

## CAPACITY DEVELOPMENT GAP ANALYSIS: RWANDA

### Introduction

In 2019, in collaboration with the University of Rwanda College of Agriculture, Animal Sciences and Veterinary Medicine (UR/CAVM) and Rwanda Agriculture and Animal Resources Development Board (RAB), the Feed the Future Innovation Lab for Livestock Systems conducted a gap analysis to identify the training and organizational development needs to enhance the research and teaching capacity of Rwanda's livestock sector. The analysis identified needs related to individual (human), organizational and enabling environment levels. This brief summarizes the needs and recommendations shared by the participants of the gap analysis activity.

### Human Capacity Development

**Laboratory Skills Gaps:** A lack of professional lab training (including refresher courses) was one of the most reported concerns by UR/CAVM lecturers and students. Laboratory technicians and users lack basic equipment maintenance skills, including how to maintain, calibrate, and repair laboratory equipment, as well as which tests to run and how to interpret test results. The labs are primarily used for demonstration purposes or to conduct basic (chemistry or biology) tests. Graduate students who must conduct research struggle to find working laboratory equipment and supplies.



*Students at the University of Rwanda participate in the gap analysis.*

#### Box 1: Short-term training needs for researchers, faculty & students

- Statistical analysis, including Biostatistics with R
- Grant writing at a high level to compete for international and collaborative grants
- Writing for scholarly journals
- Laboratory training in areas related to Food Safety, Molecular Genetics, One Health, Biotechnology
- Basic computer skills and office equipment training (for students)
- Effective communication and community outreach
- Upgrading curricula and distance learning
- Experiential learning with a focus on practical skills
- Linking outputs to community needs
- Updated technology skills

**Technical and Practical Skills Gaps:** Some key technical skills gaps listed in Box 1 are creating bottlenecks. The researchers, lecturers and students desire to conduct advanced research, including at the molecular level, but have limited statistical skills. Faculty members want to compete internationally for grant funding but lack knowledge to write winning proposals. Students outside of Nyagatare campus miss out on the opportunity to attend an academic writing course. All parties interviewed highlighted the importance of Do-It-Yourself approaches in trainings to develop practical skills.

**Teaching Capacity:** Lecturers, students and external stakeholders stated that the theoretical training at UR/CAVM is of high quality. However, the student to teacher ratio is high, making it challenging for lecturers to integrate student-focused approaches in the classrooms (e.g., experiential learning techniques) and for students to seek individual help from lecturers. Academic staff rely on traditional lecture-based teaching to accommodate large classes, while students prefer classes with extensive hands-on activities (e.g., group discussions, lab work, field work). Students with weak academic backgrounds and English language skills require considerable assistance from course instructors, thus further complicating lecturers' efforts in integrating student-centered approaches due to lack of time.

**Student Advising:** Graduate students emphasize the positive relationships they have with their faculty but wish for more opportunities to interact with their thesis advisors, especially during the thesis preparation process. In addition, it can be challenging for students to find advisors in the areas that are not traditional to UR/CAVM's research/teaching portfolio. Due to the lack of advisors, expertise and related infrastructure, interviewed students stated that they were unable to advance their research into new areas. Therefore, students often default to basing their final projects on theory or replicating the work that has already been conducted by others.

## Organizational Capacity Development

**Laboratory Management:** Good management of laboratories is a significant challenge. Compounded with understaffing, laboratory managers and technicians lack standard operating procedures to run functional labs. Poor laboratory practices often lead to malfunctioning equipment. Lab managers need the general administrative support and training to manage labs. Adequate funding for repairing, maintaining and purchasing lab equipment and supplies is another challenge requiring further analysis to understand where the bottlenecks occur.

**Qualifications of Teaching Staff:** UR/CAVM has a shortage of highly qualified teaching staff (i.e., lecturers with PhD degrees) and struggles to retain the remaining PhDs who are eagerly transferred to work for the government agencies (Tailor et al., 2018; Flaherty et al., 2018). Like other countries, UR/CAVM lecturers with PhD degrees tend to do more research than the lecturers with MSc degrees (50% teaching, 40% research, 5% outreach and 5% administration vs. 70% teaching, 25% research and 5% outreach, respectively); however, a distribution of responsibilities across teaching, research, outreach and administration creates competing commitments for lecturers who struggle to focus qualitatively on teaching, research and student advising, while also commuting between campuses to fulfill their teaching expectations.

**Lecturer Turnover:** Because the Rwandan government aims to transform the country from a low-income agrarian economy to a medium income, export-oriented and knowledge-based economy, many resources have been put in place to train more specialists with MSc and PhD degrees outside of Rwanda. The demand from both public and private sectors for these specialists is high. The lecturers from the UR/CAVM are often invited to work for other government institutions or agencies to fill in the critical areas of the expanding economy. This in turn creates a shortage of highly qualified teaching staff at the university level, which inadvertently also leads to reduced academic and research output. Provision of adequate financial resources to upgrade labs and classrooms, and to conduct both formative and advanced research, will motivate highly qualified lecturers to stay at UR/CAVM. If these changes do not happen, the university will continue experiencing a turnover of lecturers with advanced degrees.

**“Shelf” Research:** Faculty and researchers interviewed expressed concerns that the universities and research institutions are conducting “shelf research.” They stress that while there is a national research plan, there is insufficient research funding to reach the goals of the plan. Moreover, the livestock research is limited in scope and the result is a repetition of the same “old” ways of conducting research. According to interviews, the national research plan is particularly narrowly focused on increasing the production of value chain commodities, such as milk, meat and eggs, leaving behind other related disciplines, such as animal health, epidemiology, forage quality, molecular genetics, etc. Moreover, much of the livestock research conducted is not accessible or relevant to stakeholders—particularly at the community and private sector levels.

### Box 2: Ways to reduce turnover

- Initiate various programs for faculty development.
- Train students to serve as teaching assistants to senior lecturers and for junior lecturers to assume more administrative duties to take the burden off the PhD-holder lecturers, who can focus more on building collaborative research opportunities for the university and on student advising.
- Create lecture-focused positions vs. research-focused positions to enable those with research interests to pursue research opportunities that would contribute to the development of the UR/CAVM research enterprise.
- Offer salaries that are comparable to what is offered by government agencies or the private sector to retain highly trained lecturers.

**Curriculum Gaps:** More needs to be done to help undergraduates transition to graduate coursework. At the undergraduate level, many feel they are “spoon-fed” and provided with lecture materials to memorize and to repeat in tests. At the graduate level, many feel “the way of thinking and learning” changes due to increased emphasis on critical thinking skills. Many students stressed the need for coursework to focus on innovation, interdisciplinarity, the social component of animal and veterinary sciences, and practical application. This was partially confirmed by lecturers interviewed who indicated the need for capacity support in social science research methods and teaching courses or collaborating for research across disciplines.

**Institutional Linkages:** Overall, it was perceived that relationships between the university and non-university institutions are weak. This is particularly relevant in terms of research and extension linkages and community outreach. In principle, RAB could bridge this gap, making use of the existing Memoranda of Understanding (MOU) between UR and RAB to facilitate collaboration. Professional organizations expressed the same desire and suggested Ministry of Agriculture and Animal Resources (MINAGRI) to mandate the university to work with industry and disseminate research outcomes to them. This approach would help UR/CAVM switch from “shelf” research to industry-responsive research and outcomes.

**Grant Writing and Management:** Challenges in winning and managing grants are common across UR/CAVM and RAB. Researchers at RAB struggle with a heavy administrative load and are unable to purposively search for grants or write winning proposals. Researchers and lecturers also lack support from a centralized grants management-related infrastructure within their institutions (e.g., an Office of Research) that can help seek grant funding, provide grant proposal and budget development assistance, as well as manage grant awards in compliance with donor, institution and country regulations.

## Enabling Environment

**Laboratory Infrastructure:** Lack of laboratory infrastructure (equipment, supplies, consumables) limits UR/CAVM’s ability to conduct quality research and causes significant issues with international funders and partners due to delays in the ability of researchers to meet deadlines. In many instances, this lack also results in graduate students finishing their programs without practical laboratory skills, and the situation is further exacerbated if these graduates return to work for the university. More funding is needed to equip labs with modern equipment and appropriate facilities that would bring Rwanda’s research and agricultural education and training on par with international standards.

**Technological Infrastructure:** Respondents highlighted a lack of technological infrastructure and services, such as access to a digital library, e-journals or analytical software. The internet connectivity is also intermittent, which impedes lecturers’ ability to explore or participate in distant learning opportunities. Investments in this area are needed to equip UR/CAVM with various digital technologies that would facilitate student-lecturer and student-student communication. This will also help lecturers to save time by avoiding commute between campuses and utilize their time to better serve students, connect classrooms to the global learning environment and explore opportunities for research.



Participants of the HCID Gap Analysis Workshop in Kigali in April 2019. (credit: N. Ludgate)

**Gender Constraints:** The main challenge female students face is their normative duties to take care of children and maintain the household. Many students (both male and female) marry early. These students have to arrange their time in a way to allow them to participate in classes and extracurricular activities. Female students are often unable to participate in opportunities to engage with faculty outside of scheduled class time, which makes them feel less connected with faculty and reduces their opportunities to engage in discussions or receive mentorship. Many highly qualified female lecturers occupy top administrative positions within the university system. The female students would like to see more opportunities for them to share their experiences with female faculty, hear how they balance work-life challenges, and how they overcome social norms to pursue careers in research and serve as role models.

## Recommendations

Human	<ul style="list-style-type: none"> <li>• Improve the capacity of researchers and laboratory technicians to manage a laboratory, appropriately use laboratory equipment, and analyze results from laboratory tests.</li> <li>• Conduct short-term trainings to improve the professional capacity of researchers, with a particular focus on the “research package,” including design, analysis, statistics, modeling and interpretation; qualitative and quantitative research methodologies; grant and scholarly writing; facilitation skills for community engagement; grant writing; and publications in international journals.</li> <li>• Update curriculum with innovative teaching practices and methodologies.</li> <li>• Update teaching practices and pedagogies to include a focus on practical skills training.</li> </ul>
Organization	<ul style="list-style-type: none"> <li>• Assist in the development of a professional development plan for capacity engagement, including funding postgraduate training opportunities at UR/CAVM and internationally.</li> <li>• Assist in designing programs that are focused on community-based and private sector responsive research initiatives, where students can participate.</li> <li>• Assist UR/CAVM to secure funding to develop digital campus infrastructure to connect and integrate UR/CAVM campuses using one or more digital platforms and a global classroom approach.</li> </ul>
Environment	<ul style="list-style-type: none"> <li>• Support RAB and UR/CAVM efforts to strengthen the cross-institutional collaboration to jointly set research priorities, apply for funding and implement projects.</li> <li>• Strengthen cooperation with key international research networks.</li> <li>• Advocate to MINAGRI to support the relevant policy framework with adequate funding.</li> <li>• Convene policy and budget discussions at the organizational and national level to address the significant infrastructure and resource gaps in laboratories, research and teaching farms, and resources needed to conduct practical training.</li> </ul>

## Reference List:

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