



FEED THE FUTURE

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

Feed the Future Innovation Lab for Livestock Systems

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Human and Institutional Capacity Development: Synthesis Report and Recommendations for Niger

Report prepared by
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Sustainably intensifying smallholder livestock systems to improve human nutrition, health, and incomes

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Abbreviations

AET	Agricultural Education and Training
AOI	Area of Inquiry
APESS	<i>Association pour la promotion de l'Élevage au Sahel et en Savane</i> (in English: The 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	Constatative Group for International Agricultural Research
FAO	Food and Agricultural Organization of the United Nations
FASE	Faculty of Agricultural and Environmental Sciences
HICD	Human and Institutional Capacity Development
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IFAS	Institute of Food and Agricultural Sciences
IFPRI	International Food Policy Research Institute
ILRI	International Livestock Research Institute
INRAN	<i>Institut National de la Recherche Agronomique du Niger</i> (in English: The National Institute of Agricultural Research of Niger)
LABOCEL	<i>Laboratoire Central de l'Élevage</i> (in English: Central Laboratory of Livestock)
MAAUN	Maryam Abacha American University of Niger
MAL	Ministry of Agriculture and Livestock
MSc	Master of Science
UAM	University of Abdou Moumouni
UF	University of Florida
UM	<i>Université de Maradi</i> (in English: the University of Maradi)
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
WAAPP	West Africa Agriculture Productivity Program
WB	World Bank

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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 2018, the Livestock Systems Innovation Lab held initial meetings with the Ministry of Agriculture and Livestock (MAL) and with various research and agricultural education and training (AET) institutions supporting the livestock sector in Niger: *Institut National de la Recherche Agronomique du Niger* (INRAN), *Association pour la promotion de l'Élevage au Sabel et en Savane* (APESS), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Maryam Abacha American University of Niger (MAAUN), University of Abdou Moumouni (UAM), University of Maradi (UM), the National Center for Specialization in Livestock, and the School of Livestock Supervisors in Maradi. 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 INRAN, universities and other stakeholders became subawardees and subrecipients of the livestock research projects in Niger.

The report provides an overview of the Livestock Systems Innovation Lab's capacity development approach, the 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 Niger's livestock research, extension, education and related workforce development.

Capacity Development Approach

The USAID framework 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).

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 include 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.

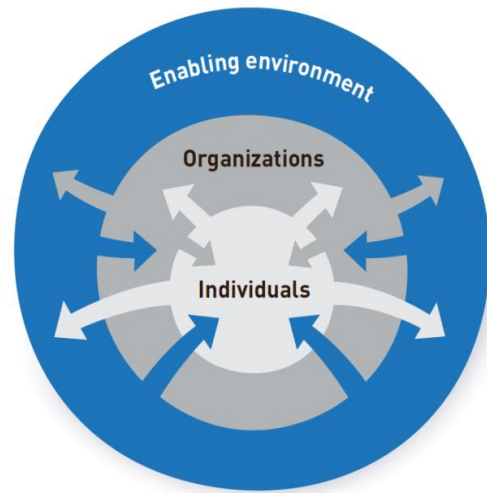


Figure 1: Three levels of capacity development (USAID, 2012)

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.

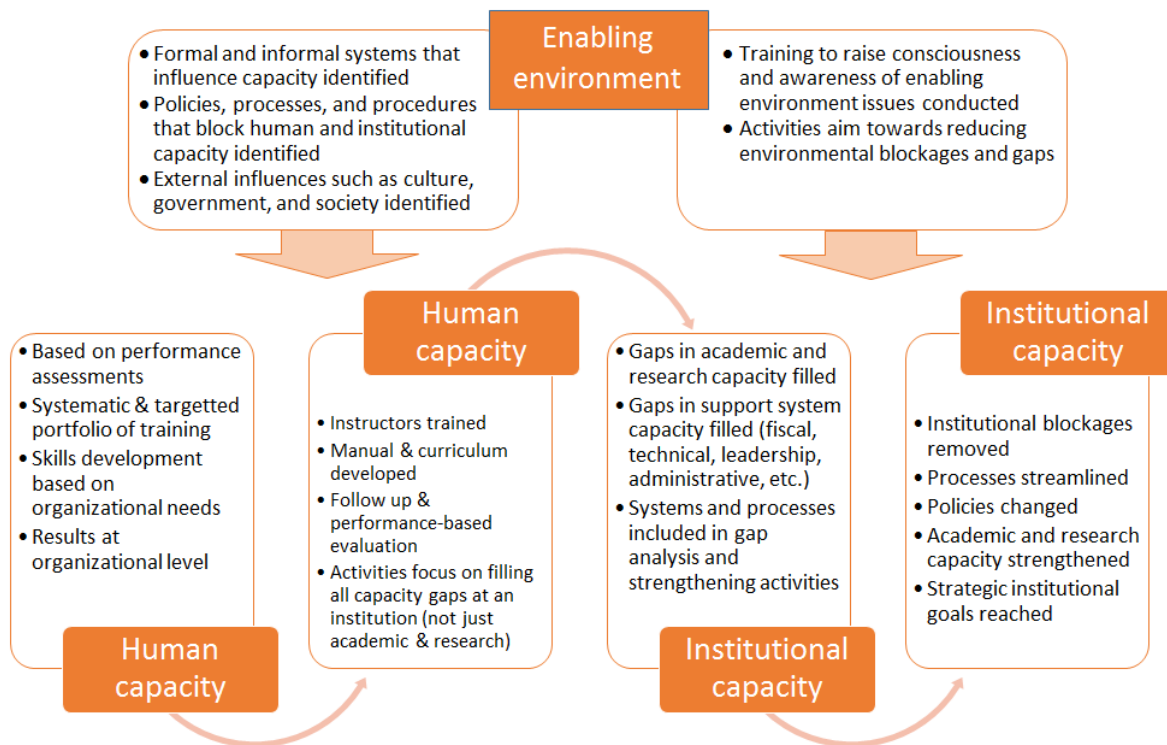


Figure 2: Conceptual Model of the Theory of Change for Livestock Systems Innovation Lab’s HICD

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 Innovation Lab for Livestock Systems to conduct research based on the rationale 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 Niger 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 Niger, 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 Niger](#)," prepared by Richard Fethiere and Dr. Nargiza Ludgate after Mr. Fethiere's rapid assessment of lab facilities in 2019. This report focuses on the forage and non-forage labs run by INRAN, universities, and *Laboratoire Central de l'Elevage* (LABOCEL), which have been evaluated for their current capacity, lab equipment, personnel and facilities' needs. Relevant literature was reviewed to supplement Dr. Hartmann's report from the HICD perspective that compiled the gaps and needs identified in the organizational and enabling environment levels of Niger's research, extension, education, training and workforce development areas of the livestock sector (see list of [references](#)).

Synthesis of HICD Gap Analysis

Institutional Strengths

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

INRAN

- It is the largest and the only comprehensive public research institute in Niger providing both research and extension support. This allows for a transfer of agricultural innovations and knowledge to farmers through extension programs. INRAN works across government prioritized value chain commodities to address food insecurity, especially in rural areas. INRAN works under the supervision of MAL.
- With headquarters in Niamey, INRAN also has regional offices in Maradi, Kollo and Tahoua.

- INRAN specializes in agricultural research programs in the rural development sector including the areas of animal health, nutrition and husbandry; selection of small ruminants; and pastoralism.
- According to Stads, Yacouba and Magne Domgho (2016), INRAN receives funding from four sources, of which government funding is the largest. In 2016, the government's share was 47%, donors' share was 25%, while goods and services offered through INRAN generated about 10%, and funding from other sources was 19%. Government funding goes primarily to pay INRAN staff, while operating and capital costs, including capacity building of researchers and technical staff, are covered by donors and revenues generated internally. For example, World Bank (WB) funding supports Niger's livestock sector research, capacity building activities, and initiatives to generate and promote new technologies among smallholders.
- INRAN has positive working relationships with various research institutions and universities in the country and abroad. For example, INRAN participates in a number of livestock projects funded by the Feed the Future Innovation Lab for Livestock Systems, including the Reach projects in collaboration with Texas A&M University and ICRISAT. This allows INRAN to involve university faculty and students in research projects.
- INRAN's technical personnel is comprised of PhD-degree holders (about 30%) followed by MSc-degree holders (60%) and BSc-degree holders (10%). The institute is the primary agricultural research entity in the country but it has fewer qualified personnel in comparison to the country's universities (94% with PhD degrees and 6% with MSc degrees, respectively). The importance of livestock to Niger's economy helped direct many PhD- and MSc-degree holders into the animal breeding field (12% of total share of researchers), followed by animal husbandry, animal nutrition, veterinary medicine, dairy science, poultry, and other animal and livestock areas (5% combined from total share of researchers) (Stads et al., 2016).

Universities: MAAUN, UAM and UM

- MAAUN, founded in 2013, is a private English-language university located in Maradi. Its mission is to provide knowledge for research and development of needed labor resources for the growth of students and society. Relevant to the Livestock Systems Innovation lab, MAAUN's School of Agricultural Science and Engineering offers a program in Animal Health and Husbandry.
- UAM, formerly University of Niamey from 1974-1994, is a non-profit public institution of higher learning under the supervision of the Ministry of Secondary and Higher Education, Scientific Research and Technology. UAM is the main academic institution in Niger for pre-service education in agricultural fields, including agricultural extension. The University previously had three University Institutes of Technology located in Maradi, Tahoua, and Zinder and the institute in Tohua offered programs in agro-business (agriculture, animal husbandry and forestry). In 2011, the three institutes became individual universities. UAM offers academic programs in five faculties and Animal Husbandry is part of the Agronomy

Faculty. Its Regional Center for Specialized Education in Agriculture (CRESA) offers continuing education in Animal Production and Advanced Studies in Agriculture.

- UM consists of the Institute of Technology and Engineering, the Faculty of Science and Technology, the Faculty of Health Sciences, and the Faculty of Agricultural and Environmental Sciences (FASE). To make research operational, the university has set up joint research units such as the Livestock Systems and Wildlife Ecology, the Diversity and Adaptation of Plants, and a platform for technological innovation.
- Overall, students find the quality of education satisfactory, particularly in the livestock-related programs. Students feel they receive a solid theoretical background in their field, despite the challenges posed by a lack of practical skills training and access to student resources on campus (equipped classrooms, libraries, internet, labs, working farms, etc.). Students also state that their faculty have good qualifications and training. They feel that the faculty have a good record of publications and have high standards for research and teaching.
- Some faculty participate in INRAN’s research projects, especially if those are mandated by donors, which provide opportunities for students to join field-based research and extension activities utilizing resources and infrastructure available at INRAN and its regional stations across the country.
- Universities have international collaborations with education and research organizations, from the Americas, Europe and Asia. However, because of the language, collaborations with French-speaking institutions prevail. Many faculty and researchers at Nigerien universities obtained their degrees from French universities.

Challenges Unique to Institutions

Human Capacity Development

Training Needs

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

Table 1: Training needs

Research Design & Methods	Teaching and Pedagogy	Extension
<ul style="list-style-type: none"> • Data analysis and modeling • Grant writing and funding sources • Molecular genetics techniques • Research protocol development • Scientific writing • Monitoring and evaluation 	<ul style="list-style-type: none"> • Teaching and methodology • Active learning • Teaching aids and instructional materials 	<ul style="list-style-type: none"> • Extension information • Extension material development • Dissemination methods • Leadership skills • Establishing and strengthening rural organizations • Strategic planning process • Technology transfer process, framework and methodology

Technical Knowledge	
<ul style="list-style-type: none"> • Agribusiness, market and value chain development • Animal pathology and immunology • Artificial insemination technologies (including semen processing) • Clinical laboratory management • Conservation of animal genetic resources • Cross-breeding for milk production • Current status of veterinary vaccines • Differential diagnosis for tropical infectious diseases • Epidemiology and disease diagnosis 	<ul style="list-style-type: none"> • Emergency animal feed and feeding strategies for dry areas • Export certification of animal products • Forage production and crop nutrition • Gender and development • Genetics (conservation genetics, consanguinity management) • Intensification of animal/livestock production • Molecular characterization • New technologies in animal breeding • Processing technologies for dairy products • Valorization of indigenous animal breeds

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

Laboratory Skills

Professional lab training was one of the most reported concerns of faculty and students as well as lab personnel (management and technicians) at INRAN. Students are usually new to the laboratories and need all the training they can get 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 good lab management practices. Generally, there is a lack of laboratory technicians 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 lab managers and lecturers who are given the chance to participate.

The labs are primarily used for demonstration purposes. Students, especially undergraduates, rarely get to use the equipment in most of the laboratories and the willingness of laboratory technicians to assist students or to give them access to the laboratories varies, but is generally low. Teaching labs in universities are not well equipped nor do students have unhindered access outside of the course work. Students also find it difficult to access the better equipped laboratory facilities of ICRISAT unless their project is part of universities' collaborative agreements with ICRISAT.

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 UAM revealed the need to develop a new or revised lab course 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 pre-requisites, such as data analysis and lab techniques, sample collection, and handling and storage, that are needed to facilitate better learning and technical skills development. Course instructors can provide an introduction to the use and maintenance of laboratory equipment and safety procedures before users can access lab facilities to conduct any 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

Some key technical skill gaps in Table 1 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 read the output, and the availability of the equipment to run the needed tests may tie, for example, to the level of statistics needed to interpret test results and create and use statistical models.

For this report, it was not possible to determine what statistical packages are common in universities and at INRAN, nor the level of proficiency of users or the version of the respective software packages that are available. It was difficult to determine if there were any faculty or researchers at INRAN who use Biostatistics with R. However, as in other Livestock Systems Innovation Lab target countries, it is assumed that the faculty, students and researchers will be interested in advancing their research into new areas, while limited statistical and modeling skills impede their desire. It is also assumed that universities and INRAN lack specialized software and computers with capacity to run large datasets. In addition, the teaching of statistics may be theoretical rather than practical, with students receiving very limited opportunities to use statistical software. Therefore, one-time, short-term trainings are helpful but considered insufficient to meet the need for building long-lasting capacity in this area. It will be advisable to have faculty and researchers 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, which is an important requirement for promotion. Faculty and researchers also want to compete internationally for grant funding but lack the knowledge to access these funds and to write to meet donors' expectations. Students also stress the need to improve their writing skills. It was difficult to determine if any of the universities in this report offer an academic writing course for students.

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

Students pointed on the lack of practical skills that they could use in the field. Few students seek internships with the private sector, although there is desire by students to obtain such an internship to acquire practical skills. They also stressed the importance of developing communication skills, especially in dealing with farmers and small holders. 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

Stakeholders interviewed from university, research and private sector stated that the theoretical trainings at three institutions (MAAUN, UM and UAM) are adequate. However, student to teacher ratio is high, putting both pressure on lecturers to integrate student-focused approaches in the classrooms and on students seeking individual help from lecturers. The practical aspect of teaching, (e.g., laboratory work) is reportedly poor due to factors mentioned above, including the lack of laboratory equipment and supplies, laboratory personnel and laboratory teaching skills. Laboratory chemicals are almost always in short supply, and in many cases the equipment is not functional, even for demonstration purposes. The interviewed students also highlighted that course curricula are at times outdated. They also wished for equipping classrooms with teaching equipment (video projectors, posters on technical subjects, etc.) that would aid lecturers in conveying the material to students.

Organizational

Laboratory Management

In addition to laboratory skills, laboratory management is a significant issue. Understaffing and lack of laboratory skills to maintain and fix equipment among laboratory technicians are acute. There are often poor laboratory practices that lead to malfunctioning equipment. 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. According to Fethiere and Ludgate's report (2019), some laboratories have fairly new equipment and instruments, but most of the equipment is sitting idle due to minor issues. Many lab technicians do not know how to troubleshoot minor issues nor are even aware of where the operations manual for this equipment is, compounded with limited understanding of English to read the manual. This is further complicated with a complex time-consuming procurement process to purchase maintenance service, lab supplies or reagents. Due to funding shortages, institutions go for lowest bids that do not include service and maintenance provisions for equipment. Moreover, almost every lab visited had a complaint about an unreliable power supply. This has negative impacts on the research process. For example, a power shortage can slow down lab tests, but more importantly, compromise the quality of lab tests or the functioning or longevity of equipment. Therefore, there is an urgent need to install a backup power supply at all lab facilities to ensure that equipment functions properly and analyses can be completed in a reliable manner.

While Fethiere and Ludgate's report discuss other issues in detail, another gap revolved around labs not having standard operating procedures (SOPs). Some laboratories do not have procedures for collection, drying and processing of samples in the laboratories, and packing, labelling and analyzing samples, and subsequent preparation of lab reports and their archiving. A lack of sufficient attention to safety of lab personnel and handling and disposal of hazardous waste were also evident in most labs. For example, many labs do not have adequate personal protective equipment.

Information Systems

Researchers in Niger would benefit for having access to a central repository for information. This includes information needed on mitigation approaches and adaptation strategies for climate change effects on animal production and sustainability of livestock systems. There is also a need for a system to facilitate the dissemination of research findings, information sharing systems for research centers, and knowledge management software on sustainable forage production practices.

Institutional Relationships

Overall, it was perceived that there are very weak relationships between academic and non-academic institutions. This is particularly relevant in terms of research and extension linkages and community outreach. Stakeholders stressed the role of INRAN in bridging this gap and making use of the existing agreements with various stakeholders, including the private sector, to facilitate collaboration. Interviewed faculty at MAAUN pointed at existing relationships that can facilitate collaborative agreements with local professional schools if revived. For example, the School of Livestock Supervisors in Maradi can benefit from MAAUN's branch in Maradi through peer-to-peer support and clinical mentoring services to the School's trainees. Professional organizations expressed the same desire and suggested that universities and INRAN work with industry and disseminate research outcomes to industry, which eventually would lead to industry-responsive research and outcomes. Several key policy reforms will be needed to encourage and strengthen institutional relationships and linkages. Experience shows that most institutions are very hierarchical and rigid, and require an incentive to work together (e.g., government can give funding with a requirement that a local university works with INRAN or vice versa).

Grant Writing and Management

Challenges in writing and winning grants are common across universities and INRAN. The issue with grant writing reaches beyond the lack of adequate skills to write competitive grants. Participants also point out that to win grants it is necessary to have already established relationships with international partners in order 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 INRAN technical personnel, they are often unable to purposively search for grants to apply for or dedicate adequate time to write grants as this conflicts with their highly demanding responsibilities within INRAN and the need to respond to ad hoc calls from different ministries to attend to urgent meetings. Instead, INRAN at times relies on other partners

to bring potential grants and grant developing skills to their attention. This makes them slow to react to grant calls when they are announced such that many opportunities are missed.

The institutional support for grant writing is very limited. There are no administrative personnel who are responsible for providing feedback on the grant proposals, or who assist with more complex aspects of grant writing and developing budgets. Proposals are submitted to the potential donor, often without adequate oversight or review at universities and INRAN's administrative level.

Other Issues

Many highly-qualified researchers at INRAN's limited pool of PhD and MSc-degree holders are approaching retirement age (official retirement age in Niger is 60 years) (Stads et al., 2016). INRAN salaries are lower versus university salaries, making INRAN a less attractive employer. This puts INRAN at a disadvantage in attracting and retaining a talented pool of research staff.

Moreover, according to Stads et al. (2016), the postgraduate training programs are limited at national universities (UAM and UM). To continue education to acquire MSc or PhD degrees, students depend largely on donor funding, which is ad hoc and scarce. World Bank's West Africa Agricultural Productivity Program (WAAPP) is working on filling the gap to a certain degree but more government funding is needed to facilitate the growth in the number and size of Niger's MSc and PhD programs.

Enabling Environment

Laboratory Infrastructure and materials base

As discussed above, adequate laboratory infrastructure support at universities, INRAN and other research entities (e.g., LABOCEL) is lacking, including equipment, supplies and consumables. These issues hinder 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 also pointed out that inadequate training in lab management compounded by poorly equipped and maintained laboratory infrastructure may result in students finishing their programs without practical laboratory skills. The situation is exacerbated if these graduates return to work for universities. The universities and INRAN need more funding to equip their labs with modern equipment and facilitate good lab management protocols (e.g., regular service of equipment) that would bring Niger's research on par with international standards and help modernize the research focus.

LABOCEL, being the only producer and quality control inspector of livestock vaccines in Niger, operates with the limited equipment that has remained functional since the creation of LABOCEL in the mid-1960s. The facilities require considerable upgrade (facilities, equipment and capacity); vaccine labels are prepared by hand; and storage is limited. LABOCEL's limitations have significant implications on livestock health, and consequently, human health nationwide.

Library Systems and Information Technology

In addition to issues with laboratory infrastructure, faculty and students from different universities stressed the 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 internet connectivity is intermittent and library computers have no connection to the internet.

Gender Constraints

According to Stads et al. (2016), universities employ more female researchers in comparison to INRAN, although they represent only 15% of the total research workforce. Furthermore, on average, female researchers tend to be younger and hold more MSc and PhD degrees (about 15% of all MSs degrees and 16% of all PhD degrees, respectively, vs. 11% of all BSc degrees). Additionally, many of these women serve in high administrative positions within the university system and INRAN (Stads et al., 2016). Similar to other Livestock Systems Innovation Lab countries, female university students in Niger stressed the need to have more opportunities to interact and seek mentorship support from the established female researchers as role models, hearing their pathway to research and professional careers, and about how to balance work-life considerations.

R&D Investment and Infrastructure

According to Magne Domgho et al. (2018), Niger's agricultural research spending as a share of agricultural gross domestic product is far below the recommended 1% target set by the New Partnership for Africa's Development and the United Nations in 2017. It stands at 0.32%, which is substantially lower than what is needed to support the growth of agricultural research, including livestock research, in the long run. As stated earlier, agricultural R&D highly depends on donor funding, which is ad hoc and scarce. Government funding should increase and fund not only the salaries of the research staff but also provide adequate resources to operate various research programs and maintain infrastructure and materials base across research and education institutions. Figure 3 shows that the bulk of the funding in 2014 supported crop research while livestock research accounted for 25% of available funding. Yet livestock products contain a cluster of nutrients that is critical to reduce the high levels of stunting in Niger.

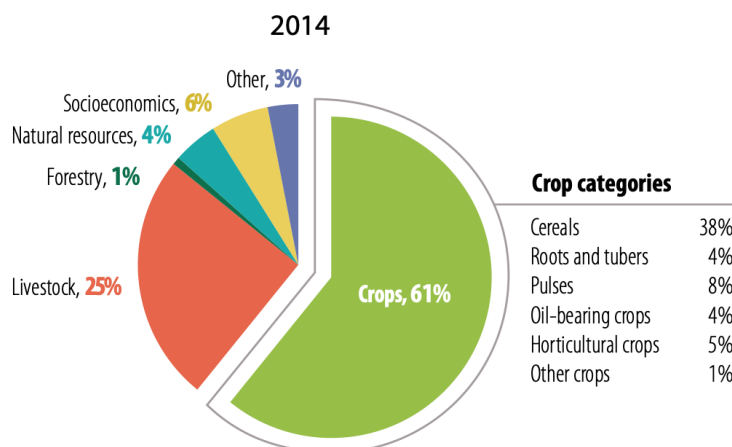


Figure 3: Niger's research areas funded (Source: Stads et al., 2016)

Recommendations from the Livestock Systems Innovation Lab’s HICD Team

The recommendations below are the priorities that a) have been identified by stakeholders and participants of rapid assessments, b) align with the Livestock Systems Innovation Lab and USAID priorities, and c) will allow the HICD team to leverage its funds to the maximum potential.

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 the capacity gaps. Where possible, short-term training should involve a Training-of-Trainers component. Training should also be focused on faculty and professional researchers and extension staff from INRAN and other research entities (e.g., APESS, the National Center for Specialization in Livestock, etc.) with students as a secondary audience. This will help to build the capacity of existing and long-term researchers who will pass improved skills to a larger body of students and young specialists. The HICD team also 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 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
- 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 remote rural communities.

Other areas for training topics have been identified in Table 1 above. The HICD team recommends leveraging the activities and presence of Livestock Systems Innovation Lab subawardees in the country for conducting such trainings. Moreover, because Niger and Burkina Faso share many common issues in the HICD area and the same language, the HICD interventions can be similar (although adapted to country context). This means if the training occurs in Niger, trainees from Burkina Faso can join this training or vice versa, which will help reduce workshop-hosting costs or international travel costs of a foreign-based trainer and allow to better leverage scarce resources to benefit both countries.

The HICD team is working on various Training-of-Trainer courses in response to demands for research-enhancing trainings that were pre-tested in other Livestock Systems Innovation Lab target

countries. These include: qualitative research methods for livestock systems research, statistics training with focus on Biostatistics with R, participatory training for adult learners, pedagogy and effective teaching methods, and good laboratory management practices. The later has been developed as a result of the laboratory assessment in Burkina Faso and Niger and it encompasses many of the recommendations in the lab assessment report.

Organizational Development

Universities and INRAN can benefit from the development of information sharing systems to promote research collaboration and for students to access resources within INRAN and its research stations. As stated earlier, this includes a central repository for information. Experience shows that information sharing platforms facilitate the creation of new knowledge, dissemination of research findings, and the generation of ideas for innovative research. Creating such a system will facilitate 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.

Furthermore, a large percentage of Nigerien researchers are in the process of retirement. This requires considerate efforts from both academic and research entities like INRAN to prepare a new cadre of professionals, technicians and others for the livestock sector. Facilitating research and technical skills development described in preceding sections will aid in this process.

Enabling Environment

Universities and INRAN 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 INRAN, UAM, UM, and the international institutes, such as ICRISAT and Mercy Corps. This allows leveraging of scarce resources (human, social, physical) in more efficient ways to cross-fertilize innovative research ideas and experiences and to 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 (as in the case of ICRISAT). Bringing agriculture-associated ministries 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 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 Niger. 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. Niger 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.
- Magne Domgho, L. V., Yacouba, B., Stads, G-J. 2018. Niger: Fiche d'information sur les indicateurs de la R&D agricole. Washington, DC: Agricultural Science and Technology Indicators (ASTI) and International Food Policy Research Institute (IFPRI).
<https://www.asti.cgiar.org/sites/default/files/pdf/Niger-Fr-Factsheet-2018.pdf>
- Stads, G.-J., Yacoba, B., and Magne Domgho, L. V. 2016. Niger: Agricultural R&D Indicators Factsheet. Washington, DC: Agricultural Science and Technology Indicators (ASTI) and International Food Policy Research Institute (IFPRI).
- 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.



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