

CONCLUSION

The number of publications produced by an academic institution does not fully represent the research profile of an organization; but it can provide a quick snapshot of the relative level of productivity and quality among institutions, and a sense of institutional commitment to academic publishing, a typical component of the research enterprise.

This singular case indicates that research-focused IBCs may not have an inherent advantage over domestic institutions in terms of research productivity when measured by the quantity of the output. However, that does not appear to be as true when looking at an indicator of research quality. In this case, NYUAD jumped to the second place of the ranking. This may be due to the academic expectations that are carried over from the home campus, the ability to leverage the established name of the home campus, and the access to networks that local institutions may not have.

Interestingly, however, the only local publication collaborator of NYUAD is Masdar University, which has both more publications and a higher quality indicator. If a benefit of importing IBCs is to build local research capacity, the absence of local collaborations is a question for further exploration. While more information is needed to unpack the research contributions of IBCs, the bibliometric data suggest that they are not necessarily a quick way to build local research capacity. ■

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Higher Education in South Sudan: Living with Challenges

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South Sudan, which attained its independence from Sudan in July 2011, has one of the smallest, but most problematic higher education systems in sub-Saharan Africa. The world's newest country has five public universities—the University of Juba, the University of Bahr el Ghazal, Upper Nile University, Dr. John Garang Memorial University of Science and Technology, and Rumbek University—with nearly 20,000 students, including 1,040 graduate students. There are also four “project” or “proposed” public univer-

sities: the University of Western Equatoria (Yambio), the University of Northern Bahr el Ghazal, Torit University of Science and Technology, and the University of Bantiu.

Exacerbated by conflicts and a lethargic economy, the system is confronted with several challenges, characterized prominently by poor physical infrastructure, underfunding, and severe staff shortage. These weaknesses have heavy implications for the capacity of the universities to function. The failure of public universities to meet the enormous demand for tertiary education has encouraged the emergence of an unregulated private university sector in the country. South Sudan has 13 private universities, but only four of them are recognized.

The focus here is on the experience of the five functioning public tertiary institutions. Faced with extant problems, the institutions have limited options but to live with the challenges. Four main approaches underline the sector's resilience: dedicated staff, institutional partnerships, a supportive tertiary governance structure, and international assistance.

DEDICATED STAFF

In 2012, there were only 721 faculty employed at the universities, which suggests a comparatively moderate student: lecturer ratio of 28:1. But the universities experience a considerable shortage in qualified academics. With 66 percent of the students, Juba University, the largest tertiary institution in the country, lost 561 of its staff, northern Sudanese, at independence. Similarly, significant numbers of faculty of Upper Nile University and Bahr el Ghazal University, the post-1991 institutions, remained in Khartoum when the universities were returned to the South in December 2010.

Moreover, the system is dominated by unqualified faculty. For example, in terms of academic qualifications, only 86 of all academics held a PhD in 2012. Furthermore, staff profiles, compiled the same year, revealed that only 36 faculty were full professors, while 62 were associate professors, 76 assistant professors, 242 lecturers, and 262 teaching assistants. To run the academic programs, universities recruit part-time tutors. Thus, 31 percent and 60 percent of Juba and Bahr el Ghazal lecturers, respectively, were part-timers in late 2016. The staff situation at the other three universities is equally alarming.

Nonetheless, the universities employ some of the most educated, experienced, and talented workforce in the country. Rigorous university recruitment procedures insulate the institutions from the corrupt practices inherent in the civil service. More importantly, the commitment of the academics to the institutions underscores their ability to impart knowledge and provide other vital services. The dedication of the academic staff mitigates the threats posed by the lack of qualified faculty. For example, a Bahr el Ghazal's

professor supervises 12 doctoral students.

INSTITUTIONAL PARTNERSHIPS

In general, scanty infrastructural facilities represent the most pressing challenge for the universities. The facilities and laboratory equipment of the three older universities were either left in Khartoum when the institutions were repatriated to the South, or plundered in the aftermath of the December 2013 conflict, as in the case of Upper Nile and John Garang.

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To tackle this problem, the vice-chancellors instituted partnerships, which had a positive impact on the capacity of the institutions. For instance, although John Garang has reopened in Bor, due to the current insecurity in Malakal, Upper Nile has been relocated to Juba. The displaced university utilizes some of Juba's facilities, and Juba's professors instruct students and work part-time at John Garang. Furthermore, Rumbek University's science students conduct laboratory experiments at the University of Bahr el Ghazal in Wau, and John Garang's science students visit Juba for their practical work.

In addition, professors in other universities supervise Juba's graduate students. To ensure staff development, universities enrol their staff for graduate studies offered by the Universities of Juba and Bahr el Ghazal.

SUPPORTIVE GOVERNANCE

Tertiary education in South Sudan is governed through the ministry of higher education, science, and technology. The ministry has policy, technical, and administrative oversight. Although the minister is a political appointee, the presence of academics, such as the undersecretary, at the helm of the ministry ensures that the views of the tertiary institutions on the problems confronting them are taken into consideration.

The ministry supports the universities, primarily by providing government funding. The ministry increased the remuneration of lecturers in 2014, a measure that attracted some academics back to the universities. The number of

Juba's permanent staff rose from 251 in 2011 to 574 in 2016. Although this indicates a 56 percent increase from 2011, it is still well below the university's preindependence staff level of 700. In addition, through the ministry's efforts, some European and African countries support university staff development programs. Currently, through this initiative, many academics pursue graduate studies at Makerere University, Uganda, the University of Zambia, and the University of Zimbabwe.

Moreover, the representation of the universities on the National Council for Higher Education (NCHE) strengthens the bonds between them and provides the institutions with a national platform. In addition, the university leaders have introduced a collegial management style in the universities. Faculty, students, and supporting staff are consulted on major institutional affairs, which enhances internal university communication. In this respect, the universities determine, and reflect on, the wider issues within and outside their campuses.

The vice-chancellors draw on their connections and political insight to access resources for the universities. They appeal to members of university councils, who are often influential ministers or parliamentarians, in order to be heard by government ministries. In a country where informality is more dynamic than bureaucratic procedures, this *modus operandi* often yields results.

INTERNATIONAL ASSISTANCE

Higher education is one of the least funded government sectors in the country. The universities consistently receive less than 1 percent of annual fiscal allocations. This meagre funding restricts university operations. University administrators use funds prudently on staff remuneration, procurement of essential services, and learning equipment such as books. As a result of the government's inability to fund physical infrastructure and staff development programs, the universities need to rely on foreign support.

International assistance is the most practical mechanism to address the two critical challenges confronting the tertiary sector: infrastructural inadequacy and staff shortage. With international support, universities can handle the issue of infrastructure. Prior to independence, Juba secured \$6.5 million from international development partners—Norway and USAID—to build premises for its college of law in 2010. The new buildings provide accommodation for other colleges and a graduate research center.

At that time, 87.6 percent of the faculty did not have doctorates. Staff development is therefore a top priority on the international assistance agenda. In early 2011, Juba agreed to a three-year venture with the Virginia Polytechnic and Virginia State University to train Juba's staff. Juba also signed a memorandum of understanding (MoU) with

the Open University of Tanzania in August 2015, to promote distance learning programs between the two institutions. The University of Bahr el Ghazal entered a similar arrangement with Makerere University in Uganda and the University of Oslo in Norway. Also, Texas's A&M University and the University of New York signed an MoU with John Garang Memorial University in June 2010. Following the outbreak of war, however, the international community suspended its assistance to the universities, as it shifted its attention to the humanitarian crisis.

CONCLUSION

South Sudan's tertiary sector is confronted with many challenges. Although universities are unable to entirely overcome the problems, they employ strategies to live with them. This experience offers invaluable lessons for comparable higher education systems in (post-)conflict contexts. ■

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Gender Inequity in African University Engineering Programs

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The African philosopher and educationalist James Aggrey (1875–1927) stated that if you educate a man, you educate an individual, but if you educate a woman you educate a family, indeed a nation. This statement suggests that the education of women is significant to the development of Africa. Though African men contribute to development, African women carry a heavier portion of the continent's underdevelopment burden in the fields of health and child-care; agriculture; and food production, processing, and preservation. For instance, invariably, African rural communities have no access to pipe-borne water systems and nonfossil fuel. It is the lot of African women to travel long distances to fetch water and firewood for household consumption.

Enrollment statistics indicate that African women are underrepresented in university engineering programs

across the African continent. For example, at Fourah Bay College, University of Sierra Leone, while marginal progress has been made in female enrollment in the engineering program, the percentage of male enrollment is about 90 percent.

Similarly, at one of the oldest African universities, Makerere University, Uganda, 2160 students enrolled in the engineering programs in the 2009–2010 academic year. Among them, only 22 percent were women. At the University of Rwanda, the percentage of women enrolled in engineering programs in the 2013–2014 and 2014–2015 academic years was 20 percent and 19 percent respectively. The University of Mines and Technology, Ghana, matriculated 503 undergraduate students in the 2014–2015 academic year. The proportion of women was only 16 percent. In the previous year, it was almost 20 percent. In average, the percentage of matriculated female students of that university hovers around 15–20 percent.

The underrepresentation of women in university engineering programs in Africa cannot be attributed solely to a lack of interest, ability, or intellectual capacity. Instead, a traditional presentation of science and mathematics as a male domain; societal cultural practices that prioritize the education of men over that of women; and an unsupportive science and mathematics teaching environment in secondary school contribute to the paucity of African women studying engineering in African universities. Thus, it is palpably an issue of social injustice, involving an unfair distribution of engineering education opportunities.

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GENDER PARITY OR EQUITY?

Most African universities publish enrollment statistics showing the percentage of women and men. The University of Cape Coast, Ghana, is an obvious case. It publishes its enrollment statistics displaying the year and the corresponding gender distribution. In the 1962–1963 academic year, for example, a total of 155 students were recorded, with only 8 percent women. In 2011–2012, by contrast, the proportion of female enrollment was 33 percent. Jomo Kenyatta University of Agriculture and Technology, Kenya, has also improved its female enrollment from 14 percent in 2012–2013 to 29 percent in 2013–2014. So did the University of