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Characterization and typology of local poultry production systems in central region of Burkina Faso

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Abstract

This study focuses on the characteristics and typology of local poultry production systems in Burkina Faso's Central region. Using a sample of 102 households across 17 villages, the research employs Multiple Correspondence Analysis and Hierarchical Ascendant Classification to analyze various aspects of poultry farming. Key findings include a dominant male involvement in poultry farming, reliance on traditional housing and feeding practices, and a notable diversity in chicken strains. The study reveals major challenges in nutrition, health management, and housing, highlighting the need for more structured training and support for farmers. The conclusion emphasizes the importance of poultry farming in this region for income generation and cultural practices, advocating for targeted interventions to enhance poultry production systems.

Keywords: Local poultry, production system, typology, selection, central region

1. Introduction

The livestock sector in Burkina Faso has a significant impact on the country's GDP, contributing on average about 11.52% annually over the past decade, according to the INSD 2021 report. Central to this sector is poultry farming, especially the husbandry of indigenous chicken breeds (*Gallus gallus domesticus*). This traditional practice not only diversifies rural income but also serves as a vital source of animal protein. Despite its criticality, there is a discernible gap in the literature, particularly concerning the characteristics of poultry production systems and breeding selection criteria in the Central region of Burkina Faso. Prior research has primarily focused on other regions, such as the Sahelian zone and the North-Western province of Sourou (Bonkoungou, 2005; Ouédraogo *et al.*, 2015)^[2, 3], leaving a lacuna in understanding this area. This study aims to bridge this knowledge gap by meticulously documenting and analyzing the diverse chicken farming systems and developing a typology of poultry farmers within this region.

2. Materials and methods

2.1. Study area: The present study was conducted in the Central region of Burkina Faso, encompassing the municipalities of Saaba, Koubri, Komsilga, and Pabré, within Kadiogo province (figure 1). The area is noted for its diverse poultry farming practices. A total of 102 households across 17 villages and four municipalities were included. Sampling criteria focused on the prominence of poultry farming in socio-economic activities, traditional livestock rearing's relative importance, and farmer availability. Households with 3 to 20 poultry, especially those raising local breeds, were selected. Livestock Technical Support Zones (ZATE) leaders in each municipality identified 25 to 28 poultry farmers for the study. At the time of the survey, each poultry farmer had at least three (03) adult subjects eligible for reproduction.

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The key topics addressed in the surveys include the identifiers of the farmer, their economic activities, the objectives of their production, marketing management, livestock farming

systems, the genetic resources utilized, farmers' perceptions of these resources, the management of these resources, and the constraints in production.

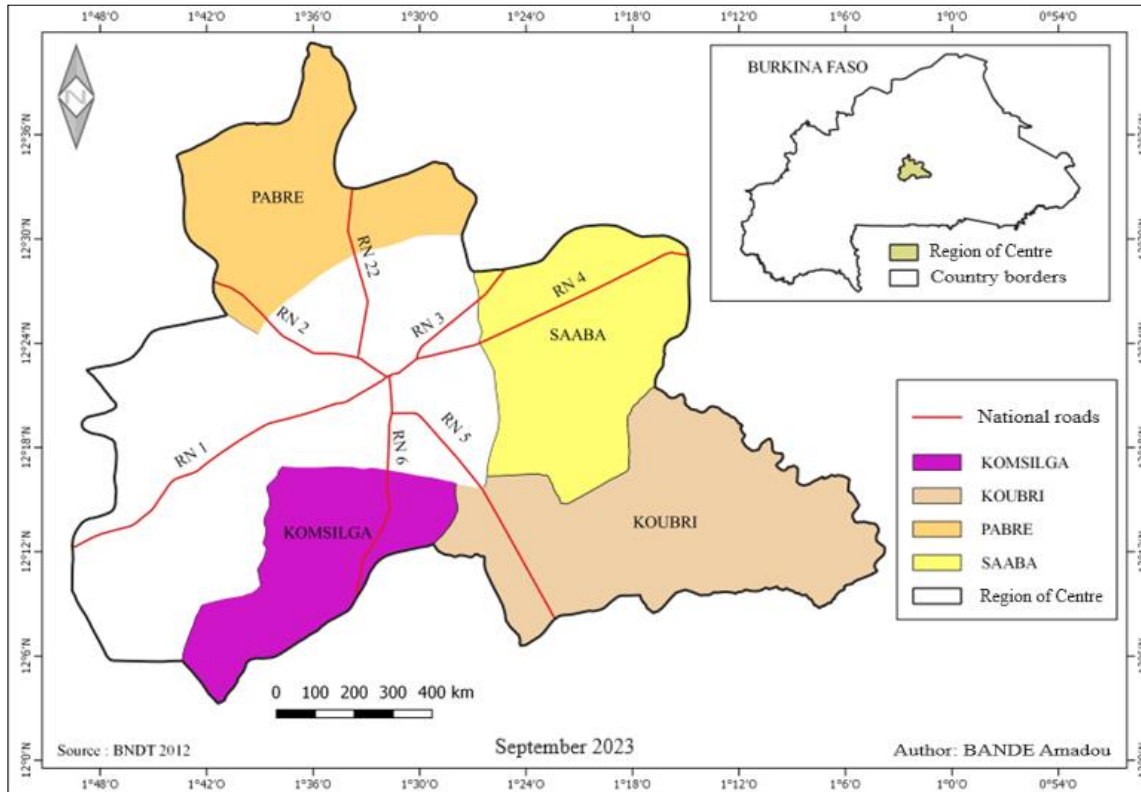


Fig 1: Sampling sites

2.2. Data analyses: Data was analyzed, first using Microsoft Excel 2016 with pivot tables for initial insights into qualitative characteristics. For deeper analysis, Multiple Correspondence Analysis (MCA) and Hierarchical Ascendant Classification (HAC) were used to develop a farmer typology by identifying patterns in the data. This analysis was performed in the R programming environment, utilizing the Factoextra package (Kassambara & Mundt, 2020) [5] for its effectiveness in extracting and visualizing MCA results, enhancing data interpretation and presentation.

3. Results

3.1. Socio-Economic characteristics of poultry farmers: Table 1 presents the socio-economic characteristics of poultry

farmers, providing detailed breakdowns across the municipalities of Komsilga, Koubri, Pabré, and Saaba. A predominant male engagement in poultry farming, with males representing 89.22% of the farmer population, while female participation stood at 10.78%. It was observed that a substantial portion of these farmers, amounting to 61.76%, lack formal education. Poultry farming emerged as the primary economic activity for the majority of respondents, accounting for 70.59% of the total. This was followed by agriculture (25.49%), commerce (1.96%), and a smaller proportion engaged in butchery and salaried employment, each constituting 0.98%. A notable presence of the elderly population was observed, particularly in Koubri (60%) and Pabré (57.69%).

Table 1: Frequency distribution of demographic and socio-economic characteristics of poultry farmers across municipalities in Burkina Faso

Variables	Modalities	Komsilga	Koubri	Pabré	Saaba	Overall Total (%)
Gender	Female	3.84	12	15.38	12	10.78
	Male	96.15	88	84.61	88	89.22
Age	Adult	38.46	24	11.53	44	29.42
	Young	34.61	16	30.76	20	25.49
	Elderly	26.92	60	57.69	36	45.09
Education level	Literate	7.69	12	15.38	28	15.70
	None	61.53	76	50	60	61.76
	Quranic	3.84	0	19.23	4	6.86
Primary Activity	Primary	23.07	4	11.53	4	10.78
	Secondary	3.84	8	3.84	0	3.92
	University	0	0	0	4	0.98
	Agriculture	3.84	28	46.15	24	25.49
Primary Activity	Butchery	3.84	0	0	0	0.98
	Commerce	3.84	0	3.84	0	1.96
	Poultry Farming	88.46	72	50	72	70.59
	Salaried Employment	0	0	0	4	0.98

3.2. Livestock diversity in poultry farming

Poultry farmers engage in breeding a diverse range of livestock species in addition to chickens. This includes goats (85.29%), cattle (84%), sheep (80.39%), donkeys (65.68%), guinea fowl (56.86%), and a smaller proportion raising other poultry such as pigeons, quails, and turkeys (11.70%) (Table 2). The number of chickens per farm varies considerably, ranging from as few as 3 to as many as 600. 31.37% of farmers are reported having between 51 to 100 chickens, closely followed by those maintaining smaller flocks of 2 to

25 chickens (30.39%). Farmers with 26 to 50 chickens comprised 28.44% of the sample, while those with larger flocks of 101 to 600 chickens were less common, representing only 9.8% of the respondents. The majority of poultry owners (90%) across the four surveyed municipalities are heads of households. A regional variation is seen in Saaba, where 60% of farmers reported having smaller flocks of 2 to 25 chickens, while Komsilga had a higher percentage of farmers with medium-sized flocks of 51 to 100 chickens.

Table 2: Distribution of livestock types and chicken population sizes among poultry farmers in Burkina Faso

Variables	Modalities	Komsilga	Koubri	Pabré	Saaba	Overall Total
Raised species	Cattle	69.23	52	50	84	84
	Sheep	76.92	76	76.92	92	80.39
	Goats	80.76	76	96.15	88	85.29
	Chickens	100	100	100	100	100
	Guinea Fowls	53.84	60	53.84	60	56.86
	Donkeys	38.46	76	57.69	92	65.68
	Other species	11.53	24	7.69	4	11.76
Flock size	[2 to 25]	7.69	20	34.61	60	30.39
	[26 to 50]	30.76	36	30.76	16	28.44
	[51 to 100]	50.00	28	26.92	20	31.37
	[101 to 600]	11.53	16	7.69	4	9.8

3.3. Objectives of poultry farming and marketing management

The primary objectives are oriented towards sales, with all respondents (100%). Self-consumption follows, with 71.56% of the farmers considering it a significant objective, while 43.13% of farmers identified donations as another purpose of their poultry farming activities (Table 3). Interestingly, in the municipality of Pabré, donations (69.23%) are prioritized over self-consumption (65.38%)

following sales. The trends in the other three municipalities generally concur with this overall pattern. The marketing dynamics of poultry farming reveals, that the principal customer base is predominantly resellers, accounting for 95.09% of the sales. However, a substantial dissatisfaction with sales prices was reported, with 70.58% of the respondents expressing discontent.

Table 3: Frequency distribution of poultry farming objectives and marketing management among farmers

Variables	Modalities	Komsilga	Koubri	Pabré	Saaba	Total
Production Objectives	Self-consumption	73.07	32	65.38	80	71.56
	Sales	100	100	100	100	100
	Donation	46.15	12	69.23	44	43.13
Sales Locations	Within the village	100	100	92.30	96	97.05
	Other localities	0	8	15.38	12	8.82
Primary Customers	Resellers	100	100	80.76	100	95.09
	Processors	50	28	15.38	8	25.49
	Direct consumers	69.23	16	11.53	20	29.41
Sales Challenges	Encountered difficulties	15.38	8	0	40	15.68
	No difficulties	84.61	92	100	60	84.32
Satisfaction with Sales Prices	Satisfactory	42.30	24	23.07	28	29.42
	Unsatisfactory	57.69	76	76.92	72	70.58

Table 4 delineates the housing structures used in poultry farming, showing a predominant reliance on traditional houses made from local materials (76.47%) (Fig 2). 22.55% of farmers lack specialized poultry housing, and only 0.98%

use semi-modern structures. Modern housing is exclusively found in the Pabré region (3.84%). The data also reveal a widespread absence of designated brooding areas (86.27%) and chick-rearing facilities (74.51%).

Table 4: Frequency distribution of poultry housing types and facilities among farmers in Burkina Faso

Variables	Modalities	Komsilga	Koubri	Pabré	Saaba	Total
Housing Type	No Housing	26.92	12	19.23	32	22.55
	Traditional Housing	80.76	80	84.61	60	76.47
Brooding Facility	Semi-Modern Housing	0	0	3.84	0	0.98
	Exists	23.07	16	7.69	8	13.73
	Does Not Exist	76.92	84	92.30	92	86.27
Chick Rearing Facility	Exists	46.15	28	11.53	16	25.49
	Does Not Exist	53.84	72	88.46	84	74.51



Fig 2: Illustration of traditional poultry housing and free-range chickens in Burkina Faso. (a) Chicken coop made of rudimentary materials, (b) a wooden chicken coop

3.4. Poultry farming system

3.4.1. Feeding practices: The predominant method of sustenance for poultry is foraging, which accounts for 98.04% of the feeding practices (Table 5). 97.06% of the farmers supplement their poultry's diet with additional feedstuffs, including cereals (58%), a combination of cereals and household by-products (27%), industrial compound feeds (8%), and a mix of cereals with industrial feeds (6%). It is noteworthy that 91% of farmers administer these supplements on a regular basis. Confinement feeding, where poultry are

restricted and provided ready-to-consume industrial feeds, is practiced by a minority (1.96%), specifically in the municipalities of Komsilga (3.84%) and Saaba (4%). Additionally, specialized chick feed is provided by some farmers (44.15%), with industrial chick feed being the predominant type (30.40%). Other feed components include millet (5.80%), cereal bran (2.94%), and occasionally, crushed cereals (1.98%). A minor subset reported using sesame (1%), a combination of industrial chick feed with cereals (1%), and a blend of millet, bran, and cereals (1%).

Table 5: Prevalence of feeding systems and chick feed types among poultry farms

Variables	Modalities	Komsilga	Koubri	Pabré	Saaba	Total
Feeding Systems	Free-Ranging	96.15	100	100	96	98.04
	Confinement	3.84	0	0	4	1.96
Types of Free-Ranging	With Supplement	96.15	100	100	92	97.06
	Without Supplement	0	4	0	0	0.98
Chick Feed Availability	Available	65.38	56	23.07	32	44.12
	Not Available	34.62	44	76.93	68	55.88
Types of Chick Feed	Industrial	50	48	19.23	4	30.40
	Industrial & Cereal Bran	3.84	0	0	0	1
	Crushed Cereals	0	4	0	4	1.98
	Millet	3.76	0	0	17	5.80
	Millet & Cereal Bran	0	0	0	4	1
	Sesame	3.84	0	0	0	1
	Cereal Bran	3.84	4	0	4	2.94

3.4.2. Feeders and waverers in traditional poultry farming: The survey indicates a predominant use of repurposed materials for feeding equipment (Table 6). A notable 69.61% of farmers forgo the use of conventional feeders, preferring instead to scatter feed directly on the ground. Modern feeders are found to be more common in the Koubri municipality (32%) but are less frequently used in Saaba (4%). In terms of watering systems, traditional pottery is the water container of choice for a majority of farmers

(63.72%), with some supplementing these with modern alternatives (32.35%). Less conventional options such as canisters and barrels are also utilized, making up 19.60% of responses. The clay pot canister emerges as the most frequently cited semi-improved model. Notably, Koubri reports a higher utilization of both modern feeders (64%) and water troughs (52%) in comparison to other municipalities, where the preference for traditional pottery is more prevalent (32%).

Table 6: Distribution and types of feeders and waterers used in central Region of Burkina Faso poultry farms

Variables	Modalities	Komsilga	Koubri	Pabré	Saaba	Total
Feeder Presence	Yes	23	64	19.24	16	30.39
	No	77	36	80.76	84	69.61
Types of Feeders	Modern	14.38	32	15.38	4	15.67
	Traditional	7.69	36	3.86	12	14.72
Types of Waterers	Modern	42.30	52	15.38	20	32.35
	Traditional Pottery	73.07	32	73.07	76	63.72
	Pottery Shards	0	8	15.38	8	7.84
	Other Water Containers	11.53	24	34.61	8	19.60

3.4.3. Avian health management practices: Table 7 shows the health management practices of poultry farmers, emphasizing vaccination and deworming. A significant majority (90.19%) follow vaccination protocols. Notably, all

farmers in Pabré municipality (100%) vaccinate their flocks. However, deworming is less common, with only 44.12% of farmers practicing it. This varies regionally, indicating a potential focus for extension services to enhance.

Table 7: Comparative rates of vaccination and deworming practices

Variables	Modalities	Komsilga	Koubri	Pabré	Saaba	Overall Total
Vaccination	Vaccinate	92.30	88.00	100.00	80.00	90.19
	Do Not Vaccinate	7.69	12.00	0	20.00	9.81
Deworming	Deworm	80.76	64.00	46.15	32.00	44.12
	Do Not Deworm	19.23	36.00	53.84	68.00	55.88

3.4.4. Poultry genetic resources and their management local chicken strain identification: Within the surveyed sites, a significant diversity of chicken strains has been documented, as presented in Table 8. Farmers identify these strains using traditional language “Mooré” nomenclature, reflecting not only the physical attributes but also the cultural significance of these classifications. In Komsilga, chickens are distinguished by size with terms such as 'Noo-riggéré' for small and 'Noo-koanga' for large (Fig 3 a). Plumage descriptions include a range of Mooré terms from 'Noo-pelaga' (white) to 'Noo-sablaga' (black), indicating a rich vocabulary for feather coloration. Similarly, in Koubri, size variations are denoted by the same terms, and plumage

diversity is richly described with terms like 'Noo-boulgou' (brown) and 'Noo-saaga' (cloudy dirty white), among others. Pabré focuses on the 'Noo-riggéré' small size (Fig 3 b), 'Noo-kingga' for medium size (Fig 3 c), and plumage descriptors such as 'Noo-kapouga' (dark dirty white) and 'Noo-zougoundi' (curly) are used. Saaba's classification encompasses all three size categories and features a similar range of plumage descriptions, including 'Noo-zougoundi' and 'Noo-boulga'. Despite this diversity, the farmers report no marked differences in meat quality across the strains, suggesting that the variations are primarily aesthetic and cultural rather than gastronomic.

Table 8: Classification of chicken strains by local language "Mooré" nomenclature in Burkina Faso

Site	Size Classification (Mooré)	Plumage classification based (Mooré)
Komsilga	Noo-riggéré, Noo-koanga	Noo-pelaga, Noo-sablaga, Noo-kingga,
		Noo-baingré, Noo-ligdi, Noo-jingga
Koubri	Noo-kingga, Noo-riggéré, Noo-koanga	Noo-sablag, Noo-jingga, Noo-boulgou,
		Noo-ligdi, Noo-baingré, Noo-saaga, Noo-pelaga
Pabré	Noo-riggéré	Noo-ligdi, Noo-pelaga, Noo-kapouga,
		Noo-zougoundi, Noo-jingga, Noo-baingré, Noo-saaga
Saaba	Noo-koanga, Noo-kingga, Noo-riggéré	Noo-zougoundi, Noo-sablaga, Noo-jingga,
		Noo-baingré, Noo-ligdi, Noo-boulga

3.4.5. Reproductive management practices in poultry farming: No reproductive control system is implemented by the farmers (97.06%). In all sampled sites, farmers personally select their breeding roosters. The selection criteria are primarily based on performance, including growth rate (75.50%), disease resistance (12.20%), laying rate (10.78%),

and other criteria such as the shape of the rooster's comb (1.52%). These criteria are predominantly observed on the individual bird itself (96.07%). All respondents practice natural brooding, with those in the Saaba region incorporating artificial brooding (4%).

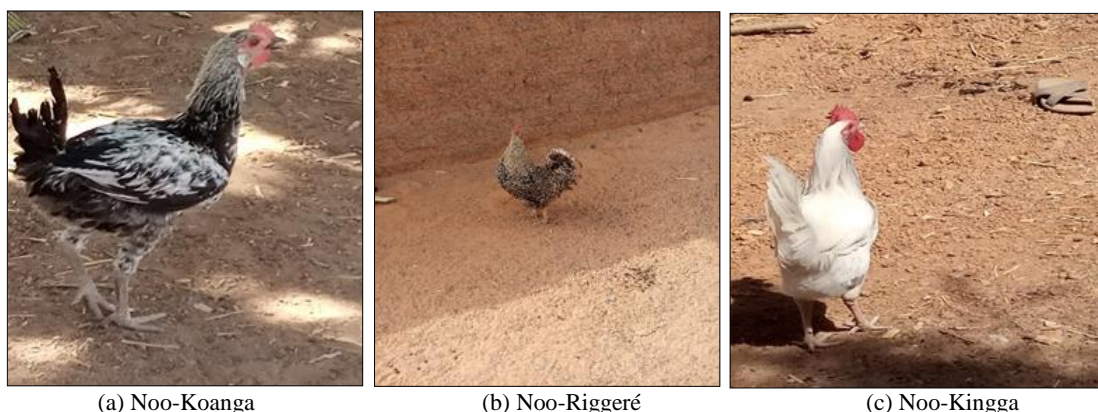


Fig 3: Three local chicken strains identified by their size

Table 9: Overview of reproductive management and breeding selection practices in poultry farms

Variables	Modalities	Komsilga	Koubri	Pabré	Saaba	Overall
Breeding Control	Controlled	0	4	0	8	2.94
	Uncontrolled	100	96	100	92	97.06
Rooster Selection Criteria	Growth/Size	80.76	64	76.93	80	75.50
	Laying rate	15.38	4	0	24	10.78

	Disease resistance	15.38	8	3.90	28	12.20
	Other criteria	0	0	0	8.44	1.52
Individual Observed for Selection	Rooster	100	92	100	92	96.07
	Ancestors	0	0	0	4	0.98
Brooding Method	Other	0	8	0	8	2.95
	Natural	100	100	100	100	100
	Artificial	0	0	0	4	0.98

3.9. Multiple Correspondence Analysis (MCA): Table 10 offers an overview of the variables in the Multiple Correspondence Analysis (MCA), including their codes and modalities. The MCA considers variables like geographical

location (Site), sex, age, main activity (covering different agricultural roles), genetic resource distinction, and production and selection criteria in poultry farming.

Table 10: ACM variable definitions and modalities

Variable	Code Variable	Modalities	Code Modalities
Site	Site	Saaba, Komsilga, Pabré, Koubri	Saaba, Komsilga, Pabré, Koubri
Sex	Sexe	Male, Female	M, F
Age	Age	Old, Young, Adult	Vieux, Jeune, Adulte
Main Activity	Actprinc	Farmer, Livestock farmer, Trader, Salaried, Butcher	Agri, Elev, Comr, Salar, Bouch
Genetic Resource	Rgenetiq	Distinguishes, Does not distinguish	Distg, Ndistgp
Production Objective	Rang	Sale of chickens, self-consumption	Ventp, Consp
Criteria for Selection	Choix	Resistance to diseases, Egg laying, Plumage, Growth, Docility	Resist, Pont, Plum, Croiss, Docil

The MCA biplot (Fig 4) shows links between farmer characteristics, production aims, and local criteria. Two main dimensions emerge, capturing 19% of the data's inertia. Dimension 1 (12% variance) contrasts economic aims, differentiating commercial aspects (like "Comr" for Merchant, "Ventp" for Sale of chickens) from subsistence ones (e.g., "Consp" for Home consumption). Dimension 2 (7% variance) underscores demographic and strategic

differences, like older ("Vieux") versus younger farmers ("Jeune"), and focuses on disease resistance versus growth, hinting at generational shifts in farming goals. Spatially, regional variations are evident with locations such as "Saaba," "Komsilga," "Pabré," and "Koubri." "Pabré" aligns with older farmers and traditional methods, while "Komsilga" is closer to younger farmers and productivity features like egg laying ("Pont"). Production.

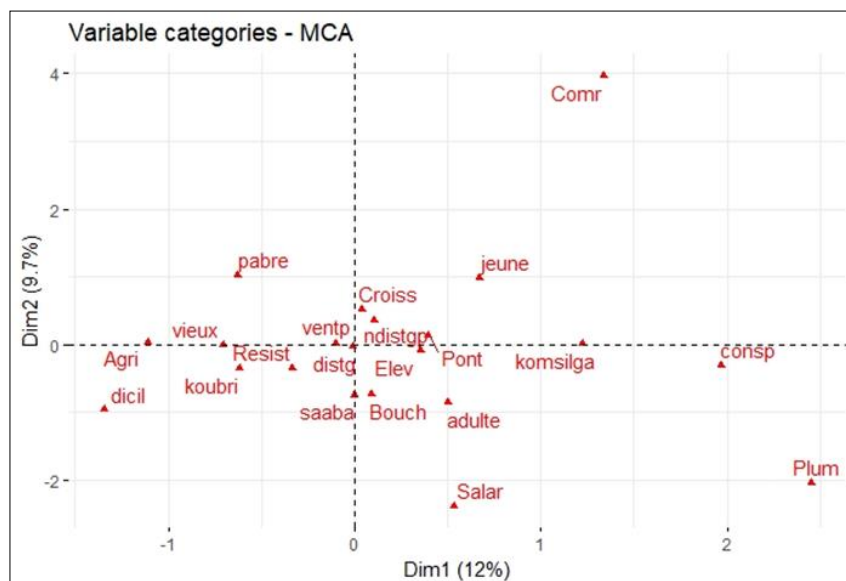


Fig 4: Biplot of multiple correspondence analysis revealing patterns in poultry farming practices by demographics and region

The hierarchical ascending classification enables the identification of three (03) distinct groups (Fig 5).

The group 1, predominantly consists of senior farmers (80.43%) and young people (69.23%). They prioritize egg-laying rate (35.48%) in choosing breeding roosters. This group 3 is mainly composed of farmers from Komsilga (88.46%), all of whom produce chickens for self-consumption. A smaller portion (29.16%) engages in livestock farming as their primary activity.

traders from Pabr  (42.30%), with all individuals engaged in commerce. It is characterized by a high percentage of women (90.90%) and young people (69.23%). They prioritize egg-laying rate (35.48%) in choosing breeding roosters.

This group 3 is mainly composed of farmers from Komsilga (88.46%), all of whom produce chickens for self-consumption. A smaller portion (29.16%) engages in livestock farming as their primary activity.



Fig 5: Clusters of the hierarchical ascending classification

Table 11: Clusters from MCA hierarchical classification

Category	Modality	Group 1 (%)	Group 2 (%)	Group 3 (%)
Age	Senior	80,43	4,34	
	Young	7,69	69,23	
	Adult		6,66	
Sex	Male	61,53	13,18	
	Female	9,09	90,9	
Main Activity	Agriculture	92,3	3,84	3,84
	Livestock Farming	44,44		29,16
	Trader		100	
Site	Koubri	92		
	Saaba	76		
	Pabr�		42,3	
Production Objectives	Komsilga			88,46
	Sale	58,76		18,55
Choice	Self-Consumption			100
	Disease Resistance	67,44	11,62	
	Egg-Laying Rate		35,48	

3.10. Constraints in poultry farming: In poultry farming, key constraints, ranked by importance in four regions, include poultry housing (75.50%), nutrition (68.63%), and health (51.96%) as shown in Table XI.

Traditional practices, like free-roaming chickens, result in nutritional deficiencies and increased disease susceptibility. Free-range management faces challenges due to poor housing. In surveyed regions, most poultry housing is rudimentary (76.47%) or non-existent (17.64%). Existing housing often lacks features like ventilation and is generally neglected

(Table 5). Only 0.98% of farmers have semi-modern houses. Essential facilities like incubation (86.27%) and chick compartments (74.50%) are often missing, exposing chicks to predators. B Additional challenges include insufficient training, marketing issues, and low prices offered by resellers (72% dissatisfaction rate, Table 4), affecting production motivation. Other concerns are land insecurity, inadequate production funding, and limited water availability, especially in places like Koubri (Table 12).

Table 12: Poultry farming constraints: disease, habitat, and nutrition

Variables	Modalities	Komsilga	Koubri	Pabré	Saaba	Overall Total
Diseases	Yes	80.76	36	46.15	44	51.96
	No	19.24	64	53.85	56	48.04
Habitat	Yes	73.08	64	0.77	84	75.50
	No	26.92	36	9.23	16	24.50
Nutrition	Yes	65.38	76	1.54	72	68.63
	No	34.62	24	8.46	28	31.37

4. Discussion

4.1. Socio-economic characteristics of poultry farmers:

The predominance of male involvement in poultry farming in Burkina Faso's Central Region aligns with the patriarchal management structure typical of rural households. This observation is consistent with studies conducted in the Democratic Republic of Congo (Bisimwa *et al.*, 2019) [6]. However, it contrasts with patterns observed in the Burkina Sahel (Ouédraogo *et al.*, 2017) [4] and Senegal (Grégoire *et al.*, 2019; Saliou, 2022) [7, 25], where women play a more significant role in poultry farming, suggesting regional socio-cultural influences on gender dynamics in poultry farming. The enhanced presence of poultry farmers in these areas may be linked to decreasing arable land availability due to population growth and increasing industrial activities, especially in peri-urban zones around Ouagadougou. Poultry farming primarily serves as a source of income (Fagrach *et al.*, 2021; Pindé *et al.*, 2020) [23, 13], underlining its role in poverty alleviation and promoting gender equity. Comparatively, in regions like Kenya, women often own poultry production assets, indicating regional variations in gender roles within poultry farming (Garsow *et al.*, 2022) [24]. In Burkina Faso, poultry farming, predominantly by small to medium-scale farmers, contributes to social and cultural cohesion through practices like gifting and sacrifices, similar to observations in Côte d'Ivoire (Loukou, 2013) [16].

4.2. Poultry farming system characteristics

4.2.1. Feeding practices: The primary sustenance of poultry in Burkina Faso's Central Region predominantly involves free-range foraging, supplemented by additional feed. This practice reflects a broader trend among local poultry farmers who generally do not prioritize or invest significantly in specialized poultry nutrition. Instead, they rely on minimal inputs and supplementary feeding strategies, utilizing available grain reserves on a seasonal basis. This approach is notably influenced by the modest income levels typical among rural farmers in the region.

Our findings in Burkina Faso resonate with similar studies conducted in Senegal (Ayssiwede *et al.*, 2015) [21] and Ethiopia (Sonaiya & Swan 2004) [12], indicating a regional pattern of poultry farming practices across West Africa. In the Central-West Region of Burkina Faso, as well as in the Sahel, similar feeding practices are observed. However, our detailed analysis reveals notable exceptions in certain villages. Here, contrary to the predominant trend of free-ranging, poultry is often confined. This variation may be attributed to the heightened commitment and possibly different socioeconomic circumstances of individuals dedicated to poultry farming in these locales. In a departure from the practices documented in other studies, the poultry farming facilities we observed in Burkina Faso are equipped with rudimentary tools for feeding and watering, such as repurposed broken pots and cans. These practices are echoed in observations from Côte d'Ivoire (Koné *et al.*, 2017) [14]. The adoption of such basic yet functional equipment is likely a result of initiatives by governmental bodies and development agencies. These entities have been

supporting micro-projects and providing grants to farmers, thereby encouraging the uptake of improved farming practices. This trend of adopting simple, yet more effective farming tools and practices aligns with the findings of Alders *et al.* (2018, 2005) [26], highlighting the impact of targeted support and education in enhancing agricultural practices in developing regions.

4.2.2. Housing: The investigation brings to light rudimentary poultry houses constructed from local materials, residential buildings, or free-ranging practices. The predominant model is traditional, bereft of standards, utilizing local materials (sticks, wood, mud bricks, etc.). This lack of standardized practices explains the prevailing scenario, with findings resonating with those reported by (Moula 2012) [11] 80% of rural poultry houses fashioned from mud bricks (73%) or straw (7%). On occasion, animals are left without shelter, perched on trees at night, exposed to predation and inclement weather. Shelters are seldom maintained, remain non-disinfected, and function as storage spaces (Kondombo, 2007) [9]. Rural poultry farming, typically undertaken by untrained farmers, underscores the imperative for training programs to enhance farming practices.

4.2.3. Reproduction and genetic resource management:

The almost complete absence of a controlled breeding system, in concordance with (Kondombo, 2007) [9] and (Bonkougou, 2005) [2], is a notable feature. Our inquiry reveals that farmers select breeding roosters based on criteria such as growth, reproductive capacity, resistance to avian diseases, and morphology. Roosters with fused combs are considered adept breeders, while small hens are favored for reproduction (exemplary brooders and protective of chicks). Some farmers take into account the performance of the rooster's ancestors and/or past generations. These practices are deeply rooted in ancestral knowledge relevant to rural settings. Phenotypically, diverse varieties of African local hens have been identified based on their structure and plumage. This phenotypic diversity reflects their adaptability and unpredictable reproduction, resulting in various strains within their population (Fotsa *et al.*, 2010, Saira *et al.*, 2021) [17, 8]. Our study catalogues nine (09) varieties of hens by feather color and three (03) by size, aligning with (Kondombo, 2000) [15] for the Central Region of Burkina Faso and in Algeria (Tair, 2021) [19]. Farmers evaluate each strain considering both advantages and disadvantages, thereby justifying the observed diversity. Nonetheless, certain strains are particularly esteemed. For instance, Noo-Koanga (large-sized chicken) is appreciated for its rapid growth, while Noo-riggéré (small-sized chicken) stands out for its high productivity (excellent for brooding and raising chicks).

4.2.4. Sanitary status: Poultry farming in the Sahelian region, including Burkina Faso's Central Region, suffers from high mortality rates, particularly among young chicks and guinea fowl keets, as noted by Brou *et al.* (2020) [22]. Health concerns are significant, with prevalent diseases like pseudo-

avian pest, Newcastle disease, and coccidiosis. Veterinary care is hindered by high costs and a shortage of health personnel. Vaccination gaps, often due to limited knowledge and financial constraints, worsen the situation. Mixed-age rearing and inadequate shelters, leading to poor hygiene, further aggravate health issues. Rural hens, lacking proper protection, are more vulnerable to weather, theft, and predators, a problem also observed by Bisimwa *et al.* (2019)^[6] in other African regions.

5. Conclusion

The study has revealed significant insights into the socio-economic dynamics, livestock diversity, farming objectives, marketing practices, housing and feeding strategies, health management, and genetic resource utilization within the poultry farming community. The predominance of traditional practices, coupled with the challenges of inadequate housing, nutritional deficiencies, and health issues, underscores a critical need for targeted interventions. The study highlights the potential of poultry farming as a sustainable livelihood option, provided that these multifaceted challenges are comprehensively addressed.

6. References

- Institut national de la statistique et de la démographie (INSD). Statistical yearbook. 2021. Online Available: [www.mra.gov.bf]. Accessed on 25th December 2021 <http://www.mra.gov.bf/annuaire/statistique>
- Bonkougou GFX. Characteristics and performance of Guinea fowl production in the Sahelian region of Burkina Faso. *Poultry Science*. 2005;84(5):68-82.
- Ouédraogo B, Balé B, Zoundi JS, Sawadogo L. Characteristics of village poultry farming and the influence of improvement techniques. *International Journal of Biological and Chemical Sciences*. 2015;9(3):1528-1543.
- Ouédraogo B, Zoundi JS, Sawadogo L. Characteristics of poultry farming in the Sahelian zone of Burkina Faso. *Rev. Ivoir. Sci. Technol*. 2017;30:263-280.
- Kassambara A, Mundt F. *Factoextra: Extract and Visualize the Results of Multivariate Data Analyses*. R Package Version 1.0.7. 2020.
- Bisimwa NP, Ayagirwe BR, Lugamba RT, Wasso SD, Aksanti B, Bisimwa BE. The local chicken production system in South Kivu. *Journal of Animal Science*. 2019;97(4):13821-13830.
- Grégoire NA, Walter O, Ayao M, Simplicite BA. Socio-economic analysis of family poultry farming. *International Journal of Agricultural Economics*. 2019;13(7):3131-3143.
- Saira B, Muhammad FK, Shumaila N, Aqsa R, Nasir K, Sajid M, *et al.* Morphological characteristics of native chickens in village Chhajjian, Haripur Pakistan. *Poultry Genetics Journal*. 2021;67(3):15-20.
- Kondombo SR. Review of the poultry sector in Burkina Faso. *World's Poultry Science Journal*. 2007;63(2):43-56.
- Pousga B. Synthesis of research work on poultry farming in Burkina Faso. *International Network for the Development of Family Poultry*. 2009;18(1/2):28-35
- Moula N, Farnir F, Moussiaux AN, Leroy P. Village poultry in Bas-Congo, democratic republic of Congo (DRC). *Livestock Research for Rural Development*. 2012;24:2-18.
- Sonaiya EB, Swan SEJ. Family poultry production: Technical manual. Food and Agriculture Organization of the United Nations, Rome; c2004. p. 140.
- Pindé S, Tapsoba ASR, Traoré F, Ouédraogo R, Ba S, Sanou M, *et al.* Characterization and typology of local chicken farming systems. *Journal of Animal & Plant Sciences*. 2020;46(2):8212-8225.
- Koné NG, Sylla M, Nacambo S, Kenis M. Production of house fly larvae for animal feed through natural oviposition. *Journal of Insects as Food and Feed*. 2017;3:1-10.
- Kondombo SR. Production systems and feeding of village chickens: A case study. Wageningen University MSc Thesis; c2000. p. 40.
- Loukou NE. Phenotypic and molecular characterization of local chickens. University Felix Houphouët-Boigny Thesis; c2013. p. 205.
- Fotsa JC, Rognon X, Tixierboichard M, Coquerelle G, Pone KD, NGoungoupayou JD, *et al.* Characterization of local chicken populations. *Animal Genetics Resources*. 2010;46:49-59.
- Alders RG, Dumas SE, Rukambile E, Magoke G, Maulaga W, Jong J, *et al.* Family poultry: Multiple roles, systems, challenges, and options for sustainable contributions to household nutrition security through a planetary health lens. *Poultry International*. 2018;42(5):14-28.
- Tair S. Phenotypic characterization and typology of local chickens in western Algeria. University of Science and Technology Final Year Project; c2021. p. 82.
- Pousga B. Synthesis of research work on poultry farming in Burkina Faso. *International Network for the Development of Family Poultry*. 2009;18(1/2):28-35.
- Ayssiweide SB, N'dri KM, Gbati O, Missohou A. Comparative study of the sensitivity of different chicken strains to avian coccidiosis. *Poultry Science*. 2011;90(1):138-142.
- Brou GKG, Adou CFD, Kouassi KD, Diomandé D. Technical analysis of traditional chicken farming. *African Journal of Agricultural Research*. 2020;15(2):14-28.
- Fagrach A, Abdeladim R, Fellahi S, Bouslikhane M. A retrospective study of traditional chicken farming in Morocco. *Journal of Poultry Science*. 2021;45(3):7-12.
- Garsow AV, Kim EG, Colverson KE, Ilic S, Kunyanga C, Bainah A, *et al.* A review of the roles of men, women, and youth in ensuring food safety in the smallholder poultry value chain in Kenya. *Frontiers in Sustainable Food Systems*. 2022;6:1041472.
- Saliou F. Phenotypic characterization and management of poultry farming in the Kolda region. *Journal of Advanced Research in Science and Technology*. 2022;4(1):13-25.
- Alders R, Dumas SE, Rukambile E, Magoke G, Maulaga W, Jong J, *et al.* Family poultry: Multiple roles, systems, challenges, and options. *Global Journal of Poultry Research*. 2018;12(3):123-136.

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