International Journal of Innovation and Applied Studies
ISSN 2028-9324 Vol. 47 No. 2 Dec. 2025, pp. 166-177

http://www.ijias.issr-journals.org/

Characteristics and typology of the cattle farming system and genetic resource management in Burkina Faso

Gniné Fabiola Traore, Kisito Tindano, Wendata Raïcha Ouedraogo, Arnaud Stéphane Rayangnéwendé Tapsoba, Bernadette Yougbare, Geoffroy Kinda, and Amadou Traore

Institut de l'Environnement et de Recherches Agricoles (INERA) - Laboratoire de Biologie et de Santé Animales, 04 BP: 8645 Ouagadougou 04, Burkina Faso

ABSTRACT: In recent decades, cattle in Burkina Faso have been crossbred without any clear long-term management of the introduced genes. The socio-economic characteristics of producers can provide an insight into the management of genetic resources. This study was designed to investigate these characteristics and the management of bovine genetic resources in Burkina Faso. A survey of 735 producers from all 13 regions of Burkina Faso was conducted. The results showed that the farmers were mainly men (98.91%) over 40 years of age (80.44%). Extensive (57.69%) and semi-intensive (41.9%) farming systems were dominant, with the majority of farmers being sedentary (78.82%). Food resources included natural grazing, crop residues, agro-industrial by-products, and minerals. The use of these resources varied depending on the season. Farming objectives varied and included milk production, sales, traction, manure production and cultural reasons. While farmers have access to veterinary services, some also use traditional medicine (10.56%). The Fulani zebu, which was reared by 97.9% of the sample, was the dominant breed and was found throughout the country. It was sometimes found alongside other breeds. Crossbreds were found among 16.15% of farmers. Breeders mainly chose their male breeding stock on the basis of conformation, growth, temperament, tail length, colour, and body size. However, there was very little mating control. Crossbreeding between zebus and taurines threatens the existence of the latter. The typology shows three groups of breeders with a significant link to the administrative regions. Action is required to ensure the sustainability of crossbreeding practices.

KEYWORDS: socio-economics, local breed, crossbreeding, zebus, taurines, Burkina Faso.

1 INTRODUCTION

Animal and crop production constitute the most practiced economic activities in Burkina Faso. Animal production plays a key role through its diverse products and services, such as food security, as well as social and financial security [1].

In Burkina Faso, the cattle production sector contributes between 36% and 40% of the total agricultural [2]. Socio-economically and culturally, cattle are considered the species that offers the most assurance and prestige. Indeed, cattle provide animal protein through meat and milk, serve in transportation and traction in rural areas, function as savings and insurance, and play an essential cultural role [3], [1]. They occupy the highest position aimed for by herders on the capitalization scale [4]. The development of this sector could significantly enhance nutrition levels, agricultural productivity, rural livelihoods, and global economic growth [5].

The country's cattle population is estimated at 10 143 000 heads [6], making it the second-largest cattle population in West Africa after Mali. This numerical importance is linked to high genetic diversity which is organized within two main species: taurines and zebu, encompassing several breeds such as Fulani zebus, Azawak, Goudali, Mbororo, and taurines like Lobi and Gourounsi [7]. In recent decades, introduced breeds, primarily from Western countries, have been used in crossbreeding with local breeds [8], [9]. While the short-term objective of such introductions is generally to use crossbred females in dairy production [9], there is often no clear long-term vision for managing the diffusion of these genes. This lack of a clear crossbreeding scheme raises concerns about the sustainability of genetic resource management systems. The determinants of animal genetic resource management are primarily linked to the socioeconomic characteristics of livestock farming systems. Indeed, all livestock management practices and production systems follow a logic that can be explained by considering the socio-economic aspects of farmers (breeding objectives, available resources, feeding and watering systems, constraints faced by herders, etc.).

This study aims to characterize cattle farming systems in Burkina Faso from a socio-economic perspective, providing a better understanding of genetic resource management.

2 MATERIALS AND METHODS

2.1 SAMPLING AND DATA COLLECTION

The study was conducted across the 13 regions of Burkina Faso from November 2019 to January 2020. Livestock farms were selected in collaboration with regional animal and fisheries resource directorates and local zone leaders. Between one (1) and four (4) provinces were chosen per region. In each province, four (4) villages were selected, and four (4) herds were selected per village. The selection of provinces, villages, and herds was done to cover the four cardinal points.

A questionnaire was developed to collect the data on livestock species, cattle breeds, feeding systems, veterinary care, and some physical environmental characteristics. The data collection process utilized the KoBoToolbox platform.

2.2 DATA ANALYSIS

The raw data from the platform were opened in Excel. The collected data underwent cleaning, and individuals with poorly filled-out records were excluded from the study. The final sample size retained for socio-economic analysis comprised 735 herders.

Two types of statistical analysis were conducted using the R software. First, a univariate descriptive analysis was performed on all variables to characterize the sampled livestock systems. Subsequently, 14 qualitative variables deemed significant were selected for multivariate descriptive analysis (Table I) through multiple correspondence analysis (MCA), followed by hierarchical clustering (HCA, Ward's algorithm) using the FactoMineR package in R. This approach allowed for establishing a typology of cattle farms. Among the 14 variables used, 13 contributed to axis construction, while the 14th (main breed raised) was included as a supplementary qualitative variable.

Table 1. Variables and modalities used for the Multiple Correspondence Analysis (MCA)

Variables	Variable codes	Modalities	Modality codes
Administrative region	reg	Boucle du Mouhoun	BM
		Cascades	Cas
		Centre	Centre
		Centre-Est	CE
		Centre-Nord	CN
		Centre-Ouest	CO
		Centre-Sud	CS
		Est	Est
		Hauts Bassins	HB
		Nord	Nord
		Plateau Central	PC
		Sahel	Sahel
		Sud-Ouest	SO
Main source of feed in the dry season	sspatu	Natural grazing	Paturnat
		Other sources	Autrealim
Production system	systP	Extensive	exte
		Semi-intensive	inte
		Industrial	indu
Treatment of ectoparasites when necessary	ectonec	Yes	ectoO
		No	ectoN
Trypanocides use	utiltrypano	Yes	trypaO
		No	trypaN
Main production objective	princ	Cultural	cult
		Manure	Fumier
		Milk	Lait
		Prestige	Prestige
		Traction	traction
		sale	vente
		Meat	viande

Vaccination against anthrax	bact	Yes	bactO
		No	bactN
Practice of castration	castrer	Yes	castreO
		No	castreN
Use of bulls for work	taurtrav	Yes	TravO
		No	TravN
Mobility	mobil	Sedentary	sed
		Transhumant	transh
		Nomad	noma
Mode of reproduction	contrrepro	Controlled	Contr
		uncontrolled	Incontr
		Uncontrolled, but sometimes artificial insemination	IncontrIA
		Uncontrolled, but sometimes group mating	Incontrsailli
Flock size	efB	Low number of head	faibef
		Medium number of head	moyef
		High number of head	fortef
Crossbreeding practice	Croisement	Yes	croisO
		No	croisN
Main breed raised	princrace	Fulani zebu	zebuP
		Crossbred	metis
		Azawak	azawak
		Goudali	goudali
		Ndama	ndama
		Lobi taurine	tlobi
		Méré taurine	tmere

3 RESULTS

3.1 CHARACTERISTICS OF HERDERS

The majority of respondents were men (98.91%), with only 1.09% being women. Herders under the age of 40 represented 19.56%, those aged between 40 and 60 accounted for 62.11%, and those aged 60 or older made up 18.33%. The study revealed significant variability in the size of surveyed cattle herds. Indeed, among the surveyed herders, 70.86% owned less than 50 cattle, 24.62% had between 50 and 100 heads, and only 4.51% owned herd larger than 100 heads. More than half of the herders (63.47%) reported living near a water source, with an average distance of 1.54 km. Only 1.78% of respondents treated their grazing areas against tsetse flies (Table II).

Table 2. Characteristics of the Sampled Cattle Herders

Variables	Modalities	Frequencies (%)
Gender	Male	98.91
	Female	1.09
Age (years)	< 40	19.56
	[40-60[	62.11
	≥ 60	18.33
Cattle Herd Size	Large (>100)	4.51
	Medium ([50-100[)	24.62
	Small (<50)	70.86
Proximity to a Water Source	No	36.53
	Yes	63.47
Dense Vegetation Presence	No	55.33
	Yes	44.67
Treatment Against Tsetse Flies	Yes	1.78
	No	98.22

3.2 SPECIES RAISED ALONGSIDE CATTLE

The study revealed that cattle rearing was often done alongside other species. Poultry was the most commonly associated species (93.49%), followed by sheep, goats, and donkeys. The average herd sizes for these species were generally low and varied significantly, with poultry being the only species averaging 50 heads (Table III).

Table 3. Frequencies, Average Herd Sizes, and Medians of Species Raised

Species/Breeds	Frequencies (%)	Average Size ± SD	Median
Goats	86.44	17.14 ± 20.05	12
Sheep	89.25	21.83 ± 29.47	15
Donkeys	71.91	1.61 ± 1.77	1
Poultry	93.49	50.09 ± 164.68	30

3.3 SYSTEMS AND OBJECTIVES OF CATTLE FARMING

Extensive and semi-intensive systems were the two main practiced farming systems among herders, representing 57.69% and 41.90%, respectively. Regarding herd mobility, most livestock was managed under a sedentary system. However, 23.52% practiced transhumance, with a small proportion engaging in nomadism (Table IV).

The reasons for cattle farming were diverse. The primary objective was sales (31.04%), followed by milk production (28.71%) and traction (21.57%) (Table IV).

Table 4. Herd Sizes and Farming Systems

Variables	Modalities	Frequencies (%)
Production System	Extensive	57.69
	Intensive	0.41
	Semi-intensive	41.90
Mobility	Sedentary	78.82
	Transhumant	23.52
	Nomadic	3.30
Main Objective of Cattle Farming	Cultural	15.25
	Manure	2.75
	Milk	28.71
	Prestige	0.69
	Traction	21.57
	Sales	31.04

3.4 FEED MANAGEMENT

Table V shows the sources of feed and water during the dry and rainy seasons. In the rainy season, natural grazing was the main source of feed, used by 97.39% of herders. Additionally, animals were mainly provided with minerals (58.3%). During the dry season, the primary feed sources were crop residues (96.3%), agro-industrial by-products (65.57%), natural grazing (52.54%), and minerals (31.55%).

Permanent water sources were the primary watering points during the dry season (82.83%). In the rainy season, herders combined various water sources, with temporary water sources being the most utilized (97.25%).

Table 5. Feed and Water Sources During the Dry and Rainy Seasons

Variables	Modalities	Frequencies (%)
Feed in the Dry Season	Crop residues	96.30
	Agro-industrial by-products (SPAI)	65.57
	Minerals	31.55
	Local bran	9.88
	Natural grazing	52.54
	Harvested natural forage	21.54
	Other	0.27
Feed in the Rainy Season	Crop residues	4.94
	Agro-industrial by-products (SPAI)	10.70
	Minerals	58.30
	Local bran	2.47
	Natural grazing	97.39
	Harvested natural forage	6.45
Water Source (Dry Season)	Permanent water points	82.83
	Temporary water points	17.17
Water Source (Rainy Season)	Temporary water points	97.25
	Permanent water points	36.85

3.5 HEALTH MANAGEMENT

Table VI indicates that nearly all surveyed herders relied on public veterinary services (99.86%). A smaller proportion used private veterinarians (16.5%) and 10.56% resorted to traditional medicine. The diseases for which herders most frequently vaccinated their animals are Pasteurellosis (92.85%) and Contagious Bovine Pleuropneumonia (CBPP, 59%).

In 70.39% of cases, herders reported that their animals had suffered from trypanosomosis. Trypanocides were used by 74.52% of the herders. Animals are treated against ectoparasites and internal parasites when necessary (88.41% and 96.55%, respectively). Routine treatments for these parasites are less commonly performed. The primary method for treating ectoparasites is spraying (96.36%), while internal parasites are treated with bolus-administered anthelmintics (99.31%) (Table VI).

Table 6. Health Management

Variables	Categories	Frequencies (%)
Use of Veterinary Services	State Service	99.86
	Private Veterinarians	16.5
	Traditional Veterinary Practitioners	10.56
Vaccination	CBPP (Contagious Bovine Pleuropneumonia)	59
	Pasteurellosis	92.85
	Anthrax	2.49
	Blackleg	25.93
Frequency of Trypanosomiasis Occurrence	No	29.61
	Yes	70.39
Use of Trypanocides	No	25.48
	Yes	74.52
Treatment of Ectoparasites	As needed	88.41
	Routine treatment	14.23
Mode of Ectoparasite Treatment	Shower	0.45
	Pour-on	1.67
	Manual Removal	27.42
	Spraying	96.36
	Burning Parasites	66.67
	Rubbing	22.22
	Injection	11.11
Treatment of Internal Parasites	As needed	96.55
	Routine treatment	17.38
Mode of Internal Parasite Treatment	Internal Antiparasitics	99.31
	Injectable Antiparasitics	19.58

3.6 BOVINE GENETIC RESOURCES

The study revealed a diversity of cattle breeds, with Fulani zebus being the predominant breed in terms of both herd size (33.14 ± 30.75 cattle) and frequency of the respondents owned them (97.93%). Crossbred cattle were also present, with an average herd size of 3.17 ± 11.08 cattle (Table VII).

Table 7. Herd Sizes and Frequencies of Different Cattle Breeds

Cattle Breeds	Frequencies (%)	Average Size ± SD
Fulani zebus	97.93	33.14 ± 30.75
Azawak zebus	2.14	0.11 ± 1.04
Goudali zebus	4.43	0.43 ± 2.83
Mbororo zebus	1.43	0.14 ± 1.44
Maur zebus	0.71	0.05 ± 0.60
Taurine N'dama	3.14	0.18 ± 1.43
Taurine Lobi	4.49	0.27 ± 1.76
Taurine Méré	3.14	0.31 ± 2.25
Crossbreeds	16.15	3.17 ± 11.08

3.7 REPRODUCTION AND SELECTION CRITERIA

The surveyed herders selected their breeding males based on various criteria. The main selection criteria included conformation (88.83%), growth performance (71.59%), temperament (43.3%), tail length (35.71%), and size (28.57%). Although breeding males are selected, a significant majority (82.61%) of herders do not control mating (Table VIII).

Table 8. Reproduction Management and Criteria for Selecting Male Breeders

Variables	Modalities	Frequencies (%)
Type of Mating	Uncontrolled	82.61
	Controlled	13.70
	Public natural mating	5.98
	Artificial insemination	7.65
Selection Criteria for Breeders	Availability	4.97
	Conformation	88.83
	Colour	28.55
	Horn shape	5.24
	Temperament	43.30
	Growth performance	71.59
	Size	28.57
	Head width	7.14
	Tail length	35.71
	Hardiness (disease resistance)	14.29
	Testicle size	7.14
	Head profile	7.14

3.8 CASTRATION PRACTICES

In the herds, castration is practiced in 26.03% of cases. Among those, 78.49% mention controlling the reproduction as the main reason for castration. Other reasons cited included improving meat production (34.41%) and animal temperament (65.5%). Castration is also performed to achieve a better market price (12.9%) and for traction (1.8%) (Table VI).

Table 9. Castration Practices and Reasons for Castration

Variables	Modalities	Frequencies (%)
Castration Practice	No	73.97
	Yes	26.03
Reason for Castration	Reproductive control	78.49
	Improved meat production	34.41
	Animal temperament	65.50
	Better market price	12.90
	Draft purposes	1.80

3.9 TYPOLOGY

3.9.1 MULTIPLE CORRESPONDENCE ANALYSIS (MCA)

The results of the MCA showed a first axis (Figure 1) that distinguishes, on one side, the regions of the Hauts-Bassins, Centre-Ouest, Centre-Est, Boucle du Mouhoun, and Cascades. These regions were associated with medium to large-sized herds, the use of natural pastures as the main source of feed, to the practice of transhumance, and milk production as the principal objective of breeding. The Crossbreeding was also practiced in these regions. On the other side of the first axis, we found the regions of Nord, Centre-Nord, Plateau Central, Centre, Centre-Sud, and Sud- Ouest. The breeders of these regions were associated with small herds of cattle, they were sedentary and practiced the semi-intensive system. In these regions, the main objective was sale. Herders in these regions did not practiced castration and treated animals against trypanosomosis.

The second axis of MCA distinguished the regions of the Sahel and the Est, which were characterized by the presence of zebus Azawak and Goudali as the main breeds in terms of herd size. These regions also showed thad Nomadic herders are found there. In this group, herders practiced controlled mating but did not treated their cattle against ectoparasites.

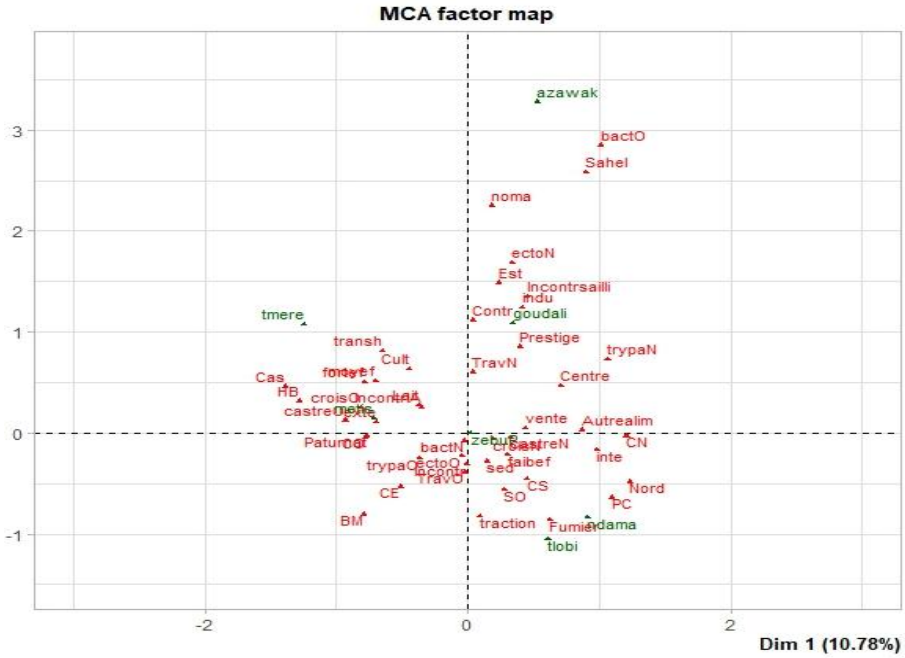

Fig. 1. Representation of Modalities According to the First Two Axes

3.9.2 HIERARCHICAL CLUSTERING ANALYSIS

Hierarchical clustering analysis identified three significantly different groups. All variables showed a highly significant association with these groups (chi-squared test, 5% threshold). These groups reflected the distinctions made by the two axes described above. Figure 2 shows the position of these three groups in relation to the first two axes.

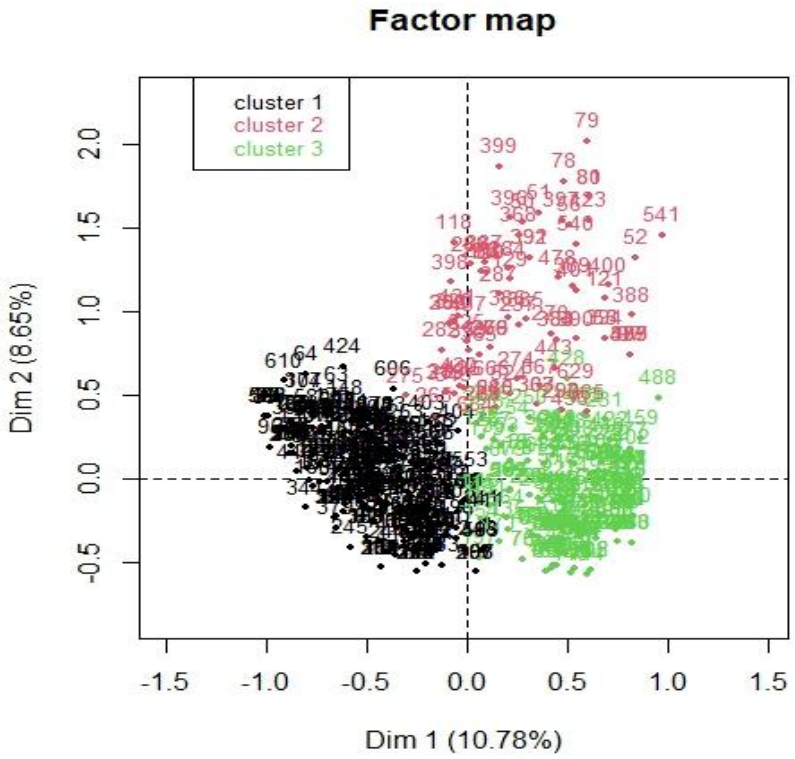

Fig. 2. Representation of the Three Herding Groups According to the First Two Axes

3.9.2.1 GROUP 1

All herders from the Centre-Ouest, Centre-Est, Boucle du Mouhoun, Hauts-Bassins, and Cascades regions were in this group, representing 26.81%, 20.64%, 22.79%, 12.33%, and 11.26% of the individuals in the group, respectively (Table X). This group is characterized by breeders who practiced extensive system. A large majority (77.94%) of herders practicing crossbreeding belonged to this group. Nearly three-quarters (73.03%) of herders with medium-sized herds were in this group. The main production objectives were milk, traction, and cultural reasons.

Table 10. Modalities Most Linked to Group 1 and Their Percentages Relative to Individuals in the Group and the Overall Sample

Modalities	Percentages Relative to Individuals Expressing the Modality	Percentages Relative to Individuals in Group	Significance (Chi-squared test)
Use of natural pastures as the main feed source in the dry season	89.60	90.08	***
Extensive farming system	85.44	94.37	***
Use of trypanocides	70.29	98.93	***
Region of Centre-Ouest	100.00	26.81	***
Region of Boucle du Mouhoun	100.00	22.79	***
Practice of castration	85.16	41.55	***
Region of Centre-Est	100.00	20.64	***
Region of Hauts-Bassins	100.00	12.33	***
Region of Cascades	100.00	11.26	***
Crossbreeding practice	77.94	28.42	***
Average herd size	73.03	34.85	***
Cultural reasons as the primary objective of farming	75.00	21.72	***
No control of mating	57.90	84.45	***
No vaccination against anthrax	54.22	100.00	***
Practice of transhumance	68.70	24.13	***

Treatment of ectoparasites when necessary	55.54	92.76	***
Milk as the main production objective	60.78	33.24	***
Crossbreeds as the main breed raised	75.00	6.43	***
Traction as the main production objective	61.74	24.66	**
Use of bulls for work	56.18	64.61	**
Small cattle herd size	44.87	59.79	***
No crossbreeding	46.84	71.58	***
No castration practice	41.60	58.45	***

**** = p-value < 0.001, ** = p-value < 0.01, * = p-value < 0.05*

3.9.2.2 GROUP 2

Table XI provides a description of Group 2, which primarily consists of herders from the Est (97.67%) and Sahel (100%) regions. More than half of the herders in this group managed small herds. Crossbreeding and castration were practically absent in this group. The feed system during the dry season included the use of crop residues and concentrates.

Table 11. Modalities Most Linked to Group 2, Their Percentages Relative to Individuals in the Group and the Overall Sample

Modalities	Percentages Relative to Individuals Expressing the Modality	Percentages Relative to Individuals in Group	Significance (Chi-squared test)
Region of Sahel	100.00	49.43	***
Region of Est	97.67	48.28	***
No treatment of ectoparasites when necessary	57.83	55.17	***
Non-use of trypanocides	35.36	73.56	***
Nomadic farming practice	100.00	24.14	***
Control of mating	38.84	54.02	***
Practice of group mating	90.48	21.84	***
Vaccination against anthrax	83.33	17.24	***
Non-use of bulls for work	20.22	64.37	***
No castration practice	15.08	90.80	***
No crossbreeding	14.39	94.25	***
Other than natural pastures as the main feed source in the dry season	17.22	65.52	***
Goudali as the main breed raised	66.67	2.30	**
Intensive farming system	66.67	2.30	**
Small cattle herd size	9.86	56.32	***
No vaccination against anthrax	10.47	82.76	***
Sedentary farming	6.86	43.68	***
Treatment of ectoparasites when necessary	6.26	44.83	***

**** = p-value < 0.001, ** = p-value < 0.01, * = p-value < 0.05*

3.9.2.3 GROUP 3

Group 3 includes herders from the Plateau Central (100%), Centre-Nord (95.45%), Nord (98.21%), Centre-Sud (72.58%), Centre (92.86%), and Sud-Ouest (78.57%) regions. Herders in this group mainly practice semi-intensive system and are predominantly sedentary. They generally manage small herds. The N'dama and Lobi taurine breeds are the primary breeds in this group. Crop residues and concentrates are the primary feed sources during the dry season. Table XII provides more details on the modalities characteristic of this group.4

Table 12. Modalities Most Linked to Group 3, Their Percentages Relative to Individuals in the Group and the Overall Sample

Modalities	Percentages Relative to Individuals Expressing the Modality	Percentages Relative to Individuals in Group	Significance (Chi-squared test)
Semi-intensive farming system	81.79	96.75	***
Other than natural pastures as the main feed source in the dry season	71.60	96.34	***
Region of Plateau Central	100.00	23.58	***
Region of Centre-Nord	95.45	25.61	***
Region of Nord	98.21	22.36	***
Small cattle herd size	45.27	91.46	***
Non-use of trypanocides	62.43	45.93	***
No castration practice	43.32	92.28	***
Sedentary farming	42.06	94.72	***
Sales as the main production objective	53.18	47.56	***
Region of Centre-Sud	72.58	18.29	***
Treatment of ectoparasites when necessary	38.20	96.75	***
No crossbreeding	38.77	89.84	***
Region of Centre	92.86	5.28	***
No control of mating	38.60	85.37	***
N'dama as the main breed raised	100.00	3.25	***
Region of Sud-Ouest	78.57	4.47	***
Lobi taurine as the main breed raised	100.00	1.63	**
Manure as the main production objective	60.00	4.88	**
Control of mating	24.79	12.20	**
Use of trypanocides	25.33	54.07	***

**** = p-value < 0.001, ** = p-value < 0.01, * = p-value < 0.05*

4 DISCUSSION

4.1 CHARACTERISTICS OF CATTLE FARMING

Cattle farming in Burkina Faso appears to be a predominantly male activity, with few young people involved, as evidenced by the results. This situation mirrors findings from other sub-Saharan African studies [10], [11]. This can be explained by the context of social structures that place older men as heads of families, making them the primary interlocutors for surveys.

Cattle farming is often associated with the rearing of other species, particularly sheep, goats, and poultry. This situation is similar to that observed by [12] among cattle herders of Borgou. This diversification strategy likely reflects income diversification, capital accumulation, and efficient resource utilization for production [4].

Typological groups show that the variable "Region" is significantly associated with farming practices, suggesting that certain regions tend to adopt similar practices. This offers an opportunity to design targeted innovations for specific regional groups.

4.2 FARMING SYSTEM AND OBJECTIVES

The majority of breeders are sedentary. Which can be attributed to increasing land pressure that makes mobility more difficult, as well as the decreasing herd sizes resulting from persistent droughts and epidemics. This sedentary nature, in turn, influences resource utilization, hence the relative importance of semi-intensive farming systems. The reference [10] observed a similar trend in Cameroon, where semi-intensive farming systems were more prominent.

Additionally, the integration of agriculture and livestock farming is evident in this study, where crop residues are used as feed during the dry season and animal power is used for fieldwork during the planting season. According to [13], besides draft power, manure is also used by herders to fertilize the soil. These interactions favour the beneficial integration of agriculture and livestock [14]. The use of natural pastures for feeding cattle is crucial in both the dry and rainy seasons, although it is often supplemented by other feed resources. This supplementary feeding is an indication of forage deficits in pastures. Similar feeding practices have been noted in other studies [10], [15], [12]. Minerals are more commonly used in the rainy season, possibly to stimulate cattle appetite and optimize the use of abundant natural pastures. Water sources also vary by season. This can be explained by the availability and accessibility, with the preferred sources at each period being the easiest to exploit.

The reasons for cattle farming are varied, but the most significant objectives are sales (milk and meat) and traction. The sale (milk and meat) represents a significant part of the production objectives of cattle herders. Indeed, it holds an undeniable place in achieving food security. Similar production objectives of sedentary herders have also been observed by [17], [18].

The production systems, production objectives, and feeding systems showed a strong connection with the typological groups.

4.3 HEALTH MANAGEMENT

The health of cattle is essential to their well-being and, consequently, their productivity (meat and milk). Nearly all herders have access to veterinary services, with public services being the most frequently used. This situation may be influenced by the involvement of public services in the sampling process. Cattle are vaccinated against various diseases. Some of them, such as pasteurellosis, are mandatory at the national level, while others, such as anthrax, are administered depending on the region and only after outbreaks [19]. In addition to vaccination, preventive measures such as deworming are widely practiced. A similar practice of combining vaccination with deworming was observed among herders in the Mandoul province of Chad [20]. More than half of the herders use trypanocides to combat trypanosomiasis. This is likely due to the high prevalence of Fulani zebus in the sample, as they are more susceptible to parasites [21], [22].

4.4 BOVINE GENETIC RESOURCES

Fulani zebu has been the most commonly raised cattle breed in terms of both herd size and frequency. Other breeds are less common and are often raised in association with Fulani zebu. Due to the search for pasture and water, the Sudanian zone of Burkina Faso has become a refuge for cattle, especially zebu [23]. A more recent study conducted by [24] in the southwest of Burkina Faso (a Sudanian zone where the native breed is the Lobi taurine) showed the dominance of Fulani zebu in the region. This preference for Fulani zebu can be explained mainly by its higher market value compared to taurines [24] and is understandable given the marketing objective cited by the producers. The results also indicate a potential risk of genetic absorption for other breeds, especially the Lobi taurine. Similar findings have been reported in Côte d'Ivoire, where the Lobi taurine is known as the Baoulé taurine [25].

Crossbred cattle occupy second place in terms of both herd size and frequency. This relative importance is due to crossbreeding practices, particularly in peri-urban areas using imported semen for dairy production, but also from crossbreeding within mixed herds and between zebu and taurine. The second most frequently cited objective was milk production, which could help to explain why certain crosses were used.

4.5 REPRODUCTION AND GENETIC IMPROVEMENT OBJECTIVES

The selection criteria for male breeders primarily focus on improving meat production performance. The most commonly mentioned criteria are conformation and growth performance. While milk production is one of the primary objectives, it seems to have little influence on bull selection criteria. This could be due to the lack of reliable physical characteristics related to milk production in males. Despite efforts to select male breeders, the lack of mating control among most producers likely reduces the effectiveness of selection. Similar findings have been reported in Côte d'Ivoire, where almost all producers select male breeders but do not control mating [25]. Only a small minority practice castration, mainly to control reproduction and improve temperament for draft purposes. The absence of mating control indicates that the risk of genetic absorption for less common breeds (particularly taurine) should be considered with greater attention.

5 CONCLUSION

From a socio-economic perspective, the study highlights that cattle farming in Burkina Faso is predominantly a male activity. The Fulani zebu is the most commonly raised breed. Animal feeding is primarily based on natural pasture grazing, crop residues, minerals, and agro-industrial by-products (AIBPs). Depending on the season, watering is provided through temporary watercourses, wells, and boreholes. Farmers rely on state veterinary services and other zootechnical practices to enhance the productivity of their herds, enabling them to better cope with the dynamic conditions of their environment and improve production performance.

Based on the hierarchical classification analysis, herders were grouped into three categories. Group 1 includes herders from the regions of Nord, Centre-Nord, Plateau Central, Centre, Centre-Sud, and Sud-Ouest. These herders manage small herds and practice sedentary farming. Group 2 consists of herders from the Sahel and Est regions, who also manage small herds but practice nomadic farming. Group 3 is composed of herders from Centre-Ouest, Boucle du Mouhoun, Hauts-Bassins, and Cascades, who manage medium to large-sized herds and practice transhumance.

REFERENCES

[1] V. Alary and D. Gautier, Évaluer la contribution de l'élevage au développement des régions sèches: indicateurs en vue de politiques publiques adaptées. Perspective, no. 60, pp. 1–4, 2023. https://doi.org/10.19182/perspective/37106.

[2] Ministère de l'Agriculture, de l'Hydraulique et des Ressources Halieutiques (MAHRH), Cadre d'action pour l'investissement agricole au Burkina Faso. Ouagadougou, Burkina Faso, 88 p. 2011.

[3] S. De la Rocque, J. F. Michel, D. Cuisance, G. De Wispelaere, P. Solano, X. Augusseau, M. Arnaud, and S. Guillobez, Du satellite au microsatellite: Le risque trypanosomien. Une approche globale pour une décision locale, Montpellier, France: CIRAD, 151 p. 2001.

[4] A. J. Nianogo and J. Somda, Diversification et intégration inter-spécifique dans les élevages ruraux au Burkina Faso. *Biotechnologie, Agronomie, Société et Environnement,* vol. 3, no. 3, pp. 133–139, 1999. https://popups.uliege.be/17804507/index.php?id=15572.

[5] FAO, Livestock sector development for poverty reduction: an economic and policy perspective – Livestock's many virtues, by J. Otte, A. Costales, J. Dijkman, U. Pica-Ciamarra, T. Robinson, V. Ahuja, C. Ly, and D. Roland-Holst, Rome: FAO, 161 p. 2012.

[6] Institut National de la Statistique et de la Démographie (INSAD), Annuaire statistique national 2023, Burkina Faso, 2024.

[7] A. Traoré, D. O. Koudandé, I. Fernández, A. Soudré, V. Granda, I. Álvarez, S. Diarra, F. Diarra, A. Kaboré, M. Sanoua, H. H. Tamboura, and F. Goyache, Geographical assessment of body measurements and qualitative type traits in West African cattle, *Tropical Animal Health and Production,* vol. 47, pp. 1505–1513, 2015. doi: 10.1007/s11250-015-0891-7.

[8] H. Boly, S. S. Some, A. Kabre, L. Sawadogo, and P. Leroy, Reproduction et croissance du Zébu Azawak en zone soudano-sahélienne (Station de Loumbila au Burkina Faso), Annales de l'Université de Ouagadougou, Série B, vol. 3, pp. 85–98, 2000.

[9] A. Soudre, M. Grema, S. A. T. Tapsoba, M. Sanou, A. Traoré, and H. H. Tamboura, Introduction of exotic breeds in extensive livestock farming system of Burkina Faso: assessment and prospects. *International Journal of Advanced Research,* pp. 658–668. ISSN 2320-5407. 2018.

[10] J. Kouamo and P. Pa-ana, Typology of cattle farms in the northern regions of Cameroon. *Revue d'Élevage et de Médecine Vétérinaire des Pays Tropicaux,* vol. 70, no. 3, pp. 73–80, 2018. doi: 10.19182/remvt.31520.

[11] E. Ahikiriza, J. Wesana, X. Gellynck, G. Van Huylenbroeck, and L. Lauwers, Context specificity and time dependency in classifying Sub-Saharan Africa dairy cattle farmers for targeted extension farm advice: The case of Uganda, *Agriculture,* vol. 11, no. 9, p. 836, 2021. https://doi.org/10.3390/agriculture1109083.

[12] H. S. S. Worogo, R. Idrissou, A. S. Assani, J. S. Adjassin, M. Azalou, B. G. C. Assogba, Y. Idrissou, C. D. A. Alabi, and I. T. Alkoiret, Towards community-based in situ conservation strategies: A typological analysis of Borgou cattle herding systems in northeastern Benin, *Tropical Animal Health and Production,* vol. 52, no. 3, pp. 1055–1064, 2020. https://doi.org/10.1007/s11250-019-02101-y .

[13] M. Tiffen, «Urbanization: impacts on the evolution of 'mixed farming' systems in sub-Saharan Africa, *Experimental Agriculture,* vol. 42, no. 3, pp. 259–287, 2006. doi: 10.1017/S0014479706003589.

[14] M. Chenost and C. Kayouli, Utilisation des fourrages grossiers en régions chaudes, Étude FAO - Production et santé animales, no. 135, 1997. http://www.fao.org/docrep/W4988F/W4988F00.htm

[15] J. Rangel, J. Perea, C. De-Pablos-Heredero, J. A. Espinosa-García, P. Toro Mujica, M. Feijoo, C. Barba, and A. García, Structural and technological characterization of tropical smallholder farms of dual-purpose cattle in Mexico, *Animals,* vol. 10, no. 1, p. 86, 2020. https://doi.org/10.3390/ani10010086.

[16] P. K. Thornton, Livestock production: recent trends, future prospects,« Philosophical Transactions of the Royal Society. *Biological Sciences,* vol. 365, pp. 2853–2867, 2010. https://doi.org/10.1098/rstb.2010.0134.

[17] A. Touré: Analyse des typologies d'élevage et des performances des bovins en vue d'évaluer des stratégies de développement des ressources génétiques bovines au Mali,« Thèse de doctorat, Université de Liège, Belgique, 2020.

[18] Ministère des Ressources Animales et Halieutiques (MRAH), Rapport annuel d'activités 2018, Burkina Faso, 2019.

[19] M. Baizina, M. Tellah, M. Assadi, N. Odjigue, and Y. Mopate Logtene, Éleveurs, pratiques d'alimentation et soins sanitaires des systèmes d'élevage bovin de la Province du Mandoul au Tchad, *Journal of Applied Biosciences,* vol. 181, pp. 18901–18916, 2023. https://doi.org/10.35759/JABs.181.3.

[20] B. Deltour, Proposition d'enquêtes transversales sur la trypanosomose du bétail en Adamaoua, mémoire de stage, Projet GESEP (coopération française), CEA V-PARC 2002–2003, ENVT-CIRAD, Ngaoundéré, Cameroun, 2003.

[21] A. Soudré, S. Ouédraogo-Koné, M. Wurzinger, S. Müller, O. Hanotte, A. G. Ouédraogo, and J. Sölkner, Trypanosomosis: a priority disease in tsetse-challenged areas of Burkina Faso, *Tropical Animal Health and Production,* vol. 45, no. 2, pp. 497–503, 2013. https://doi.org/10.1007/s11250-012-0248-4.

[22] Z. Bengaly, R. Ganaba, I. Sidibé, and G. Duvallet, Infections trypanosomiennes chez des bovins dans la zone Sud-soudanienne du Burkina Faso, *Revue d'Élevage et de Médecine Vétérinaire des Pays Tropicaux,* vol. 51, no. 3, pp. 225–229, 1998. https://doi.org/10.19182/remvt.9626.

[23] B. Zoma-Traoré, A. Soudré, S. Ouédraogo-Koné, N. Khayatzadeh, L. Probst, J. Sölkner, G. Mészáros, P. A. Burger, A. Traoré, M. Sanou, G. M. S. Ouédraogo, L. Traoré, D. Ouédraogo, B. Yougbaré, and M. Wurzinger, From farmers to livestock keepers: a typology of cattle production systems in south-western Burkina Faso, *Tropical Animal Health and Production,* vol. 52, no. 5, pp. 2439–2449, 2020. https://doi.org/10.1007/s11250-020-02241-6.

[24] B. Soro, D. P. Sokouri, G. K. Dayo, A. S. P. N'Guetta, and C. V. Yapi-Gnaoré, Caractérisation des bovins de race Baoulé dans le 'Pays Lobi' de Côte d'Ivoire: rôles socio-économiques, modes d'élevage et contraintes de production, *Tropicultura,* vol. 33, no. 2, pp. 111–124, 2015. https://doi.org/10.25518/2295-8010.147774.