



Feed the Future Innovation Lab for Livestock Systems

Burkina Faso: Human and Institutional Capacity Development Brief

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The Human and Institutional Capacity Development Brief was prepared by Elizabeth Poulsen, Office for Global Research Engagement, under the supervision of Dr. Sandra L Russo, UF International Center

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Acronyms

APESS	Association for the Promotion of Livestock in the Sahel and Savanna
BIFAD	Board for International Food and Agricultural Development
CCT	Cross-cutting theme
CGIAR	Consultative Group for International Agricultural Research
CNRST	<i>Centre National de la Recherche Scientifique et Technologique</i> (National Center for Scientific and Technological Research)
CoVeP	<i>Collective des Vétérinaires Privées</i> (Collective for Private Veterinarians)
CRS	Catholic Relief Services
DGM	<i>Direction Générale de la Météorologie</i> (General Directorate of Meteorology)
ECOWAS	Economic Community of West African States
ENESA	<i>Ecole Nationale de l'Élevage et de la Santé Animale</i> (National School of Animal Husbandry and Animal Health)
FAO	Food and Agriculture Organization
FTE	Full-time equivalent
HICD	Human and Institutional Capacity Development
HKI	Helen Keller International
ILRI	International Livestock Research Institute
INERA	<i>Institut de l'Environnement et de Recherches Agricoles</i> (Environment and Agricultural Research Institute)
INSD	<i>Institut National de la Statistique et de la Démographie</i> (National Demographic and Statistics Institute)
INSS	<i>Institut des Sciences des Sociétés</i> (Institute of Social Sciences)
IRSAT	<i>Institut de Recherche en Sciences Appliquées et Technologies</i> (Research Institute of Applied Sciences and Technologies)
LSIL	Livestock Systems Innovation Lab
NARS	National Agricultural Research System
NGO	Non-Governmental Organization
ONV	<i>Ordre National des Vétérinaires</i> (National Veterinary Association)
PAPISE	<i>Plan d'actions et programme d'investissements du sous-secteur de l'élevage</i> (Action Plan and Investment Program for the Livestock Sub-Sector)

PNDSA-II	<i>Deuxième Programme National de Développement des Services Agricoles</i> (Second National Agricultural Services Development Program)
REGIS-AG	Resilience and Economic Growth in the Sahel – Accelerated Growth
REGIS-ER	Resilience and Economic Growth in the Sahel – Economic Resilience
RISE	Resilience in the Sahel Enhanced
SAREL	Sahel Resiliency Learning
SNVA	<i>Système national de vulgarization agricole</i> (National System for Agricultural Extension)
SNVACA	<i>Système national de vulgarization et d'appui conseil agricole</i> (National System for Agricultural Extension and Advisory Services)
UNACEB	<i>Union Nationale des Commerçants et Exportateurs de Bétail</i> (National Union of Livestock Traders and Exporters)
UNAEBV	<i>Union National des Exportateurs du Betail et de la Viande</i> (National Union of Cattle and Meat Exporters)
UNABOC	<i>Union Nationale des Bouchers et Charcutiers</i> (National Butcher's Union)
UPB	<i>Université Polytechnique de Bobo-Dioulasso</i>

Introduction

The Board for International Food and Agricultural Development (BIFAD) notes that research and extension systems must be strengthened in order for food security initiatives such as Feed the Future to succeed (BIFAD, 2014). For this reason, human and institutional capacity development (HICD) has been designated as a “cross-cutting theme” of the Feed the Future Livestock Systems Innovation Lab (LSIL) in Burkina Faso. HICD efforts in Burkina Faso and all other LSIL countries will target at least one of the four following themes:

- Developing research capacity
- Developing extension and education capacity
- Developing institutional capacity for policy development and implementation
- Developing capacity of the private sector, including producers

Activities that contribute to achieving the goals of HICD may include short-term training for value chain actors, long-term degree training for host-country students, and development of institutional capacity in areas such as curriculum enhancement, leadership, and financial management.

Educational and extension institutions

As seen in Table 1, Burkina Faso has very low enrollment rates at all educational levels, with a moderate gender gap, and one of the lowest literacy rates in the world. Currently, there are eight vocational agricultural schools in the country, known as Centres de Promotion Rurales (CPRs) or Rural Promotion Centers, which provide training for rural youth on the topics of crop production, animal husbandry, and handicrafts (Centre Songhai Regional, 2016); only 3% of Burkinabe youth attend these institutions, with more male students attending than female (The World Bank, 2016). The University of Ouagadougou is the primary higher education institute in the country, containing 83% of all public university students (Ministère des Affaires Etrangères et Européennes, 2011). Other major public institutions include the Polytechnic University of Bobo-Dioulasso and the University of Koudougou. Private institutions include the University of St. Thomas of Aquinas of Ouagadougou and The Catholic University of West Africa.

Government ministries supporting agricultural services include the [Ministry of Agriculture and Water Development](#) and the [Ministry of Animal and Fish Resources](#). Additionally, the [Ministry of Higher Education, Scientific Research, and Innovation](#) operates the [National Center for Scientific and](#)

Table 1: Education and Literacy Data			
Gross enrollment ratios*			
	Male	Female	Total
Primary level ¹	89%	85%	87%
Secondary level ¹	32%	28%	30%
Vocational schools (as a percentage of total secondary-level enrollment) ¹	<i>Not available</i>	<i>Not available</i>	3%
Colleges/Universities ²	5%	2%	3%
Literacy rates			
Adults (15+ years old) ³	37%	22%	29%
Youth (15-24 years old) ³	47%	33%	39%
Enrollment in tertiary institutions (# of students)			
University of Ouagadougou ⁴	<i>Not available</i>	<i>Not available</i>	40,000
University of Koudougou ⁴	<i>Not available</i>	<i>Not available</i>	5,400
Polytechnic University of Bobo-Dioulasso ⁴	<i>Not available</i>	<i>Not available</i>	2,600
University of St. Thomas of Aquinas of Ouagadougou ⁴	<i>Not available</i>	<i>Not available</i>	650
Catholic University of West Africa ⁴	<i>Not available</i>	<i>Not available</i>	300
* The gross enrollment ratio measures all students enrolled, regardless of age, relative to the population of the age group that officially corresponds to the level of education shown. Therefore, many countries have a gross enrollment ratio of over 100%.			
¹ The World Bank, 2014			
² UNESCO Institute for Statistics, 2010			
³ UNESCO Institute for Statistics, 2012			
⁴ Ministère des Affaires Etrangères et Européennes, 2011			

[Technological Research](#) (CNRST), which in turn operates three research institutions which may be of interest to LSIL:

1. The [Environment and Agricultural Research Institute](#) (INERA)
2. The [Institute of Social Sciences](#) (INSS)
3. The [Research Institute of Applied Sciences and Technologies](#) (IRSAT)

National agricultural extension services in Burkina Faso are provided primarily by the National System for Extension and Advisory Services (SNVACA), which was established in 2010 (Sare, 2012). An NGO called [APESS](#) (Association for the Promotion of Livestock in the Sahel and the Savanna), which is based in Burkina Faso and operates throughout the Sahel, provides education and training specifically for livestock owners.

Several ministries and departments are currently responsible for coordinating agricultural technical vocational education and training (ATVET). This fragmentation complicates the country's ability to implement a truly systemic approach, though the government is currently developing an ATVET strategy. In addition, institutions are lacking in capacity to implement meaningful reforms, such as curricula revisions (GIZ, 2016). To respond to these challenges, GIZ's Comprehensive Africa Agriculture Development Program (CAADP) aims to integrate ATVET into national strategies, target knowledge management, and establish training centers targeting specific value chains. This project, which began in 2014, lends support to the leading ATVET structure in Burkina Faso: the Direction Generale du Foncier de la Formation et de l'Organization du Monde Rural (DGFOMR) (GIZ, 2016).

Capacity-building needs related to livestock

Burkina Faso's national Action Plan and Investment Program for the Livestock Sub-Sector (PAPISE) outlines several institutional constraints affecting the livestock sector (Ministère des Ressources Animales, 2010, pp. 8-10):

1. Poor structuring and professionalism – Only 6% of farmers belong to professional organizations. National structures and actors exist for marketing, food processing, and market linkages,¹ but their “social base” is limited, their representativeness is questionable, and they do not have the capacity to fully participate in the development of the sector.
2. Public financing for livestock is very low.
3. Weak planning and implementation – There is low capacity within ministry in charge of livestock because of a) insufficient human resources and/or insufficient qualifications beyond the animal science field (e.g., economists and sociologists), b) inaccurate and insufficiently detailed statistical information, and c) very low financial resources. There is also a lack of institutional capacity to support links between research institutes, extension services, and veterinary services, especially since the end of PNDSA-II² which allowed for the implementation of the National Agricultural Extension System (SNVA).
4. Weak research and agricultural extension – The National Agricultural Research System (NARS) does not have a sufficient budget to generate new technologies to develop agriculture and livestock. Generally, there is little support for agricultural research and extension.

¹ For example, UNACEB (Union Nationale des Commerçants et Exportateurs de Bétail/National Union of Livestock Traders and Exporters), UNAEBV (Union National des Exportateurs du Betail et de la Viande/National Union of Exporters of Cattle and Meat), UNABOC (Union Nationale des Bouchers et Charcutiers/National Butcher's Union), and Table Filière Lait (Milk Sector Organization)

² *Deuxieme Programme National de Developpement des Services Agricoles* (Second National Agricultural Services Development Program)

5. Low competitiveness of animal products because of policies.
6. Low enforcement of policies. For example, livestock farmers are frequently hassled while moving herds across national borders, despite provisions previously made by ECOWAS.

A review of livestock policies in Burkina Faso conducted by FAO (2016) suggests the establishment of a capacity-building project within the beef and milk sectors. They propose that this project have two components:

1. Support for professional organizations so that they can independently manage their production facilities, represent and defend the interests of their members, and provide various services.
2. Improve public and private advisory support services offered to producers and other sectoral operators, such as in the areas of training, knowledge and monitoring of markets, and access to credit.

Traore, Traore, and Stads (2014) note that at INERA, which is Burkina Faso's primary agricultural research institution, there is a need to build capacity around data management. This is because each center within INERA manages its own financial and human resource database, and donor funding is often distributed directly to the centers without the knowledge of personnel at headquarters (including the director of finance). These authors also note that the animal health discipline at INERA lacks PhD-qualified researchers; LSIL staff members note that this may be because veterinary medicine training can only be obtained abroad, possibly posing a barrier to Burkinabe citizens.

Human and institutional capacity-building policies and initiatives

The PAPISE describes three areas in which the government of Burkina Faso should focus its livestock-related capacity-building efforts: vocational training, advisory support services, and professional organizations. Note that the PAPISE was written in 2010 and was to be implemented from 2010-2015; it is unknown whether these programs were actually implemented or to what extent. [Appendix A](#) contains a summary of each proposed program.

USAID's [RISE](#) (Resilience in the Sahel Enhanced) initiative primarily focuses on Burkina Faso and Niger, and includes three projects that complement LSIL's mission:

1. The [REGIS-AG](#) (Resilience and Economic Growth in the Sahel – Accelerated Growth) project works to improve cowpea, poultry, and small ruminant value chains, and—among other goals—“concentrate[s] on improving the delivery of and access to veterinary services and feed provision centers for poultry and small ruminants” (CNFA, 2015). LSIL staff met with the REGIS-AG's gender specialist on June 27, 2016, who reported that the project provides trainings on improved animal production practices, animal health services, and market development. She additionally stated that REGIS-AG is creating a network for veterinarians and community animal health workers.
2. The [REGIS-ER](#) (Resilience and Economic Growth in the Sahel – Enhanced Resilience) project aims to improve both acute and chronic food security through (among other approaches) “nutrition-led agriculture and livestock rearing.”
3. The [SAREL](#) (Sahel Resiliency Learning) project “works to strengthen the capacity of key stakeholders to engage in adaptive, evidence-based learning” to enhance resiliency-related efforts (USAID, 2015).

All three projects are implemented in the East, Central-North, and Sahel regions of Burkina Faso.

Educational institutions with livestock-related programs

University of Ouagadougou

According to ILRI (2009), The University of Ouagadougou has seven research and training units, one of which (Life and Earth Sciences) deals with some aspects of animal production (animal ecology and physiology). Unfortunately, at the time of writing this report, the university's website was not functioning (<http://www.univ-ouaga.bf/>), and so it is difficult to find further information about their livestock-related programs. Traore, Traore, & Stads (2014) report that in 2011, the university employed 19 FTEs³ in agricultural research.

University of Koudougou (UK)

The [University of Koudougou](#), established in 2005, is located about 100km west Ouagadougou. It is comprised of five units: the University Pedagogy Center (which focuses on teacher training), University Institute of Technology, the Training and Research Unit on Economic and Management Sciences, the Training and Research Unit in Arts and Humanities, and the *Ecole Normale Supérieure* (which offers twelve education-related degrees).

Polytechnic University of Bobo-Dioulasso (UPB)

ILRI (2009) reports that the [Polytechnic University of Bobo-Dioulasso](#) (UPB; established in 1995 and located 350km south-west of Ouagadougou) offers both Master's and PhD degrees in animal husbandry, with specializations in reproductive physiology or animal nutrition. They do not have a veterinary medicine degree program. Faculty members of these programs identified that the programs' main strengths include basic training in animal production and poultry production, while weaknesses include a lack of up-to-date equipment for advanced analytical procedures, a general lack of equipment and infrastructure, lack of funds for maintenance of research farm facilities and animals for experiments, and low staff development/lack of scientific staff (ILRI, 2009). In addition, ILRI lists the following as areas for improvement: livestock policies and institutions, development of poultry production, and a focus on global health issues. ILRI plans to assist Bobo Dioulasso's postgraduate program by facilitating an exchange of research information and literature, and by providing training courses and fellowships. See [Appendix B](#) for details about the curriculum content of Bobo Dioulasso's livestock programs.

The [Institute for Rural Development](#) at Bobo Dioulasso University, where the animal husbandry program is housed, also offers training in agricultural extension.

Université Saint Thomas d'Aquin (University of St. Thomas of Aquinas)

Located 15 kilometers east of Ouagadougou, the [Université Saint Thomas d'Aquin](#) is a private institution that offers Master's degrees in animal production. This degree program is housed in the College of Science and Technology. Additionally, this college offers a professional degree in agro-sylvo-pastoralism with an animal production option.

ENESA

The National School of Animal Husbandry and Animal Health (ENESA; *Ecole Nationale de l'Élevage et de la Santé Animale*) is located in Ouagadougou and offers professional degrees for three career tracks: livestock advisors, technical livestock officers, and senior livestock technicians (Sawadogo, 2012). In 2012, a total of 108 students graduated from the three programs (Sawadogo, 2012). During an in-person meeting with the director general of ENESA on June 29, 2016, LSIL staff members learned that ENESA

³ FTEs (full-time equivalents) take into account the time that researchers actually spend on research, without counting other activities like teaching or administrative duties.

has 15 permanent professors, plus 70 who teach on a temporary basis (though they are formally employed at other institutions, such as universities).

Other institutions conducting livestock-related research

INERA

The [Environment and Agricultural Research Institute](#) (INERA; *Institut de l'Environnement et de Recherches Agricoles*) accounts for two-thirds of all agricultural researchers in Burkina Faso, with 144 FTEs in 2011 (Traore, Traore, & Stads, 2014; see graph in [Appendix C](#) for a visual depiction of agricultural researchers by institutional category). These authors do not provide an exact number of researchers that are dedicated to livestock research, but they do provide a graph (also in Appendix C) which indicates that about 10% of research conducted at INERA is focused on livestock. INERA's main office is located in Ouagadougou, and it has regional offices in the Central, East, West, Northwest, and Sahel regions as well as a research and training center in Kamboinsé.

IRSAT

The [Research Institute for Applied Sciences and Technologies](#) (IRSAT; *Institut de Recherche en Sciences Appliquées et Technologies*) is also located in Ouagadougou and employed 21 FTEs in 2011 (Traore, Traore, & Stads, 2014). LSIL staff members met with IRSAT staff in person on June 28, 2016, where they learned the following information: among other areas of focus, IRSAT's Food Technology Department conducts research into food processing and food safety, with several projects relating to animal-source foods, such as *kilchi* (local dried meat), sausages, dairy, and eggs. They also collaborate with several universities, including the University of Ouagadougou, the University of Bobo Dioulasso, the Catholic University of West Africa, and the University of Aube Nouvelle; students from these universities have completed internships at IRSAT, and IRSAT staff have given lectures at the universities. Staff members at IRSAT would like to build their capacity on the topics of research into processing meat and eggs, as well as sanitary control and analysis of pesticide residue. There are a total of 43 staff members at IRSAT, over half of whom are women.

ILRI

The [International Livestock Research Institute](#) (ILRI), a CGIAR institution, has one current project in Burkina Faso, entitled "Enhancing the value of ecosystem services in pastoral systems." This project will end in November 2016.

CIRAD

The [Center for International Cooperation in Agronomic Research for Development](#) (CIRAD; *Centre de coopération internationale en recherche agronomique pour le développement*) is a French research center that currently has 14 expatriate researchers stationed in Burkina Faso. Their research centers on two main projects: 1) Ecological intensification and design innovations in the agro-forestry-pastoral systems of West Africa (working in Mali, Burkina Faso, and Cote d'Ivoire), and 2) Spatial information systems, territories, and observatories of West Africa (focusing on food security in Niger, Burkina Faso, Mali, and Senegal).

Livestock-related extension organizations

APESS

The Association for the Promotion of Livestock in the Sahel and Savanna (APESS; *Association pour la promotion de l'élevage au Sahel et en Savane*) is an NGO that provides education and training to livestock owners. The organization has six main objectives (as described on their website):

- Promoting initiatives of herders and farmer groups and allowing better control of animal feeding;
- Disseminating methods and techniques of production, promoting increased production and productivity of animals and pastoral areas;
- Searching for better livestock by-products;
- Strengthening the capacity of farmers through information, literacy, education and training;
- Supporting the organization and structure of breeders;
- Promoting and enhancing the cultural heritage of pastoralists.

APESS was founded in Bobo Dioulasso, Burkina Faso, and operates in Senegal, Guinea Bissau, Gambia, Niger, Mali, Burkina Faso, Cameroon, Nigeria and Chad (APESS, 2011).

Public and private veterinarians

National Veterinary Association and the Collective for Private Veterinarians

On June 28, 2016, LSIL staff members met with a representative from the Collective for Private Veterinarians (CoVeP; *Collective des Veterinaires Prives*), which is part of the National Veterinary Association (ONV; *Ordre Nationale des Veterinaires*). They learned that all practicing veterinarians in Burkina Faso must be registered with the ONV, which has 130 members (90 in the public sector and 40 in the private sector). There are 7 private veterinarians working in Ouagadougou, and at least one in most of the other major towns in the country. During the meeting with LSIL staff members, the CoVEP president identified two main capacity-building needs. The first was training for livestock keepers on the topics of improved husbandry practices and market-oriented production; they stated that this training would be easier if livestock keepers were formed into groups. The second need is training for veterinarians. While public sector veterinarians have moderate access to trainings, it is much more difficult for private sector veterinarians, though there are occasional training initiatives from foreign embassies or universities. The ONV does not offer any types of refresher courses.

Livestock sector support organizations

The [Directorate General of Meteorology](#) (DGM; *Direction Generale de la Meteorologie*) manages meteorology-related activities in Burkina Faso, including integrating meteorological information into regional and global trade networks and communications, developing weather and climate forecasting capability for the benefit of public and private organizations, conducting studies for applied climatology, and monitoring climate change (DGM, 2016).

In addition, the National Demographic and Statistics Institute (INSD; *Institut National de la Statistique et de la Démographie*) has some livestock-related data posted on their [website](#), though it is unclear whether INSD is still the primary organization responsible for gathering this information, as the livestock-related data appears to have been last updated in 2008.

Nutrition and health organizations relevant to livestock sector development

Helen Keller International (HKI)

HKI implements several nutrition-related projects in Burkina Faso, some of which involve livestock. For example, during in-person meetings with HKI staff, LSIL staff members learned that in HKI's CHANGE project, rural Burkinabe women receive chickens and receive training on proper feeding and vaccination techniques (the project partners with local officers from the Ministry of Animal and Fish Resources, who provide the vaccinations). The emphasis of this project is on nutrition and consumption of eggs. In previous projects, HKI had learned that there is a cultural taboo in some regions of the country regarding

feeding eggs to children, but they have had success in overcoming this taboo by promoting various behavior change communication strategies. HKI also had previously implemented a project with dairy goats—improving their feeding and increasing their milk production in an effort to encourage home consumption of milk—but this project was ended after two years because the cost of feed was deemed to be too expensive.

Catholic Relief Services (CRS)

During an in-person meeting with LSIL staff members, [CRS](#) staff members reported that they have implemented several emergency projects involving the distribution of small ruminants, recuperation of degraded pasture lands, organizing local vaccinations, and community-based trainings on animal production (chickens and small ruminants). Their efforts are focused exclusively in the Sahel region, as this is where refugee/emergency work is concentrated in Burkina Faso. Their nutrition-focused MYAP project, which is part of USAID’s RISE initiative, works with “care groups” of pregnant women and new mothers. Project participants receive chickens and are trained in their care, participate in vaccination campaigns, and receive information about the nutritional value of animal products. CRS has had a longstanding partnership with INERA on this and other initiatives. In discussing priorities for livestock initiatives in Burkina Faso, a CRS staff member emphasized the importance of improving feed for animals, explaining that Burkinabe people are generally resistant to growing feed because they prioritize growing millet and sorghum for their families; this may be because people do not recognize the importance of providing animals with nutritious feed.

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Appendix A: Summary of capacity-building programs proposed in PAPISE

Program for strengthening vocational training	
Objective	Strengthen capacity of public and private institutions through a) curricula revision, and b) development of educational techniques by improving recruitment and continual education for older professionals.
Targets	<ul style="list-style-type: none"> • National School of Animal Husbandry and Animal Health (ENESA) • The Centre Agricole Polyvalent (CAP) Matourkou • Nanoro Agricultural High School • The Rural Development Institute (IDR) of the University of Bobo Dioulasso
Strategy	<ul style="list-style-type: none"> • Develop partnerships with schools in emerging and developed countries • Promote private investment in vocational training • Open new public and private vocational training institutes across the country • Develop a faculty training plan • Establish a coordinating body for vocational training
Expected Results	<ul style="list-style-type: none"> • Each school has and implements a capacity development plan • The training curricula of schools are better suited to the needs of professional sectors • Five regional vocational institutions are functional according to regional specialization

Capacity-building program for advisory support services	
Objective	Strengthen public and private advisory support services to enable them to provide sufficient support for professionals in different animal sectors.
Targets	<ul style="list-style-type: none"> • Centralized and decentralized public advisory support services • Private advisory support services • NGOs • Research institutions
Strategy	The Ministry of Animal Resources will conduct a demographic study on the management of human resources. This study will include a recruitment plan (numbers and profiles) to meet the demand for technical and support staff, and they will also develop and implement a training plan to better face human resource challenges and issues in the livestock sub-sector.

Capacity-building program for professional organizations	
Objectives	<ul style="list-style-type: none"> • Better structuring of professional organizations of various livestock sectors • Better management of activities • Strengthened representativeness and representation of professional organizations within local organizations for natural resource management, and at the level of defining strategies for local, regional, and national development programs
Targets	<ul style="list-style-type: none"> • Grassroots organizations (groups and associations) • Umbrella organizations (unions, federations) • Inter-professional organizations • Formal and informal consultation frameworks (sectoral “<i>tables</i>”/groups?, “<i>maison de l’aviculture</i>,” “<i>maison des eleveurs de porc</i>,” etc. – poultry and pig farmers associations?)
Expected Results	<ul style="list-style-type: none"> • Viable and sustainable inter-professionals in the different animal sectors • Cooperative services are developed • 50% of direct chain actors, including 30% of women, are literate • At least 30% of the country’s producers are members of professional organizations

Source: Ministère des Ressources Animales, 2010, pp. 17-22. More information on each of these programs, including details about proposed activities, can be found in the PAPISE document.

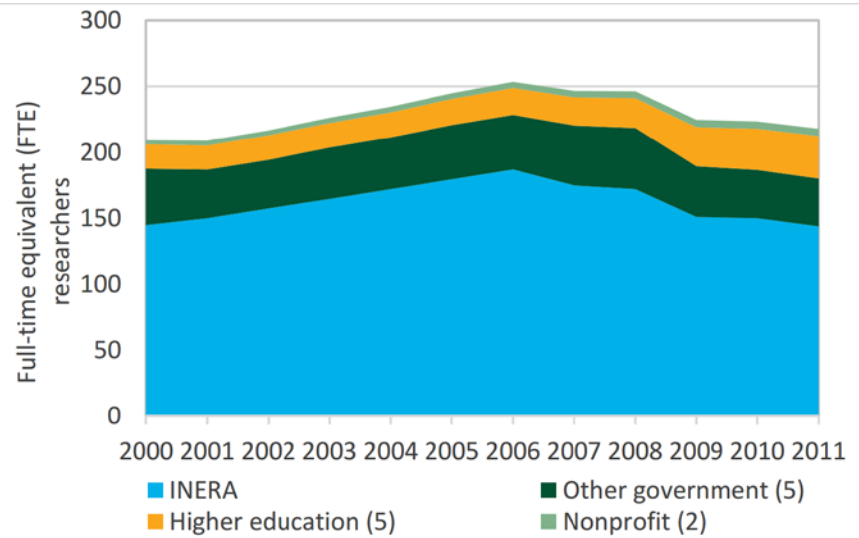
Appendix B: Curriculum content of animal husbandry program at the University of Bobo Dioulasso

Programs	IPR- IFRA Mali	Abomey- Calavy Benin	ENSA Thiès Senegal	EISMV Dakar Senegal	Abeo- kuta Nigeria	Oba- femi Nigeria	U. Ibadan Nigeria	UP Bobo Burkina	KNUST Kumasi Ghana
1. Participatory research methods	AO	AO	MI	AO	AO	NO/EI	NO/MI	AO	NO/MI
2. Leadership and decision making	NO/MI	NO	MI	AO	NO/EI	NO/EI	AO	MI	NO/MI
3. Strategic planning	AO	AO	EI	NO/EI	NO/EI	NO/EI	NO/MI	MI	NO/MI
4. Intellectual property right policy	NO/MI	NO	NI	NO/EI	AO	AO	NO/EI	NI	NO/EI
5. Negotiation and conflict resolution skills	NO/NI	AO	MI	AO	NO/NI	NO/NI	AO	MI	NO/NI
6. Facilitation skills	NO/MI	AO	MI	AO	AO	NO/NI	AO	NI	NO/MI
7. Design, implementation and assessment of net works and partnerships	NO/EI	NO	MI	AO	AO	NO/EI	AO	MI	NO/MI
8. Monitoring, evaluation and impact assessment	NO/EI	AO	EI	NO/EI	AO	NO/EI	NO/EI	AO	NO/EI
9. Planning and priority setting	NO/EI	NO/MI	EI	NO/EI	AO	AO	NO/MI	MI	NO/EI
10. Climate change; implications and adaptation strategies	NO/EI	NO/EI	MI	NO/MI	AO	NO/EI	AO	EI	NO/EI
11. Poverty, vulnerability and risk analysis	NO/EI	AO	EI	AO	NO/EI	NO/EI	AO	EI	NO/EI
12. Value chain analysis, market orientations and implications to R&D	NO/EI	AO	EI	NO/MI	NO/EI	AO	AO	NI	NO/EI
13. Innovation systems perspective and implication to R&D	NO/EI	AO	MI	AO	NO/MI	AO	NO/EI	NI	NO/EI
14. Interaction of crop-livestock-water	AO	AO	EI	AO	AO	AO	AO	AO	AO
15. Gender analysis	AO	AO	MI	NO/MI	NO/EI	NO/MI	AO	NO/EI	NO/EI
16. Sustainable use of animal genetic resources	NO/EI	NO/EI	EI	AO	AO	AO	NO/EI	NO/EI	AO
17. Management of gene bank	NO/MI	NO/EI	NI	NO/MI	NO/MI	AO	NO/EI	NO/EI	AO
18. Convincing proposal writing	NO/MI	AO	EI	AO	AO	AO	AO	NO/MI	AO
19. Scientific writing	AO	AO	EI	AO	NO/EI	AO	AO	NO/EI	AO
20. Effective communication	AO	AO	EI	AO	NO/EI	AO	AO	NO/EI	AO
21. Bioinformatics	NO/MI	AO	EI	AO	AO	NO/MI	NO/EI	NO/EI	NO/EI
22. Disease surveillance and preparedness	NO/NI	NO/EI	EI	AO	NO/EI	NO/MI	NO/EI	NO/EI	NO/MI
23. <i>Ex situ</i> conservation of animal genetic resources	NO/MI	NO/EI	NI	NO/MI	NO/MI	AO	NO/EI	NO/EI	NO/MI
24. Biosafety	NO/EI	NO/EI	NI	AO	AO	AO	NO/EI	NO/EI	AO

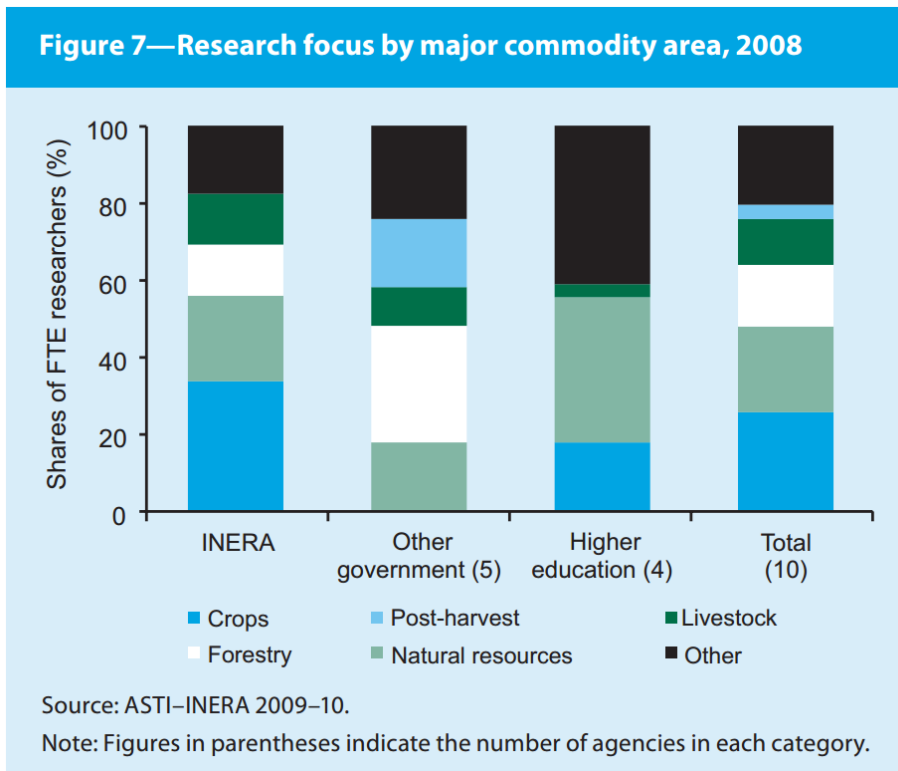
(*) NO = not offered; AO = already offered; EI = extremely important; MI = moderately important; NI = not important.

Source: ILRI, 2009

Appendix C: Agricultural research institutions



Source: Traore, Traore, & Stads, 2014



Source: Traore, Traore, & Stads, 2014