In all the above-mentioned policies, these publications are a common currency to assess performance – both productivity and quality. The quality dimension is connected to the *peer-review process* applied by these journals to assess submitted manuscripts. As it is often difficult to determine the quality of a research publication, for any set of publications submitted for different administrative considerations, a number of expert committees are required to assess the submitted publications for the associated purpose. Oftentimes the vetting process is considered time-wasting, especially since these publications would have gone (or are considered to have gone) through an elaborate quality assurance mechanism put in place by publishing houses and editors of journals. It goes without saying that some journals may skip this rigorous process, thereby leaving much to be desired in this role. On occasion, the university has sought post-publication opinion on some publications submitted for the purposes of promotion.

A common critique associated with the heavy emphasis on producing these publications is that little emphasis tends to be placed on activities associated with *good teaching*. As a consequence, teaching is (potentially) less incentivised and often simply taken for granted. The implemented ‘publication-biased’ policies have tended to create a calibre of staff who are ‘too good to fail’; those staff that have already produced high numbers of publications may have no immediate needs to show ongoing excellence.

There is no real incentive to improve quality at the top rank of professor; this raises the question of what would drive publication output, and other research quality considerations, at this level.

To address this issue, the university decided to implement the position of *emeritus professor* for those who have reached the mandatory retirement age of 70 and yet continue to exhibit high performance within their disciplines. This position does not attract salaries from

the university. An emeritus professor has access to university facilities at the same level as that of an ordinary professor. In addition, the university expects its emeritus professors to attract funding from which they may derive financial benefits. So far, there has been no dash to become an emeritus professor. The likely explanation is that universities that are not government funded are free to employ professors of any age. As a consequence, professors have opted for paid positions in privately funded universities, as opposed to remaining as volunteers in public universities.

The dilemma: Funding from development partners

With the ever-increasing aspiration for excellence, and globalisation pressures amidst shrinking resources available for its operations, Makerere University has partnered with a range of development partners in an effort to diversify its resources. The tuition stream of income is inadequate especially in the face of low gross domestic product (GDP). Most of the excellence measures are not corrected for GDP variations; this is depicted in international rankings. There would have been efficacy variables that correct for innovative utilisation of limited resources to generate reasonably comparable outputs. It is very cost-effective for development partners to spend funds on research in lower-income developing countries where the cost of living is relatively low. The average output per invested US dollar is certainly higher in the high-income countries. This fact is also a cause for a dichotomy when a project is bilateral and results are to be reported in both economies.

In the period 2000–2012, Makerere University received more than USD 214 million from development partners, mainly for research (see Table 2). The current annual donor operational budget (about USD 3 million a year) is about 6% of the university's total budget. Most of this budget is dedicated to research. Component research funding comes to the university through the Government of Uganda's 'Initiative for Science Support' that operates under the office of the President of the Republic of Uganda. About USD 2 million per annum is allocated to specialised projects identified by the president under the Presidential Science Initiative. Without support from the

development partners, research at the university would barely be possible. The long-term research arrangements have supported the building of institutional capacity to do research by supporting PhD training. These collaborations with foreign partners and funders have also helped networking researchers who would otherwise be isolated. It is estimated that more than 50% of the PhDs obtained between the year 2000 and the year 2010 were acquired from outside Uganda, with support from development partners. The Swedish government alone has supported the training of about 300 PhDs in the period 2000–2015 with the utilisation of the ‘sandwich mode’ of training, where the student has supervisors from all countries partnering in the project.

Table 2: Development partners’ research funding to Makerere University, 2000–2012

Funding agency	United States dollars
Government of Sweden	62 380 000
Government of Norway (NORAD)	39 809 385
USAID	28 926 924
Rockefeller Foundation/IDA/WB	24 468 824
Carnegie Corporation of New York	16 591 000
European Union (EU)	9 992 885
CDC	5 670 572
African Capacity Building Foundation	5 150 000
Netherlands Government (NUFFIC)	4 750 000
IDRC	4 073 651
DFID	3 621 209
Ford Foundation	2 826 000
Millennium Science Initiative	2 134 453
World Health Organization	1 288 325
Uganda National Council for Science and Technology	1 245 898
Johns Hopkins University	766 228
MacArthur Foundation	735 000
PHEA (Partnership for Higher Education in Africa)	450 000

A dilemma associated with obtaining funding from development partners is with the alignment of the research focus, which tends to be biased toward interests supported by the funder. For instance, in

the period 2008–2016, about 40% of the research indexed in major databases was in Medicine, with an additional 8% in Immunology and Microbiology (see Table 3). Whereas Health Sciences and attendant problems are key to Uganda’s economy, Agriculture is the mainstay of the economy, employing 40% of the labour force and generating 25% of the country’s GDP. Research in Agriculture and Biological Sciences only accounted for about 12% of the total volume of research during the period. Competitive calls for research funding, which emanate from funding agencies in the Western countries, are typically thematic with themes aligned to the intentions of the funder. Such calls also require that partners on the research teams are drawn from countries from the West. These stringent requirements tend to outpace any other considerations that may bring excellence to the table. The rule of thumb is for there to be sufficient overlap in the aspirations of the partnering institutions in the funding collaborations. To exacerbate the problem, capacity-building research has tended to bias the capacity towards the same areas of Western priority, which now pushes the problem of misalignment to the distant future. Some of the capacity-building efforts have lasted for a period of 30 years, leading to the graduation of PhDs in those areas, and the creation of research labs and facilities. In the case of Makerere, the Rakai Health Sciences Program in Southern Uganda, the Iganga-Mayuge Demographic Surveillance Site in Eastern Uganda and the Institute for Infectious Diseases at Makerere sprang out of capacity-building research in the recent past. In essence, the ripple effect that these research centers will create will drift the research generated over time in the same direction for years to come, after the funding agreements have been extinguished.

According to data available in the Scopus database, about 40% of Makerere research output for the period 2008–2016 (3 441 publications) was in the general subject area ‘Medicine’, with an extra 8% (702 publications) in the area ‘Immunology and Microbiology’. Indeed, most of the funding in research is concentrated in Makerere’s College of Health Sciences. Some development partners have recognised the possible harmful effects of this bias and have therefore relaxed funding requirements that are now also targeted towards institutional capacity building, as well as supporting the research agenda of the university. The

College of Health Sciences has the mandate to engage research areas and topics that seem to attract the interest of the international community, especially in the OECD countries. The designation of the Sustainable Development Goal (SDG) 3 on health and well-being has bolstered this arrangement. A proliferation of interests is heavily embedded in this SDG and is likely to outweigh all SDGs in terms of investments.

Table 3: Makerere University research publication output by subject areas, 2008–2016

	Subject area	Research publications	Percentage
1	Medicine	3 441	39.5%
2	Agricultural and Biological Sciences	1 039	11.9%
3	Immunology and Microbiology	702	8.1%
4	Social Sciences	686	7.9%
5	Biochemistry, Genetics and Molecular Biology	624	7.2%
6	Environmental Science	405	4.7%
7	Computer Science	206	2.4%
8	Pharmacology, Toxicology and Pharmaceutics	168	1.9%
9	Engineering	155	1.8%
10	Psychology	147	1.7%
11	Veterinary	138	1.6%
12	Nursing	128	1.5%
13	Business, Management and Accounting	109	1.3%
14	Earth and Planetary Sciences	109	1.3%
15	Mathematics	98	1.1%
16	Arts and Humanities	95	1.1%
17	Economics, Econometrics and Finance	88	1.0%
18	Energy	61	0.7%
19	Chemistry	50	0.6%
20	Multidisciplinary	45	0.5%
21	Physics and Astronomy	39	0.4%
22	Neuroscience	36	0.4%
23	Health Professions	34	0.4%
24	Materials Science	34	0.4%
25	Chemical Engineering	26	0.3%
26	Dentistry	22	0.3%
27	Decision Sciences	16	0.2%

Source: (Scopus database, 2008–2016)

Regardless of the interests of the Ugandan government, (as articulated in the country's vision and its development plans), as long as research funding from development partners continues at the current level, Makerere's research portfolio will be tilted towards the interests of

those funders. This is likely to remain the case even when the calls for funding seem to imply responsiveness to Uganda's national agenda.

Going forward:

Resolving dichotomies from the global economy

Until the mid-1990s the role of HE in Africa's socio-economic development was fairly anomalous; the majority of the education development projects focused either on primary or secondary education. International donors and development partners regarded universities, for the most part, as institutional enclaves neglecting the particular development needs of African communities. However, current research shows that the returns on investment from higher education are not only on the increase, but also surpass those of the other levels of education. There is evidence that countries that have expanded HE systems, with higher levels of investment in research and development (R&D) activities, have higher potential to grow faster in the globalised knowledge economy. It is also evident that research productivity from African universities is under the radar, with Africa's visible contribution at only about 2% of the global research volume; this is at severe variance with the population proportion of 17%. The experience from Makerere University points to the fact that the national economies are yet to mobilise their flagship universities to actively support national development agendas through knowledge generation. As a result, such universities resort to sources of funding for research; these sources may not necessarily take kind interest in those development agendas. Excellence and quality in such cases will have dichotomous readings, one from the funder's point of view and the other from the recipient's. A clear way around this dichotomy is for governments to appropriate funding for key areas to their development agendas.

Uganda's participation rate in HE, as measured by the HE gross enrolment ratio (GER), is about 10% lower than the world average of 26%. According to the 'State of Education in Africa' report (Africa-America Institute 2015), returns to investments in higher education in Africa are 21%, the highest in the world. However, the enrolment rates at universities in sub-Saharan Africa are among the lowest in the world. In

the same report, it is also noted that African countries have allocated, on average, 18.4% of government expenditure to education, with Uganda's current allocation at 11% (financial year 2016/2017) down from 16.2% (financial year 2009/2010). The proportion of this budget allocated to HE is about 12% (rather than the recommended 20%).

Another issue relates to the funding allocation model of universities, which is largely dependent on student numbers. Research outputs are not included in this. As such, universities can avoid doing research. To mitigate this disincentive, there is a need to create a National Research Council that appropriates research funding to universities. The same council could devise a research-rating mechanism for professors, as well document and incentivise research efforts in universities.

Development partners play an important role in correcting these historical imbalances which have relegated universities in Africa and the Global South into positions of dismal contributions to the global research footprint. Besides, there is adequate motivation for partners from high-income countries to associate with counterparts in the Global South for further collaboration and synergy in resolving global challenges of hunger, absolute poverty, energy, climate change and health. In addition, the Global South harbours crucial resource reservoirs that are of much interest to researchers from anywhere in the world in the quest for solutions in health and agriculture, as well as in the provision of raw materials for industries. It is crucial that support from development partners be made less stringent for sustainability, and less in terms of offloading international burdens onto unsuspecting populaces and more in partnering for solutions of mutual benefit. Support to development agendas that have been articulated by the regional consortia, countries and the recipient institutions through their research agendas could be a good start.

Finally, the capacity of universities to participate successfully in high-quality research and scientific knowledge generation needs to be increased. Whereas quality (fitness for purpose) research would have to face the question of articulation (in the national and university visions and agendas), an even bigger question would have to be faced in the form of research capacity, research process and resourcing. Currently there are less than 50 researchers per one million people in Uganda,

compared with more than 7 000 researchers per one million people in Sweden and over 8 000 per one million people in Israel. Raising this low base requires addressing several institutional, logistical and infrastructural obstacles at various levels throughout the Ugandan educational system. These hurdles range from school inputs, teachers, curricula, long distances to schools, feeding, parental support and examination policies. Other high-priority issues are in the incentives to investments in schooling or returns to investment in education. The government, as the leading provider of social services, has a vital role to play in leveraging HE capacities and outcomes in order to generate the knowledge and skills that are required for economic development and prosperity. The development partners can only play a complementary role in this process. With regard to improving the quality of research, a beginning would be to allocate a reasonable percentage of the GDP (say 1%) to research, improve research organisation and production capacity, strengthen research infrastructure and facilities, regularly review and update the national research agenda, and monitor its implementation through compelling mechanisms to ensure that targets are met.

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