

## CAPACITY DEVELOPMENT GAP ANALYSIS: ETHIOPIA

### Introduction

In 2017 and 2018, the Feed the Future Innovation Lab for Livestock Systems' Human and Institutional Capacity Development (HCID) team collaborated with Haramaya University, Hawassa University, and Gondar University to conduct a gap analysis to identify the training and organizational development needs that would lead to improved research and teaching capacity. The team identified several gap areas related to the human (individual), organizational, and enabling environment needs. This analysis provides a general outline of these gap areas and recommendations.



*Students at Gondar University participating in the gap analysis*

### Human Capacity Development

**Laboratory Skills:** Issues with laboratories were the most reported concern of researchers, faculty and students alike. Laboratory technicians do not know how to properly use or maintain equipment, which tests to run and why, and how to interpret the results of tests. The labs are primarily used for demonstration purposes. Students rarely practice in laboratories. Graduate students who must conduct research struggle to find the opportunity to use laboratory equipment.

**Technical Skills Gaps:** Certain key technical skills gap areas are creating bottlenecks and blockages to the development of faculty and students. The lack of knowledge on which laboratory tests to run, how to read the output, and the availability of the equipment to run the needed tests is directly tied to the level of statistics needed to interpret test results and create statistical models. Few researchers use the R statistical package, which is the software package most often used for higher level statistics, and there is some resistance to moving to R due to the perceived complexity of the software. While researchers desire to conduct advanced research, including at the molecular level, they cannot do so due to limited statistical skills. The teaching of statistics is theoretical, with students receiving limited opportunities to use software. Both faculty and students perceive this as a key issue to the capacity of the university to conduct research. Faculty want to be competitive internationally for grant money but lack advanced grant writing skills. They also fall short in scholarly writing skills.

**Teaching Capacity:** The perception of teaching capacity varies. Many state that the theoretical training in Ethiopia is of high quality. However, PhD and MSc students who teach courses are not well prepared to teach and are not well mentored in teaching by faculty. Student teachers state that they need mentoring in teaching practices and previous teachers

### Training Needs

*Areas that identified for short-term training include:*

- Biostatistics, R statistical software, including sequencing and modeling
- Biotechnology
- Curriculum development
- Food processing
- General software training (for students)
- Grant writing at a higher level to become competitive for international and collaborative grants
- Leadership skills, dynamic thinking, and creative thinking
- Linking outputs to community needs
- Microbiology
- Molecular genetics
- Teaching practice – particularly practical
- Updated technology skills
- Writing for scholarly journals

should be willing to share course materials. Additionally, there is no support for student teachers in terms of sharing experiences, materials, or techniques. Both students and faculty members state that university resources primarily go to research activities over teaching activities. The teaching of practical skills falls short due to the lack of laboratory equipment and skills. Teaching farms are under-resourced and lack state of the art equipment. Laboratory chemicals are in short supply. Many pieces of equipment are not functional, not even for demonstration purposes. In subjects such as biostatistics and molecular biology, there is a general knowledge gap that forces instructors to teach theoretically rather than practically.

## Organizational Capacity Development

**Laboratory Management:** Good management of laboratories is a significant challenge. Laboratory managers and technicians lack the skills to maintain and fix equipment. There are often poor laboratory practices that result in equipment malfunctioning or wearing out. Laboratory staff are in dire need of training on how to run, maintain, and repair laboratory equipment as well as the general administrative duties associated with managing a lab.

**Staff Leveling:** The goal of the Ethiopian government is that within the next 3 to 4 years all university faculty involved in teaching must hold a graduate degree (MSc or PhD). All of the Ethiopian universities that participated in this analysis will not be able to reach this target. Some of the suggestions given to address this need included sandwich programs, long-term research partnerships, faculty exchanges, and short-term training. The government also aspires to have all faculty take a year long pedagogy course but it is unclear whether that has been operationalized anywhere.

**“Shelf” Research:** Many express the 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 money to reach the goals of the plan, the livestock component is limited in scope, and the result is a repetition of “old” status quo ways of conducting research. Much of the research conducted is not accessible or relevant to stakeholders—particularly at the community level.

**Institutional Linkages:** Linkages between the research institutions, universities, and extension are weak. Attempts had been made to establish platforms for these institutions to discuss these challenges, but as of the writing of this analysis, these efforts have not been successful. The different institutions suggest the need for joint plans at the national level between ministries as well as a research agenda that supports collaboration and joint resources. Coupled with this is the under-resourcing of laboratories, particularly at regional research locations, which in some areas do not have the equipment to conduct basic tests. These issues are also coupled with the issues of laboratory management, technical training gaps, and “shelf” research. At research and extension institutions, the training that is conducted is short-term and there is little consistency and no follow-up training conducted after initial training has taken place.

**Turnover of Young Faculty:** PhD holders are scarce and senior faculty often refuse to teach undergraduate courses, which leads the younger faculty having to teach an overload of courses. Junior faculty also report that they feel the quality of students has decreased and being a faculty member is not as good of a career choice as it was twenty years earlier. They feel that politics and a lack of motivation are affecting job satisfaction and performance.

**Thesis Support:** An issue consistently raised by students is a lack of thesis support. The primary challenges are a lack of updated knowledge on the part of the faculty, poor laboratory resources, and insufficient funding. Students report that faculty do not have the knowledge to assist students in researching new ideas. This includes updated research methods, statistics, and subject matter expertise. The lack of laboratory equipment and consumables also prevents students from conducting advanced lab research. These issues result in students, particularly at the MSc level, conducting research that has already been done. In many cases this means taking the thesis title from a student at another university and replicating the study. While the government provides some funding for graduate students, it is insufficient in particular for extensive, PhD level research.

## Enabling Environment

**Laboratory Infrastructure:** Laboratory infrastructure is inadequate, lacking equipment and consumables. Currently, the Ministry of Finance oversees the purchasing of laboratory equipment and consumables. The Ministry aggregates all of the equipment orders nationally and waits for a large enough order to purchase from outside of Ethiopia. This approach results in researchers waiting up to two years to receive their equipment, causing significant delays in research projects. Once the consumables arrive at the laboratory, they have often already expired. These issues hurt the university and research institutions' ability to conduct quality research. Significant issues arise with international funders and partners due to delays in the ability of researchers to meet deadlines. In some labs, equipment is available but in poor condition or there is a lack of knowledge on how to use the equipment. In other labs there are both equipment gaps and boxes of unopened, unused new equipment.

**The HICD team's primary recommendation:** To improve research capacity, organizations must address the linkages and gaps between (a) laboratory infrastructure, resourcing, and management; (b) the skills of the researcher in research design, biostatistics, methods, and analyses (inclusive of modeling); (c) policy and funding mechanisms at the state level; and (d) the research and extension connection.

**Gender Constraints:** Across the three universities, female students are complimentary on the general treatment of female students and faculty. However, there are some gender barriers and challenges that exist for female faculty and students at the university. Female students feel that faculty do not take gender training seriously. The level of integration of a gender lens in coursework, research, and interactions can vary widely. The main challenge female students face is their normative responsibility to take care of children and maintain the household. The students have arranged their time in a way to allow for them to participate in classes. However, other opportunities to engage with faculty occur outside of scheduled class time and female students are often unable to participate. This leads to female students feeling less connected with faculty, which in turn they see as preventing them from having equitable access to opportunities, such as to collaborate with faculty, engage in discussions, and receive mentoring attention.

## Recommendations

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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 (inclusive of existing equipment).</li><li>• Conduct short-term training to improve the research capacity of researchers, with a particular focus on the “research package” including design, analysis, statistics, modeling, and interpretation; grant and scholarly writing; and modern technologies and innovations.</li><li>• Update curriculum with innovative teaching and evaluation practices.</li><li>• Update teaching practices and pedagogies to include a focus on practical training.</li></ul>
Organization	<ul style="list-style-type: none"><li>• Assist in the development of processes and transparencies for the application, selection, and allocation of mini-research grants that are sponsored within the university.</li><li>• Develop and implement processes and opportunities for professional career development for junior faculty.</li><li>• Assist in the development of a gender strategy to include female students in mentorship and collaboration opportunities.</li><li>• Increase partnerships between the university and research institutions in Ethiopia with organizations in the US, EU, and other high-level partners to provide laboratory support.</li></ul>

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- Develop a strategy to address the challenge of providing practical training with limited resources.
- Policy and budget discussions at the organizational and national level need to occur to address the significant infrastructure and resource gaps in laboratories, research and teaching farms, and resources to conduct practical training.
- Increase the availability of low-cost resources, including assistance with accessing journals and e-library resources.
- Address the research-extension linkage and the issue of “shelf research” in terms of meeting the needs of local peoples and communities.

*At the national level:*

- Address policies at the national level (Ministry of Finance) that result in blockages and delays to ordering and receiving laboratory equipment and consumables.
  - Address the research-extension linkage and how research institutions can conduct advanced research to be competitive and collaborative internationally while still meeting the needs of local peoples and communities.
  - Address gaps in the national research master plan in terms of livestock systems such as animal health, feed production, livestock genetics, and intercropped systems.
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