

ACBI Monitoring, Evaluation & Learning Bulletin

Assessing & Improving Laboratory Capacity

- November 2021 -

The Royal Society-FCDO Africa Capacity Building Initiative (ACBI) aims to strengthen the research capacity of higher education and research institutions in sub-Saharan Africa by supporting the development of sustainable research and laboratory networks, increasing the number of PhD trained African researchers, improving the quality of research training and mentorship, and retaining these researchers in African institutions. The Centre for Capacity Research (CCR) at Liverpool School of Tropical Medicine, lead the monitoring, evaluation and learning (ME&L) component of the ACBI programme. The ME&L project aims to generate research-informed learning to improve ACBI within its lifetime and to contribute to the global pool of evidence on the science of research capacity strengthening.

In 2017, CCR carried out a qualitative review of research capacity across ACBI's African partner institutions. The review revealed that although laboratories and laboratory technicians are crucial for generating cutting-edge and innovative research, they are a neglected component of the research 'ecosystem' in many institutions. The Royal Society and FCDO responded quickly and advised consortia that in addition to providing research equipment, they should also include laboratory and other support staff (e.g. administrators, accountants) in training and other skills-enhancement opportunities.

To get a better understanding of the problems they faced, 35 laboratory technicians from across ACBI contributed to CCR's surveys and in-depth interviews.

Challenges faced by research laboratory technicians

- Understaffing and expectations of unpaid overtime
- Maintaining and procuring equipment (i.e. poor-quality equipment; procurement delays and inadequate repair and maintenance of equipment)
- Poor infrastructure and inadequate support services (e.g. cramped laboratories, and inadequate physical space, power cuts, poor internet, broken benches, lack of basic tools such as laptops or up-to-date computers)
- Lack of professional and personal development opportunities
- Weak policies/processes for health and safety, and quality assurance

"We use empty plastic bottles as substitute for glassware. We haven't bought any new equipment in 10 years."

"We have obsolete equipment. You can receive some equipment and the software is no longer even available"

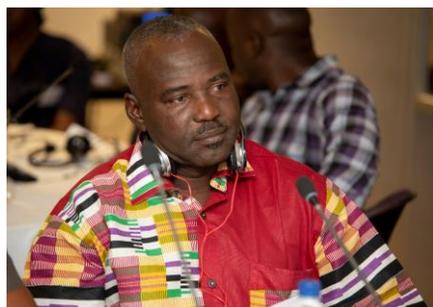


Photo: ACBI-affiliated laboratory technicians at the Lusaka workshop, 2019 [Credit: Royal Society]

Initially laboratory technicians said they felt undervalued; they were **not involved in decisions about laboratory services** and **lacked opportunities for training**, networking, conferences and authorship.

"When there's a new machine the training component has to be there to safeguard the equipment [but] they assume you should know."

"I want a training, a good training and having a certificate"

As ACBI progressed they appreciated the benefits such as **access to high-quality consumables and equipment** (including mechanisms for formal transfer of equipment to African laboratories), and **better processes for quality assurance and health and safety**; some even **commercialised their services**.

Increasingly the technicians had **opportunities for training and exchange visits**, and their **self-confidence and motivation improved**. Workshops to address technicians' priorities were set up and a dedicated on-line platform enabled the **creation of a community of laboratory staff** across ACBI.



Photo: ACBI-affiliated laboratory technicians at the Luska workshop, 2019
[Credit: Royal Society]

"That really changed my entire life because I learnt a lot of things from there. I learnt how to run the lab, I learnt how to work with people, I learnt a lot of things"

"From what I learned I'm now tightening the rules to the student in my research lab, because I'm responsible"

"...we understand our common issues through those networking the workshops and we can discuss solutions... it's a form of solidarity"

The technicians proposed ways to **improve laboratory capacity to support research** that should be built into future collaborations including a) cost-recovery and **commercialisation strategies** (underpinned by achieving accreditation) which would fund equipment maintenance and repair, and infrastructure improvements, and b) actions to **motivate and retain laboratory staff** including investing in their professional development and career progression.

"There are percentages that are set aside for maintenance of equipment, in case the equipment is broke"

"Every sample that we're running, the monies that we're getting can be used to sustain the instrument"



Photo: ACBI-affiliated laboratory technicians at the Luska workshop, 2019 [Credit: Royal Society]

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Royal Society-FCDO Africa Capacity Building Initiative (ACBI)
Research laboratory capacity: case study

The ACBI programme as a whole
Strengthening research capacity in low- and middle-income countries is recognised by international research funders and development agencies as a major contributor to a country's economic development and to achieving Sustainable Development Goals. The UK Government's Foreign, Commonwealth & Development Office (FCDO) and the Royal Society (RS) funded the Africa Capacity Building Initiative (ACBI) which aims to "strengthen the research and training capacity of higher education institutions and support the development of research scientists in sub-Saharan Africa through UK-Africa research collaborations". ACBI has two research consortia each comprising consortium UK and three African institutions. Consortia research focuses on three areas – waste and sanitation, renewable energy, and salt-tolerant science.

The Centre for Capacity Research (CCR) Liverpool School of Tropical Medicine, leading the monitoring, evaluation and learning component of the ACBI programme, explored factors influencing the capacity of research laboratories to support ongoing projects during and beyond the lifetime of the programme.

This case study highlights some of the challenges hindering the robustness and sustainability of laboratory capacity in African research institutions and discusses an ongoing story of a laboratory technician involved in the ACBI programme. His story demonstrates the importance of programmes such as ACBI in strengthening the human resources and infrastructure of laboratories, which are often overlooked in research capacity strengthening programmes.

Challenges
Laboratories are crucial for many types of research in Africa yet they are widely regarded within research programmes. Laboratory technicians across the ACBI consortia reported numerous challenges including:

- High and acute lack of investment in laboratories with the majority of technicians feeling overworked and under-valued.
- Maintaining and protecting up-to-date laboratory equipment mostly due to lack of budget and bureaucratic procurement systems.
- Limited opportunities for professional development and career progression for laboratory staff participating in a range of training on new technologies and techniques which could provide better support to students and researchers, and very scarce scholarship opportunities and exchange visits to laboratories in other institutions.
- Understaffed laboratories which creates stress for laboratory staff who often teach a large number of students and also have postgraduate research students conduct their experiments. Some laboratory technicians reported working unpaid additional hours including over weekends.
- Poor laboratory infrastructure ranging from inadequate physical space in the laboratory, to the lack of gas cylinders, power cuts, water internet, lack of basic equipment (such as pipettes – regular maintenance for collecting and analysing data) and lack of health, safety and quality assurance systems for laboratories.
- Ineffective structures affecting constructive communication between laboratory technicians and decision makers such as heads of the departments, university managers, researchers and programme coordinators and exclusion of technicians from decision-making processes.

How was data collected?
Findings presented in this case study were derived from qualitative data, collected by the CCR research team through semi-structured in-depth interviews and focus group discussions (FGDs) with laboratory staff who were associated with the ACBI programme.

Laboratory staff highlighted the challenges hindering laboratory capacity strengthening in public research institutions in Africa, benefit derived through ACBI and suggestions for addressing long-term impact and for sustaining capacity gains.

The lead researcher at LSTM University has provided assurances that the case study of the laboratory will be published once they emerge from COVID-19 disruptions.

for laboratory accreditation and existing institutional structure reforms to improve laboratories' effectiveness.

Engaging laboratory staff in negotiating procurement processes
The ACBI programme provided direct laboratory technicians with the opportunity to engage in procurement processes including being consulted about the specifications of the equipment and the quality of the consumables/chemicals.

After the success of a workshop in Lusaka in 2019 led by CCR on **quality management systems for laboratories and educational skills for laboratory technicians**, a series of virtual workshops took place online between March and October 2021. Laboratory technicians who had attended the 2019 workshop were invited to present the **progress they had made with their quality improvement projects** highlighting successes, barriers and learning. They also discussed some of the challenges they faced because of the **COVID-19 pandemic** and changes that they have introduced as a result that may be **beneficial in the long term**. The experiences of laboratory technicians has since been developed into a **case study by CCR in collaboration with the Royal Society** featuring **recommendations and lessons learned** which is available online here: <https://bit.ly/3vyTPaH>

Researcher Profile



Dr Taghreed El Hajj is a Post-Doctoral Research Associate. With Prof Imelda Bates she leads the Monitoring, Evaluation and Learning (ME&L) project within the African Capacity Building Initiative (ACBI). ME&L-ACBI generates research-informed learning about how consortia and programmes can maximise the effectiveness of research capacity strengthening activities.

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About the Centre for Capacity Research

The Centre for Capacity Research specialises in the science of research capacity strengthening – a process of individual and institutional development leading to higher levels of skills and greater ability to perform useful research. The centre is a global leader in advancing evidence-informed capacity strengthening practice in low- and middle-income countries, through:

- Conducting high quality, implementation focused capacity strengthening research
- Fostering a global community of capacity strengthening scientists with equitable low- and middle-income country participation
- Sharing learning and advocating for evidence-informed capacity strengthening practice

The Centre for Capacity Research retains a broad interest in capacity strengthening initiatives of all types within a low- and middle-income country contexts, including a speciality in laboratory strengthening.

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