FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

Feed the Future Innovation Lab for Livestock Systems November 2020

# Human and Institutional Capacity Development:

# Synthesis Report and Recommendations for Burkina Faso

Report prepared by
Nargiza Ludgate and Sandra L. Russo with the support from
Marta Hartmann, Richard Fethiere, Isidore Gnanda, Nouhoun Zampaligre, and Rebecca J. Williams

USAID FROM THE AMERICAN PEOPLE
BILL & MELINDA GATES foundation
ILRI INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE
CGIAR
UF IFAS UNIVERSITY of FLORIDA

**Recommended Citation**
Ludgate, N., Russo, S.L., Hartmann, M., Fethiere, R., Gnanda, I., Zampaligre, N. and Williams, R.J. 2020. Human and Institutional Capacity Development: Synthesis report and recommendations for Burkina Faso. Gainesville, FL, USA: Feed the Future Innovation Lab for Livestock Systems.

This report was prepared for the Feed the Future Innovation Lab for Livestock Systems and for key Burkina Faso partners, including academic and research institutions involved in the livestock sector.

**Essential Bibliographic Information**
Leader with Associates Cooperative Agreement Award No. AID-OAA-L-15-00003

Sponsored by the USAID Bureau for Food Security

*Sustainably intensifying smallholder livestock systems to improve human nutrition, health, and incomes*

**Disclaimer**
This work was funded in whole or in part by the United States Agency for International Development (USAID) Bureau for Food Security under Agreement # AID-OAA-L-15-00003 as part of Feed the Future Innovation Lab for Livestock Systems. Any opinions, findings, conclusions, or recommendations expressed here are those of the authors alone.

## Abbreviations

| | |
|---|---|
| AET | Agricultural Education and Training |
| AOI | Area of Inquiry |
| APESS | *Association pour la promotion de l'élevage au Sahel et en Savane* (in English: Association for the Promotion of Livestock in the Sahel and Savannah) |
| ASF | Animal-Source Food |
| ASTI | Agricultural Science and Technology Indicators |
| BSc | Bachelor of Science |
| CCT | Cross-Cutting Theme |
| CGIAR | Consultative Group for International Agricultural Research |
| CIRDES | *Centre International de Recherche Developpement sur L'Elevage en Zone Sub-humids* (in English: International Center for Research and Development on Livestock Production in the Sub-humid Zone) |
| ENESA | *Ecole Nationale de l'Elevage et de la Sante Animale du Burkina Faso* (in English: National School of Livestock and Animal Health Mission of Burkina Faso) |
| FAO | Food and Agricultural Organization of the United Nations |
| GoBF | Government of Burkina Faso |
| HICD | Human and Institutional Capacity Development |
| IFAS | Institute of Food and Agricultural Sciences |
| IFPRI | International Food Policy Research Institute |
| ILRI | International Livestock Research Institute |
| INERA | *The Institut de l'Environment et de Recherches Agricoles* (in English: Institute of Environmental and Agricultural Research) |
| IRSAT | *Institut de Recherche en Sciences Appliquées et Technologies* (in English: Applied Science and Technology Research Institute) |
| MAFS | Ministry of Agriculture and Food Security |
| MAFR | Ministry of Animal and Fish Resources |
| MSc | Master of Science |
| UF | University of Florida |
| UJK | University of Joseph Kizerbo |
| UNB | University of Nazi Boni (former Polytechnic University of Bobo-Dioulasso) |
| UNDP | United Nations Development Programme |
| UO | University of Ouagadougou |
| USAID | United States Agency for International Development |
| WB | World Bank |

## Contents

## Introduction

The U.S. Agency for International Development (USAID) awarded funds to the University of Florida (UF) Institute of Food and Agricultural Sciences (IFAS) to manage the Feed the Future Innovation Lab for Livestock Systems. This five-year initiative (October 2015 to September 2020) supports USAID's agricultural research and capacity building activities under Feed the Future, the U.S. Government's global hunger and food security initiative. The International Livestock Research Institute (ILRI) partners with UF/IFAS in implementing the Livestock Systems Innovation Lab.

In 2016, the Livestock Systems Innovation Lab held initial meetings with the Ministry of Agriculture and Food Security (MAFS), Ministry of Animal and Fish Resources (MAFR) and with various research and agricultural education and training (AET) institutions supporting the livestock sector in Burkina Faso: *Institut de l'Environnement et de Recherches Agricoles* (INERA), *Association pour la promotion de l'élevage au Sahel et en Savane* (APESS), *Centre International de Recherche Développement sur L'Elevage en Zone Subhumides* (CIRDES), *Ecole Nationale de l'Elevage et de la Santé Animale* (ENESA), *Institut de Recherche en Sciences Appliquées et Technologies* (IRSAT), University of Ouagadougou (UO), University of Nazi Boni (UNB), and University of Joseph Kizerbo (UJK). This led to joint prioritization of research for their development needs, issuing of a Request for Grant Applications by the Livestock Systems Innovation Lab; subsequently, INERA, universities and other stakeholders became subawardees and subrecipients of the livestock research projects in Burkina Faso.

The report provides an overview of the Livestock Systems Innovation Lab's capacity development approach, findings from the assessments and literature, suggested areas of intervention, and recommendations for next steps. The Livestock Systems Innovation Lab has been renewed for a second phase (October 2020 to September 2025). At the onset of this second phase, the findings from this report will be reviewed in coordination with the above listed partners and other stakeholders to develop an intervention plan that will strengthen Burkina Faso's livestock research, extension, education and related workforce development.

## Capacity Development Approach

The USAID and other frameworks for HICD emphasize the connection between building the capacity of the individual and organization, and systemic change at the institutional and enabling environment levels. Human capacity development can only function for the growth of the individual, organization, and institution when newly acquired skills are supported by adequate infrastructure, resources, policies, and the capacity to change and adapt (Jones, Rojas, and Gill, 2015). As such, in-depth analyses of human and organizational capacity, institutional gap assessments, and collaboration with key stakeholders must be conducted to fully address HICD needs. These efforts must align with organizational needs and abilities and use an iterative and collaborative process (USAID, 2010).

For the purposes of this project, the following definitions will clarify Livestock Systems Innovation Lab's HICD objectives and activities in terms of capacity development. Figure 1 shows the relationship between individuals, organizations, and the enabling environment (FAO, 2016).

**The individual (human) level**: the knowledge, experiences, and skills that enable an individual to perform. Access to resources and experiences that develop individual capacity are shaped by the organizational and environmental factors in which the individual operates, which in turn are influenced by the degree of capacity and agency of the individual (FAO, 2016; UNDP, 2009).


**Figure 1**: Three levels of capacity development (USAID, 2012)

**The organizational level**: the internal structure, policies, and procedures that determine an organization's effectiveness (FAO, 2016; UNDP, 2009). This includes support systems (fiscal, human resource, technical), incentive systems, as well as organizational goals and plans that influence an individual's ability to perform (FAO, 2016; USAID, 2012).

**The enabling environment level**: the broad social system within which individuals and organizations function, including the rules, laws, policies, power relations, and social norms that govern civic engagement (FAO, 2016; UNDP, 2009). The enabling environment involves how human capacity functions within the organization and the environmental system that surrounds it (FAO, 2016; USAID, 2012). These connections extend to external institutions such as government, civil society, the private sector, and the larger cultural system (FAO, 2016; USAID, 2012). Institutional arrangements encompass the policies, practices, and systems that allow the effective functioning of an organization or group. This includes policies and laws, the legal environment, terms of contracts, and informal rules such as codes of conduct and generally accepted values (FAO, 2016; UNDP, 2009).

The Livestock Systems Innovation Lab's HICD plan is built on the rationale that: "*Strong, knowledgeable livestock systems scientists and researchers, along with effective and competent institutions, are essential for the development of agricultural innovation systems and specifically, livestock innovation systems.*" An enabling environment (innovation policies and investments, agricultural policies and educational policies) that encourages and permits innovation is just as important.

Figure 2 shows a conceptual model of the Livestock Systems Innovation Lab's HICD Theory of Change and the interactions between human capacity, institutional capacity, and the enabling environment.

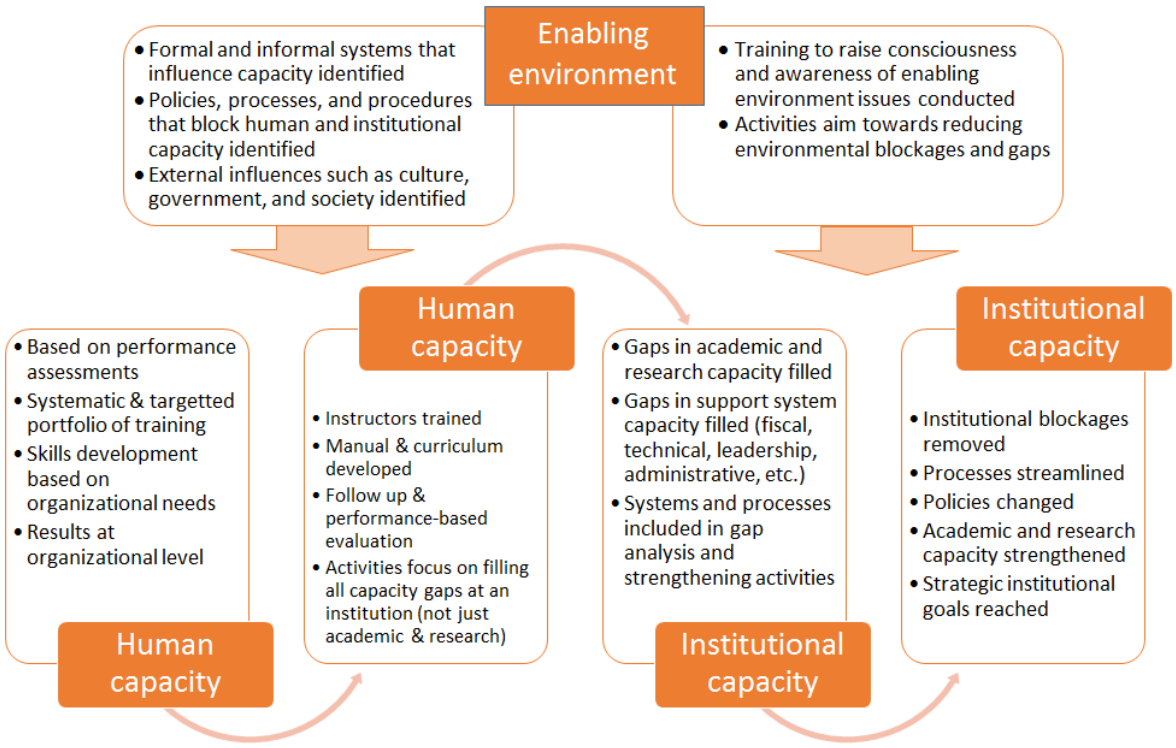


**Figure 2:** Conceptual Model of the Theory of Change for Livestock Systems Innovation Lab's HICD

After a close examination of capacity development literature and documentation, the HICD team focused the core HICD efforts on Agriculture Education and Training (AET) institutions that are partnering with the Livestock Systems Innovation Lab to conduct research based on the rational that:

- AET institutions have both faculty and students who are conducting research in animal-source food (ASF) systems.
- The focus of AET institutions on faculty and students will lead to longer-term sustainability of HICD efforts and other research investments, as students move from the AET organizations into research, government, extension, and various roles in ASF value chains.
- Many AET institutions have partnerships with government research institutions. Inclusion of these institutions in key stakeholder interviews/focus groups will allow the HICD team to evaluate the working relationship between both AET and government-based research institutions and explore avenues to strengthen research collaboration through HICD activities.
- Many AET institutions are positioned to be focal points for current and/or future human capacity development such as professional development training and skills upgrade, across livestock research and development institutions, including public, private, and extension systems.

With these issues and priorities in mind, the Livestock Systems Innovation Lab's HICD team proposes a phased process that will focus on capacity development efforts with partner AET organizations in Burkina Faso through:

1. Identifying and filling the human and organizational capacity related gaps among research and academic institutions in the livestock sector.
2. Attuning to institutional arrangements and the enabling environment in which the livestock system operates, and collaborating with governmental, non-governmental, and private organizations to provide recommendations to strengthen institutional arrangements and establish a positive enabling environment.

## Sources for this Report

The primary sources for this report come from Dr. Marta Hartmann's rapid assessment of human and institutional capacity development gaps in livestock research in Burkina Faso, conducted in 2018. This report identifies the needs on the human level of the HICD framework and is based on findings from Dr. Hartmann's visit to various research and education institutions that specialize in livestock research, extension, education, and workforce development. Her assessment is complemented by the more recent "Report on the Assessment of Forage and Non-Forage Laboratories in Burkina Faso," prepared by Richard Fethiere and Dr. Nargiza Ludgate. It is based on Mr. Fethiere's rapid assessment of lab (both forage and non-forage) facilities towards in 2019. This report focuses on current capacity, lab equipment, personnel and facility's needs of labs managed by INERA and UNB. Additionally, undergraduate and graduate students were approached with a short semi-structured survey instrument to obtain their feedback on universities' performance and what can be done to strengthen the preparation and development of the future workforce to support the livestock sector in Burkina Faso. Students were interviewed in January 2020. Students represented various specialties in the livestock-related disciplines, including Feeding and Nutrition of Ruminants, Animal Biotechnology, Animal Nutrition, and Animal Genetics. Relevant literature was reviewed to supplement Dr. Hartmann's HICD report that compiled the gaps and needs in the individual, organizational and enabling environment levels of Burkinabe's livestock-related research, extension, education sector (see list of references).

## Synthesis of HICD Gap Analysis

### Institutional Strengths

The focus of this report is on the capacity development gaps of INERA, UO, UNB, and UKZ. It is important to state that the interview participants had many positive comments about these institutions, some of which are listed below:

#### INERA

- It is the largest and most comprehensive public research institute in Burkina Faso, providing both research and extension support. This allows for a transfer of agricultural innovations and knowledge to farmers through extension programs. INERA works on the Government

of Burkina Faso (GoBF)-prioritized value chain commodities to address food insecurity, especially in rural areas.

- While headquartered in Ouagadougou, INERA has a research and training center in Kamboinsé and five regional centers serving the country's major agro-ecological zones: the Sahel, Sudan-Sahel, and the Sudan zones (WB, 2009).
- INERA specializes in four major themes: animal production, crop production, forestry, and natural resources and farming systems management. Livestock-related research makes up about 10% of the total research agenda.
- According to Magne Domgho, Neya and Stads (2017), INERA receives funding from three sources, with donor funding being the largest: GoBF (30-35%), donors (50-55%), and revenue through the sale goods and services offered through INERA (about 10%). Funding goes primarily to pay INERA staff and to support staff trainings and research infrastructure (labs).
- INERA has a positive working relationship with various research institutions and universities in the country and abroad. For example, INERA participates in a number of livestock projects funded by the Feed the Future Innovation Lab for Livestock Systems, including the forage project funded by the Bill & Melinda Gates Foundation. This allows INERA to involve university faculty and students in research projects.
- During 2013-2017 period, INERA recruited many MSc and PhD-qualified researchers to increase its talent pool (Magne Domgho et al., 2017). More than half of INERA's research workforce are PhD-degree holders, while the remaining workforce are made up of MSc degree-holders.

### Universities: UO, UNB and UKZ

- UO is the primary higher education institute in the country and offers a comprehensive agricultural program that combines animal science degrees with other agricultural and social disciplines. UNB offers MSc and PhD degrees in animal husbandry, with specializations in reproductive physiology or animal nutrition. UKZ uses the Master Doctorate License (MDL) system, which allows it to issue internationally recognized diplomas. The courses are primarily taught in person. However, the plethora of students, the lack of teachers, the academic delays and the conditions of application to the LMD are constraints limiting the quality of teaching. None of the universities in this report offer a veterinary medicine degree program, which is usually obtained abroad.
- In the surveys, students praised the quality of education, particularly in the livestock-related programs. Students feel that they are competitive when they leave the institution and get a solid theoretical background in their field, despite the challenges posed by a lack of practical skills training and access to resources on campus (libraries, internet, etc.). It should be pointed that UNB is well positioned with having a functioning forage laboratory where students are trained and conduct research.

- Students at all three universities also feel their faculty have better qualifications and training than the faculty at other Burkinabe universities. They feel that the faculty have a strong record of publications and have high standards for research and teaching. The universities offer a wide range of academic studies that provide opportunities for students to pursue a variety of interdisciplinary programs, which buffers the lack of infrastructure (e.g., working farms and well-equipped classrooms), which are desirable for universities as a place of study.
- Faculty from all three universities participate in INERA's research projects, which provide opportunities for students to join field-based research and extension activities utilizing resources and infrastructure available at INERA and its field stations across the country.
- Universities have international collaborations with education and research organizations, from the Americas, Europe and Asia, though collaborations with French-speaking institutions prevail. Many faculty and researchers obtained their degrees from French or Francophone universities.
- Universities have academic and research agendas that focus on addressing the needs of local stakeholders. MSc and PhD students conduct research in the communities, although they lack strategies or mechanisms to return and share results of the research with the communities.
- According to Traore (2009), UNB lecturers from the animal husbandry program stressed that the strength of the program was in the basic training UNB offers in animal and poultry production.

## Challenges Unique to Institutions

### Human Capacity Development

**Training Needs**

All four institutions covered in this report have identified several areas of human capacity development needs that could be partly addressed through short-term courses or a Train-the-Trainer format training. The needs fall into the following thematic areas presented in Table 1.

While universities stress more needs in the research design and methods areas to upgrade the capacity of lecturers and students to conduct research, INERA's needs fall more around technical and extension areas to boost the capacity of researchers and extension staff.

**Table 1: Skills gaps in Research, Technical Knowledge, and Extension**

| Research Design & Methods | Technical Knowledge | Extension |
|---|---|---|
| • Data analysis and modeling<br>• Grant writing and funding sources<br>• **Livestock modeling**<br>• **Methods for disseminating research products**<br>• **Research protocol development**<br>• **Scientific writing**<br>• **Statistics and statistical analysis** | • Value chain development and management (for livestock species and crops)<br>• Laboratory Management and technical skills<br>• Animal feeding guidelines<br>• Forage analysis<br>• Forage production and climate change<br>• Genetics, animal breeding and livestock improvement<br>• Meat hygiene<br>• New technologies for milk production<br>• Semen technologies for animal breeding<br>• Technologies to improve animal performance<br>• Value addition including production, processing, packaging, distribution, commercialization, and marketing of animal products | • Communication for extension education and development<br>• Dissemination of research findings<br>• Extension methodologies and approaches<br>• Research and extension linkage and approaches<br>• Small business and enterprise development<br>• Training of technicians |

**Laboratory Skills**

According to Fethiere and Ludgate (2019), additional professional lab training was one of the most reported concerns of faculty, students, researchers as well as lab personnel (management and technicians). Students are usually new to the laboratories and need training in order to complete their research and publish findings. Laboratory managers, who are responsible for the day-to-day lab operations, require refresher trainings on best lab management practices. Generally, both at the universities and INERA, there are insufficient numbers of laboratory technicians and this is compounded by a lack of basic equipment maintenance skills among those present, including how to maintain, calibrate, and repair lab equipment. Technicians lack skills on how to properly use equipment, which tests to run and why, and how to interpret test results. They also need to develop skills in general lab administration and management aspects, including sample intake, processing, supplies purchase, storage and use, equipment maintenance, manuals and procedures, inventory management, workflow, safety, and disposal of hazardous waste. When opportunities for trainings occur, it is usually the lab managers and lecturers who are given the chance to participate and it is unclear whether they then transfer the training knowledge and skills to the technicians.

The labs are primarily used for demonstration purposes. Students, especially undergraduates, rarely get to use the equipment in most of the laboratories. The willingness of laboratory technicians to assist students or to give them access to the laboratories varies but is generally low. For example, a teaching lab in UNB is well equipped but the access of students outside of course work is restricted. Students also find it difficult to access the better equipped laboratory facilities of INERA unless

their project is part of the universities' collaborative agreements with INERA. The majority of the laboratories focus on basic chemistry and biology tests. Overall, laboratories lack diagnostic kits, consumables, and equipment.

Mr. Fethiere's visit to universities (UO and UNB) stressed the need to develop new or revised lab courses or a certificate program to guide the preparation of lab technicians. It was not clear if such a course currently exists in universities. The course can include prerequisites, such as data analysis and lab techniques, sample collection, handling and storage, that are needed to facilitate better learning and technical skills development. Course instructors can introduce the use and maintenance of laboratory equipment and safety procedures before users access lab facilities to conduct lab work. Measurement and calculation concepts can be integrated in the course along with scientific terminology related to laboratory procedures.

**Technical and Practical Skills Gaps**

Several key technical skill gaps are creating bottlenecks and blockages for the development of faculty, students, and researchers. Laboratory skills are discussed above, but it is important to note that issues with laboratory skills, consumables, laboratory access, and infrastructure are directly related to some of the other key gap areas. The lack of knowledge on which laboratory tests to run, how to interpret the output, and the availability of the equipment to run the needed tests are compounded by, for example, lack of knowledge about the type of statistical tests needed to analyze and interpret results.

Faculty, students, and researchers use various statistical packages from basic to more sophisticated options, such as Excel, SPSS, SAS, and Stata, but the level of proficiency widely varies as do the versions of the respective software packages that are available. It was difficult to determine if there were any faculty or researchers at INERA who use Biostatics with R, which is available free of charge. The faculty, students and researchers are interested in advancing their research into new areas but limited statistical and modeling skills impede their desire. Universities and INERA research stations lack specialized software and computers with capacity to run large datasets. In addition, the teaching of statistics is theoretical rather than practical with students receiving very limited opportunities to use statistical software. Faculty, students and researchers at INERA perceive this as a key constraint to the capacity of the institutions to conduct research or train their students. One-off short-term trainings are helpful but insufficient to meet the need for building long-lasting capacity in this area. Particularly, students articulated a need to have faculty that specialize in statistics and large data set analysis.

Writing grants and scholarly writing is another key challenge. Faculty and researchers are expected to publish scientific papers as an important requirement for promotion. They also want to compete internationally for grant funding, but they do not know-how to access these funds and to write proposals that meet donors' expectations. Students also stress the need to improve their writing

skills. It was difficult to determine if any of the universities surveyed/assessed offer any academic or grant writing courses for students.

The most frequently identified issue across junior faculty (lecturers with MSc degrees) and students was the lack of opportunities to gain practical skills. This is due to the high teaching load of faculty (large classes), a lack of needed/basic working equipment and infrastructure, and the limited capacity of faculty and technicians to train students.

Students pointed to the lack of practical skills that they could use in the field during field-based research or after graduation. Few students seek internships with the private sector although there is a large desire from students to obtain such internships to acquire practical skills. They also stressed the importance of developing communication skills, especially in dealing with farmers and smallholders. Faculty and researchers, on the other hand, stressed the need to improve dissemination of research findings through extension and on effective extension methodologies that use participatory approaches.

**Teaching Capacity**

University, research and private sector stakeholders stated that the theoretical trainings at the three institutions were adequate. However, the student to teacher ratio is high, making it difficult for lecturers to integrate student-focused approaches in the classrooms and for students to get individual help from lecturers.

The practical side of teaching, (e.g., laboratory work) is reportedly poor due to factors such as the lack of laboratory equipment and supplies, insufficient laboratory personnel and inadequate laboratory teaching skills. Laboratory chemicals are almost always in short supply, and in many cases the equipment is not functional, even for demonstration purposes. Students also pointed out that some course curricula are outdated. They also wished for classrooms to be equipped with teaching aids and instructional materials (e.g., video projectors, posters on technical subjects) that would enliven classroom instruction to students.

### Organizational

**Laboratory Management**

Understaffing and the lack of laboratory skills to maintain and fix equipment are acute problems. Laboratory practices are often poor, resulting in equipment malfunctioning. Laboratory staff are in dire need of training on how to run, maintain, and repair laboratory equipment as well as on general administrative duties associated with managing a lab. It is also important to note that obtaining adequate funds for repairing, maintaining, and purchasing equipment is a challenge. This is an issue that requires further exploration to determine where the bottlenecks are. Moreover, it is assumed that lab managers were appointed based on their rank within the institution and some may not necessarily have appropriate managerial skills to run a lab or provide technical oversight over laboratory equipment.

**Information Systems**

Researchers in Burkina Faso would benefit from having access to a central repository that collects, filters, stores, and processes digital information. This includes information needed on mitigation approaches and adaptation strategies for climate change effects on animal production, sustainable forage production, and how to improve the sustainability of livestock sector. There is also a need for an information system that can facilitate the dissemination of research findings to support decision making, coordination, control and analysis among academics, researchers and practitioners.

**Curriculum Gaps**

Students report that the change from undergraduate to graduate coursework is particularly challenging. At the undergraduate level, students are "spoon-fed," i.e., provided with lecture materials to memorize, and repeat memorized materials in tests. At the graduate level, the "way of thinking and learning" changes and new graduate students feel unprepared for this change. Students also feel as though their coursework is lacking a perspective on innovation, interdisciplinarity, the social component of animal and veterinary sciences, and practical applications. Graduate students would like to see courses or coursework integration on:

- Interdisciplinary research and qualitative research methodology;
- Publishing in peer-reviewed journals;
- One Health.

**Institutional Relationships**

Overall, it was perceived that relationships between academic and non-academic institutions are very weak. This is particularly relevant in terms of education, research and extension linkages and community outreach. Respondents pointed at INERA's existing capacity (i.e., partnership agreements) can be utilized to bridge such relationships and build collaborations between various stakeholders. Professional organizations expressed similar views and suggested that INERA and universities work with industry to facilitate innovation and technology transfer, and commercialization of research results. This could eventually lead to creating an industry-responsive research fund within academic or research institutions, which in turn would enhance university-industry collaborations and involve the private sector.

**Grant Writing and Management**

Challenges in writing and winning grants are common across universities and INERA. The issue with grant writing reaches beyond the lack of adequate skills to write competitive grants. The institutional support for grant writing is very limited. There are no administrative personnel responsible for providing feedback on the grant proposals or assisting with the more complex aspects of grant writing and developing budgets. Proposals are submitted to the potential donor, often without adequate oversight or review at the universities or at INERA. Participants also point out that to win grants it is necessary to have previously established relationships with international partners for the grant writing team to be fast and efficient enough to respond to complex grant calls. Forming these relationships is challenging. Another challenge is that due to the heavy administrative

load of INERA technical personnel, they are often unable to purposively search for grants or dedicate adequate time to write grants, as this conflicts with their highly demanding responsibilities within INERA and the need to respond to ad hoc calls from different ministries to attend urgent meetings. Instead, INERA sometimes relies on other partners to bring potential grants and grant developing skills to their attention. This makes them slow to react to grant calls such that many opportunities are missed.

**Other Issues**

According to Traore et al. (2014), INERA had weak administration systems and practices. In interviews, researchers and administrators from INERA pointed out that each center manages its own financial and human resource databases. In some instances, donor funding may be routed directly to centers or individuals without the headquarters' knowledge and oversight. Although this is an efficient system of routing funds directly to centers, it prevents internal controls and oversight of financial resources by the headquarters and deprives centers and researchers of the protection that can be offered by the headquarters that are familiar with donor compliance requirements.

The imminent retirement of highly qualified researchers and faculty is another issue raised by Traore et al. (2014). Many INERA researchers are close to official retirement age (60-65 years depending on the researcher's rank). Universities are in slightly better position, but a number of highly qualified faculty are also nearing the retirement age. Unless efforts are put in place to train and retain many young PhD and MSc-qualified researchers, both INERA and universities will not be able to fulfil their mandates and maintain a skill mix that is necessary for livestock research. In recent years, the GoBF approved the recruitment of many young MSc and PhD researchers but preparing them to meet INERA's research mandate will require considerable resources that INERA does not currently have.

## Enabling Environment

**Laboratory Infrastructure**

At the university level, laboratory infrastructure, including appropriate facilities, equipment, supplies and consumables, is lacking. These issues hinder the universities' abilities to conduct quality research, which may also cause issues with international funders and partners due to delays in the ability of researchers to meet deadlines. Stakeholders pointed out that inadequate traning on lab management compounded with poorly equipped laboratory infrastructure may result in graduate students finishing their programs without practical laboratory skills, which would further exacerbate the situation if these graduates return to work for universities. The universities and INERA need more funding to train and equip their labs with modern equipment and appropriate facilities that would make Burkinabe research on par with international standards and help modernize the research focus.

Shortcomings in laboratory infrastructure and other issues discussed below are generally related to policy. For example, developing and maintaining functional laboratory facilities and equipment is

not cheap. The livestock-related research is not only interdependent on other disciplines (e.g., microbiology, chemistry, statistics, etc.) but it also requires physical methods of analysis, isotope and radiation techniques with a range of sophisticated equipment. This all requires funding, but due to competition for limited resources, inadequate funding is allocated to support research.

**Library Systems and Information Technology**

Students from different universities stated a lack of sufficient library resources and information technology systems, such as access to e-library tools, e-journals, analytical software and distance education tools. They also reported that the internet connectivity is intermittent and library computers have no connection to the internet.

**Gender Constraints**

In comparison to universities, INERA employs more female researchers, although they represent only 19% of INERA's workforce. On average, female researchers tend to be younger but less qualified than their male counterparts. BSc degrees among women prevail (64%) followed by MSc (25%) and PhD degrees (13%). Many highly qualified female researchers are in high administrative positions within the university system or INERA. Female students stressed the need for more opportunities to engage with established female researchers as role-models, hear about their pathway to a career in research, and learn how to find a work-life balance.

**R&D Investment and Infrastructure**

According to Magne Domgho et al. (2017), Burkinabe agricultural research spending as a share of agricultural gross domestic product reached the recommended 1% target set by the New Partnership for Africa's Development and the United Nations in 2017. This percentage is better than in other West African countries, but it is still not adequate to support and boost Burkina Faso's agricultural R&D, including R&D in the livestock sector. As stated earlier, agricultural R&D very much depends on donor funding, which is perceived as ad hoc and does not necessarily align with GoBF priorities and. Government funding should increase to fund staff salaries, provide adequate resources to operate research programs, and maintain and upgrade infrastructure and facilities across research and education institutions. For example, while INERA has a large infrastructure (21 research laboratories, 13 of which are in Kamboinse and 8 in Farako-Ba) 90% of them are outdated (Traore et al., 2014). The authors further state that INERA lacks facilities to manage and properly dispose of organic waste. It does

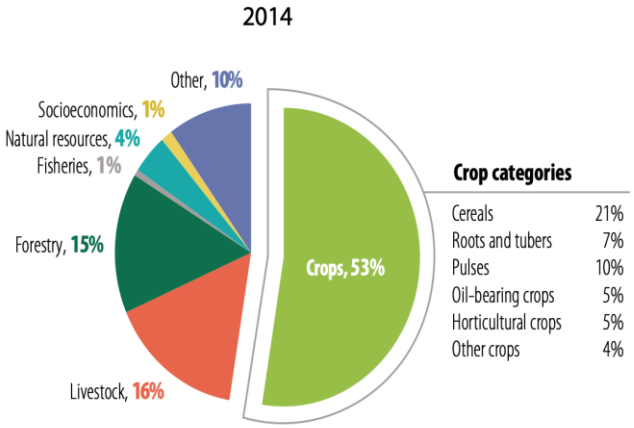


**Figure 3:** Relative funding allocation by research domain in Burkina Faso in 2014 (Source: Magne Domgho et. al., 2017)

not have sufficient vehicles to meet the growing needs. The number of computer servers is insufficient. Internet access is unreliable, exasperated by power outages. The available software is outdated (Traore et al., 2014). Combined, these shortcomings continue to hinder the agricultural R&D, including the that in the livestock sector (Ibid). Moreover, Figure 3 shows that the bulk of the funding in 2014 supported crop research, while livestock research received 16% of available funding. Yet livestock products contain a cluster of nutrients that is critical to reduce the high levels of stunting in Burkina Faso.

**Extension Linkages**

INERA operates under the National Center for Scientific and Technological Research, which in turn reports to the Ministry of Higher and Tertiary Education and Scientific Research. Universities are managed by the same Ministry. Despite this association, the linkages between research, education, and extension are weak. Interviewed stakeholders also claimed that extension linkages between universities and INERA are weak. Funding and a concerted effort between universities and INERA are needed to develop functional linkages that will facilitate the transfer of research outputs and technologies to farmers and smallholders.

## Recommendations from the Livestock Systems Innovation Lab's HICD Team

The recommendations below are the priorities that have been identified by stakeholders and participants of the rapid assessment surveys.

### Human Capacity Development

**Short-Term Training**

Technological and practical skills gaps were identified across all of the stakeholders. There are several areas in which short-term training can assist in filling capacity gaps. Where possible, short-term training should involve a Training of Trainers component that is also supported with an operational plan that funds and provides management support/oversight for these trainers to then train others. Training should be focused on university lecturers and professional researchers and extension staff from INERA and other research entities (e.g., CIRDES, IRSAT) with graduate students as a secondary audience group. This will help build the capacity of existing and long-term lecturers and researchers who will pass improved skills to a larger body of students and young specialists. The HICD team recommends that where possible, short-term training should include at least one follow-up training rather than a "one-and-done" training model. The following areas are suggested as priorities for training initiatives as these gap areas are consistent across Livestock Systems Innovation Lab target countries, allowing the Lab to leverage training that has been developed for one country to be adapted and utilized for others.

- The "research package" including design, analysis, statistics, modeling, and interpretation; scholarly writing; and modern technologies and innovations,
- Laboratory skills (modern methods and technologies, analysis and interpretation of results, lab management, maintenance of lab equipment and instruments, and lab safety procedures),

- Grant writing, especially for international funding opportunities, and
- Animal health and veterinary services for auxiliary providers. This training should focus on developing the skills of the community-level animal health care providers who are frequently the only animal health care providers in rural and remote communities.

Other areas for training topics or areas were identified in Table 1 above. The HICD team recommends leveraging the activities and presence of Livestock Systems Innovation Lab sub-awardees in the country for conducting these trainings.

Finally, the HICD team is working on various TOT courses in response to demands for research-enhancing trainings that were pre-tested in other target countries of the Livestock Systems Innovation Lab. These include qualitative research methods for livestock systems research, statistics training with focus on Biostatics with R, participatory training for adult learners, pedagogy and effective teaching methods, and good laboratory management practices. These were developed as a result of the laboratory assessment in Burkina Faso and Niger and encompass many of the recommendations in the lab assessment report.

### Organizational Development

Universities and INERA can benefit from the development of an information sharing system to promote research collaboration and for students to access resources within INERA and its research stations. As stated earlier, this could include a central repository for information. Experience shows that information sharing platforms facilitate the creation of new knowledge, dissemination of research findings and generate ideas for innovative research. Creating such a system will encourage institutions to invest in digital infrastructure and communication equipment that would address many shortfalls students stressed: lack of access to e-journals, online courses, library resources, etc. Moreover, such a system can also facilitate information dissemination to various stakeholders, including the private sector.

A large percentage/share/number of Burkina Faso researchers, especially in the forage areas, are in the process of retirement. This requires concerted efforts from both academic and research entities like INRERA to prepare a new cadre of professionals, technicians and others for the livestock sector. Facilitating the research and technical skills development described in the preceding section will aid in this process.

### Enabling Environment

Universities and INERA are interested in strengthening the cross-institutional collaboration to jointly set research priorities or apply for funding. The Livestock Systems Innovation Lab facilitated a number of such initiatives to foster research collaboration in the livestock sector between INERA, OU, UNB and the international research institutes, such as ILRI, and ICRISAT. This allows leveraging of scarce resources (human, social, physical) in more efficient ways, cross-fertilization with innovative research ideas and experiences. This initiative will also bring both research and

academic communities together, resulting in more opportunities for student involvement. Finally, it opens opportunities to strengthen the cooperation with key international research networks (such as the CGIAR). Bringing MAFS and MAFR on-board to support such initiatives through adequate policy frameworks with adequate funding will be critical. Several key policy reforms are needed, as noted earlier, especially with regard to adequate research support. Finally, the HICD team recommends increasing the availability of low-cost resources including assistance with accessing e-journals and strengthening e-library resources across academic and research institutions.

## References


Fethiere, R., and Ludgate, N. 2019. Report on the Assessment of Forage and Non-Forage Laboratories in Burkina Faso. Gainesville, FL, USA: Feed the Future Innovation Lab for Livestock Systems.

Food and Agriculture Organization of the United Nations (FAO). 2016. Common framework on capacity development for agricultural innovation systems: Synthesis document. Tropical Agriculture Platform. Rome.

Hartmann, M. 2018. Burkina Faso Livestock Research Human and Institutional Capacity Development Gap Analysis: Summary Report and Recommendations for HICD Activities. Gainesville, FL, USA: Feed the Future Innovation Lab for Livestock Systems.

Jones, K., Rojas, C., and Gill, T. 2015. Degree training and curriculum development to support HICD: Good practices from USAID Collaborative Research Support Programs and Feed the Future Innovation Labs for Collaborative Research. Blacksburg: InnovATE.

Traore, A. 2009. Status of postgraduate training in the livestock sector in West and Central Africa and priorities for ILRI's support. Nairobi, Kenya: International Livestock Research Institute.

Magne Domgho, L. V., Neya, S., and Stads, G-J. 2017. Burkina Faso: Agricultural R&D indicators. Washington, DC: Agricultural Science and Technology Indicators (ASTI) and International Food Policy Research Institute (IFPRI). https://www.asti.cgiar.org/sites/default/files/pdf/Burkina-Faso-Factsheet-2017.pdf

Traore, H., Traore, S., and Stads, G-J. 2014. Agricultural R&D in Burkina Faso: An Assessment of the Environment and Agricultural Research Institute. Washington, DC.: ASTI and IFPRI. July 2014. https://www.asti.cgiar.org/pdf/coraf/BurkinaFaso-SummaryNote.pdf

United Nations Development Programme (UNDP). 2009. Capacity development: A UNDP primer. New York: United Nations Development Programme.

USAID. 2012. Human and institutional capacity development handbook. Washington, D.C.: USAID.

FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

**Feed the Future Innovation Lab for Livestock Systems**


http://livestocklab.ifas.ufl.edu
Livestock-lab@ufl.edu

University of Florida
Institute of Food and Agricultural Sciences
P.O. Box 110910
Gainesville, Florida
32611-0910