2026, Scienceline Publication
World's Veterinary Journal
World Vet J, 16(3): 909-917.
ISSN 2322-4568

DOI: https://dx.doi.org/10.54203/scil.2026.wvj83
PII: S232245682600083-16

The Implementation of Biosecurity Measures in Poultry Farms in Haut-Bassins Region, Burkina Faso

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ORIGINAL ARTICLE
Received: June 13, 2026
Revised: July 17, 2026
Accepted: August 16, 2026
Published: September 25, 2026

ABSTRACT

Poultry farming is an important socio-economic sector in Burkina Faso. However, disease outbreaks can substantially impact livestock production, so appropriate preventive measures should be implemented. The present study aimed to assess the implementation of biosecurity measures in poultry farms in the Haut-Bassins Region, Burkina Faso. The present cross-sectional study included 79 poultry farms and used a validated questionnaire. Questions were asked of each poultry farmer through interviews, and farms were observed to verify the implementation of certain biosecurity measures, including the presence and quality of foot baths, the presence of stagnant water, the orientation of the buildings, and the presence of gates. The current results indicated that the majority of farms were managed by men (86.1%), and 45.6% of farmers had more than 10 years' experience. Regarding farm capacity, 68.4% could house up to 10,000 poultry, and 64.6% of the reported farms had facilities that could accommodate more than 1,000 poultry. Over 59.5% of farms were located more than 300 meters away from the main road; however, 64.6% were located less than 500 meters from the nearest poultry farm. More than 97.5% of farms were enclosed by fences, and 87.3% of these fences were made from waterproof materials. On farms, 60.8% had functional footbaths, 11.4% produced poultry feed, and 92.4% were not protected against wild birds entering their airspaces. Most farms (97.5%) regularly cleaned and disinfected materials and equipment, but only 38% had suitable waste disposal practices, and 22.8% kept water waste outside the farm. The present study reported that 56.9% of farms implemented a satisfactory level of biosecurity. Farmers who attended poultry farming training were more likely to apply biosecurity practices on their farms. The present study delineated the application of biosecurity measures on farms and emphasized the importance of raising awareness about biosecurity among poultry farmers in the Haut-Bassins Region of Burkina Faso.

Keywords: Biosecurity, Implementation, Poultry farm, Survey, Questionnaire

INTRODUCTION

In Burkina Faso, poultry farming is an important socio-economic sector and represents the primary source of animal protein (Dione et al., 2025). Poultry production is a significant source of income for rural and urban populations throughout all regions of Burkina Faso and plays an important role in ensuring food security (MRA/DGSV, 2006). The livestock sub-sector contributed between 18.3% and 19.5% to the gross domestic product, ranking second after cotton (MRA, 2011). Although livestock production contributes less to the country's economy than gold and cotton production, it still plays an important socio-economic role (FAO, 2018). In Burkina Faso, poultry meat accounts for around 16.5% of total meat production, with estimated per capita consumption of about 8 kg of poultry meat and 1 kg of eggs per year (FAO, 2018). In 2021, national chicken production was estimated at more than 50,413,102 heads (INSD, 2021). Among the different regions of Burkina Faso, the Hauts-Bassins region ranks third in poultry production, with around 6,115,920 poultry heads in 2020 (INSD, 2021). Burkina Faso has two primary livestock production systems; an active traditional and semi-traditional sector, which accounts for 90% of the livestock and is mainly operated by small farmers in rural and semi-urban areas, and a modern sector centered around the country's main cities (MRAH, 2019). However, the development of poultry production is closely linked to proper control of poultry diseases (Adesola et al., 2025). In Burkina Faso, many poultry diseases have been reported, including infectious bursal disease, Newcastle disease, avian coccidiosis, avian pox, and highly pathogenic avian Influenza (HPAI; FAO, 2008), which led to significant mortality and economic losses on farms. Therefore, effective implementation of biosecurity measures can help reduce the risk of pathogens entering farms (Van Limbergen et al., 2018). To date, few studies have examined biosecurity in Burkina Faso.

To cite this paper: Dahourou LD, Bama BJW, Bako BIA, Wonou MCK, Savadogo M, and Traore A (2026). The Implementation of Biosecurity Measures in Poultry Farms in Haut-Bassins Region, Burkina Faso. *World Vet. J.*, 16(3): 909-917. DOI: https://dx.doi.org/10.54203/scil.2026.wvj83

Despite the importance of poultry farming in the Hauts-Bassins region, no study has assessed the implementation of biosecurity measures in poultry farms.

The present study aimed to assess the implementation of biosecurity protocols in poultry farms and identify factors associated with biosecurity levels in urban and peri-urban poultry farms in Bobo-Dioulasso, Burkina Faso.

MATERIAL AND METHODS

Ethical approval

Ethical approval was obtained from the Research Ethics Committee of the University Joseph KI ZERBO (agreement reference CE-UJKZ/2020-03). In addition, before interviews, farmers were informed of the study's context and purpose, emphasizing that participation was voluntary and that collected data would remain confidential. Therefore, only poultry farmers who provided consent to participate were included in the study.

Study area and period

The current investigation was conducted from August to November 2022 in the Haut-Bassins region, Burkina Faso, in the communes of Bama, Péni and Bobo-Dioulasso (Figure 1). Bobo-Dioulasso is the region's capital, located in Southwestern Burkina Faso, 365 km from the capital, Ouagadougou, and 125 km from the Mali border. It covers an area of 1,102 km^2 and has one urban commune, 12 rural communes, and 205 villages (INSD, 2021). It is limited to the North by the province of Banwa, to the South by the province of Comoé, and to the East and Southwest by the provinces of Kénédougou and Bougouriba, respectively. The region ranks third in poultry production in Burkina Faso, after the Boucle du Mouhoun and Centre-Ouest regions. The poultry population of the region was estimated at more than 6 million heads in 2020 (INSD, 2021). Poultry production was mainly characterized by traditional and semi-modern systems for local and mixed poultry species. Modern systems are predominantly located near urban areas and focus on egg and broiler production.

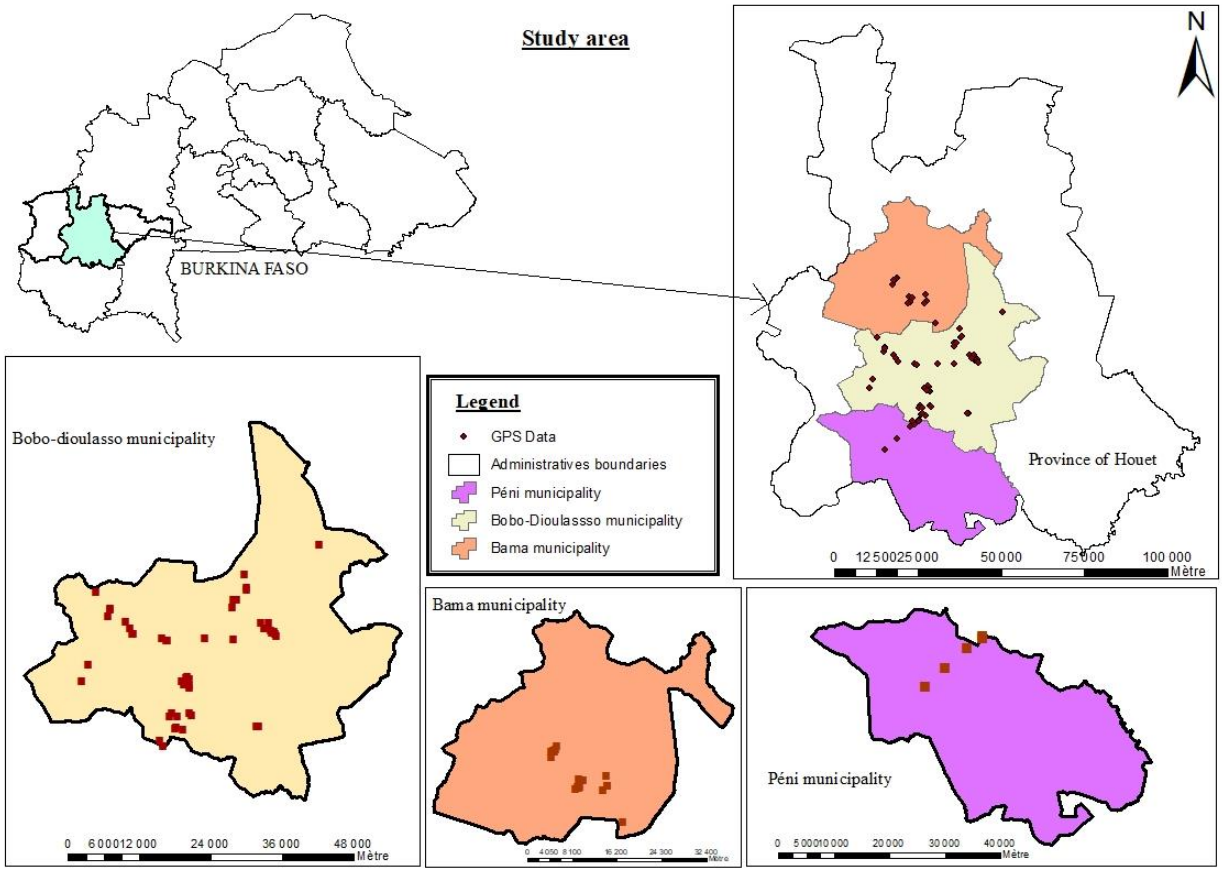

Figure 1. The study site is located in the Haut-Bassins region, Burkina Faso

Sampling and data collection

Poultry farms were selected using snowball sampling within a 30 km radius of Bobo-Dioulasso because of security concerns and limited road connectivity. A total of 79 poultry farms participated in the survey. The questionnaire was

developed from the questionnaire used by Ismael et al. (2021) and validated through a preliminary survey of 10 poultry farmers in the region. The pre-survey assessed participants' understanding of the questions and the interview duration. After the pre-survey, the authors revised the questionnaire based on field feedback and confirmed its validity. A total of 79 farmers were interviewed face-to-face in either their local language or French, based on their understanding, using validated questionnaires (Moore or Dioula). Respondents included farm managers and, when farm managers were absent, senior on-site staff. In addition to the interviews, infrastructure and documents were observed, and distances and building dimensions were measured with a tape measure. The questionnaire was divided into three sections focused on socio-economic characteristics of farm owners, general characteristics of farms, such as ownership of the premises, the type of farming, the number of buildings, the capacity of the farm, and the presence of other species, and conceptual, structural, and operational biosecurity indicators, including location of the farm and orientation of buildings, material used for buildings, feeding and watering equipment, as well as access rules and management of the farms.

Statistical analyses

Data were collected using KoBoCollect and exported to a Microsoft Office 2016 Excel spreadsheet. The data collected were processed and coded. Interview responses were scored according to their accuracy. All biosecurity assessment questions were designed to be answered yes when the assessed parameter was present and no when it was absent. Moreover, when the answer had a positive effect on biosecurity, a score of 1 was assigned; otherwise, the score was 0. Overall, a poultry farmer could attain the highest possible score of 74 by applying all biosecurity indicators assessed in the present study. Farms that achieved a total score of at least 50% (37/74) were considered to be applying a satisfactory level of biosecurity, and those with a total score below 50% were considered to be implementing an unsatisfactory level of biosecurity (Ismael et al., 2021).

Statistical analyses were carried out using R software version 3.5.2. The chi-square test was used to evaluate the association between a satisfactory level of biosecurity and different explanatory variables, such as farm capacity, age of the farm, level of owner education, and location of the farm. For all statistical analyses, the significance level was set at p-value less than 0.05.

RESULTS

Socio-economic characteristics of poultry farmers

Data on the characteristics of poultry farm owners in the study area were reported in Table 1. Of the 79 farmers interviewed, 68 (86.1%) were men, 56 (70.9%) were aged 30 to 50, and 44 (55.7%) held higher education degrees. A total of 36 (45.6%) farm owners practiced full-time poultry farming, while 50 (63.3%) farmers had completed at least one biosecurity training course. In the present study, 61 (77.2%) farmers had 10 years or less of poultry farming experience.

Table 1. Characteristics of poultry farm owners in the Hauts-Bassins region, Burkina Faso, 2022

Variables	Frequency number (%)
Gender	
Woman	11 (13.9)
Man	68 (86.1)
Age class	
Less than 30 years old	10 (12.7)
Between 30 and 50 years old	56 (70.9)
More than 50	13 (16.5)
Level of study	
Primary	5 (6.3)
Secondary	17 (21.5)
Higher education	44 (55.7)
No formal education	13 (16.5)
Main activities	
Full-time poultry farmer	36 (45.6)
Non-agricultural entrepreneur	22 (27.8)
Official	18 (22.8)
Retirement	3 (2.8)
Experience of poultry farmers	
10 years or less	61 (77.2)
More than 10 years	18 (22.8)
Biosecurity training	
Yes	50 (63.3)
No	29 (36.7)

Characteristics of poultry farms

Overall, 75 (94.9%) participants owned their farms, 22 (27.8%) had medium-sized buildings (500-1000 poultry), and 68.4% of farms had multiple buildings with a total production capacity between 1000 and 10,000 poultry. Three main poultry species were identified on farms, including laying hens (83.5%), broiler chickens (24.0%), and local chickens (20.2%). The characteristics of the farms surveyed were presented in Table 2.

Conceptual biosecurity measures

Among the farms, 47 (59.5%) were located more than 300 m away from the main road. However, 64.6% of farms were constructed within 500 meters of the nearest farm (Table 3). The present results demonstrated that 73.4% of farms had buildings less than 20 m from staff living facilities, while only 31.6% of farms were located more than 200 m from the nearest dwellings. Most farms (82.3%) had no stagnant water nearby, 97.5% had mesh fences, and 87.3% were built using impermeable material. In the present study, 81% of buildings were oriented perpendicular to the prevailing winds. Additionally, 69.6% of the farms reported the presence of carnivores and several bird species, including ducks, geese, and guinea fowls.

Structural biosecurity measures

The present study reported that none of the farms had a hatchery; only 5.1% had a functional tire bath, 11.4% produced their own feed, 60.8% had a functional footbath, and 45.6% had complete fencing. Moreover, 48.1% of farms had a gate at the entrance, and among those farms, 73.7% did not keep their gates closed. Among surveyed farms, 26.6% prohibited vehicle access, 94.9% had specific materials and equipment for each poultry building, and 86.1% had a process to control the quality of water used for drinking and cleaning. The current findings reported that 24.1% of farms applied measures to control wild animals and rodents. In 84.4% of farms, wild animals have access to litter. Table 4 reported data on the application of structural biosecurity measures.

Operational biosecurity measures

The present study reported that 31.6% of farms had staff uniforms and 41.8% had staff work shoes. The current results indicated that 2.5% of farms had implemented proper signage, 38.0% had established adapted dumping sites, 22.8% used a high-pressure sprayer during cleaning, 22.8% discharged wastewater outside the farm, 20.3% prohibited staff from contacting other farms, and 82.4% ensured the isolation of sick animals. Among farms, 73.4% contacted a veterinarian or an animal health specialist when sick animals were reported on their farms, and 97.5% of farms were vaccinated against Newcastle disease. Table 5 reported detailed data on operational biosecurity indicators.

Factors associated with a satisfactory level of biosecurity on poultry farms

The present results demonstrated that 56.9% of farms had a satisfactory level of biosecurity. An adequate level of biosecurity was significantly correlated with poultry training ($p < 0.05$), with 72.3% of poultry farmers trained to implement a satisfactory level of biosecurity. Biosecurity level was not significantly associated with farmer experience, farm capacity, farm age, number of buildings, owner gender, owner age, study level, or study location ($p > 0.05$).

Table 2. Characteristics of poultry farms in the Hauts-Bassins region, Burkina Faso, 2022

Variables / modalities	Frequency number (%)
Farm ownership status	
Rental	4 (5.1)
Property	75 (94.9)
Building capacity	
Small scale (< 500)	6 (7.6)
Medium scale (500-1000)	22 (27.8)
Large scale (> 1000)	51 (64.6)
Farm capacity	
Small scale (< 1000)	14 (17.7)
Medium scale (1000-10000)	54 (68.4)
Large scale (> 10000)	11 (13.9)
Farm type *	
Laying hens	66 (83.5)
Broiler chicken	19 (24.0)
Local chicken	16 (20.2)

*In some farms, laying hens, broiler chicken, and local chickens were found.

Table 3. Conceptual biosecurity indicators in poultry farms in the Hauts-Bassins region, Burkina Faso, 2022

Conceptual biosecurity indicators	Frequency number (%)
Distance to main road	
0-50 meters	10 (12.7)
50-100 meters	7 (8.9)
100-300 meters	15 (19.0)
> 300 meters	47 (59.5)
Distance to neighboring farms	
< 500 meters	51 (64.6)
> 500 meters	28 (35.4)
Distance between buildings and dwellings on the farm	
0-20 meters	58 (73.4)
20-100 meters	13 (16.5)
> 100 meters	8 (10.1)
Distance between the farm and the nearest townhouse	
0-20 meters	11 (13.9)
20-200 meters	43 (54.4)
>200 meters	25 (31.6)
Presence of stagnant water near the farm	
Yes	14 (17.7)
No	65 (82.3)
Building's orientation	
Perpendicular to the prevailing winds	64 (81.0)
Parallel to the prevailing winds	15 (19.0)
Construction of buildings using waterproof material	
Yes	69 (87.3)
No	10 (12.7)

Table 4. Structural biosecurity indicators in poultry farms in the Hauts-Bassins region, Burkina Faso, 2022

Structural biosecurity indicators	Frequency number (%)
Presence of a complete fence	36 (45.6)
Presence of a hatchery	0 (0)
Presence of a gate at the entrance	38 (48.1)
Presence of a gate always closed	28 (73.7)
Presence of functional footbaths	48 (60.8)
Vehicle access prohibited on the farm	21 (26.6)
Existence of a single vehicle entry point	36 (45.6)
Presence of tire bath/spray at the gate	4 (5.1)
Registration of visitors at the entrance to the farm	8 (10.1)
Feed production on the farm	9 (11.4)
Material and equipment specific to each building	75 (94.9)
Farm-specific vehicles	36 (45.6)
Prohibition of access to pets	32 (40.5)
Existence of a permanent rodent control mechanism	19 (24.1)
Existence of a wild animal control mechanism	19 (24.1)
Access of wild birds to buildings	73 (92.4)
Access of wild birds to used litter	67 (84.8)
Access of wild birds to used food	6 (7.6)
Inaccessibility of food to other farm animals	79 (100.0)
Staff informed of the emergence of an illness	62 (78.5)
Control of drinking water	68 (86.1)
Control of cleaning water	68 (86.1)

Table 5. Frequency and percentage of operational biosecurity indicators in the Hauts-Bassins region, Burkina Faso, 2022

Operational biosecurity indicators	Frequency number (%)
Presence of a poultry house per building	74 (93.7)
Use of work attire	25 (31.6)
Use of work shoes	33 (41.8)
Using a work mask	5 (6.3)
Use of work cap	0 (0.0)
Regular washing of work clothing	28 (35.4)
Prohibition of access for non-professional visitors to the building	48 (60.8)
Existence of special clothes for visitors	7 (8.9)
Existence of special shoes for visitors	12 (15.2)
Presence of signage on the farm	2 (2.5)
Poultry raised in an identical age group	74 (93.7)
Applying care starting with the youngest poultry	74 (93.7)
Application of the All-in and All-out system on the farm	73 (92.4)
Regular cleaning and disinfection	77 (97.5)
Disposal of wastewater outside the farm	18 (22.8)
Building cleaning using high-pressure spray	18 (22.8)
Presence of a suitable storage location for waste	30 (38.0)
Prohibiting access of drivers to poultry building	5 (6.3)
Banning staff contact with other poultry farms	16 (20.3)
Proper management of dead birds	61 (77.2)
Storage of soiled litter in a suitable place	54 (68.4)
Appropriate treatment of new litter before using it on the farm	67 (84.8)
Application of sanitary downtime	73 (92.4)
Contact ban with neighboring farms	11 (13.9)
Absence of other species on the farm	44 (55.7)
Absence of pet birds on the farm	40 (50.6)
Isolation of sick animals	65(82.3)
Veterinarian intervention in case of illness	58 (73.4)
Regular serological monitoring of major poultry diseases on the farm	3 (3.8)
Practice of vaccination against Newcastle disease	77 (97.5)
Practice of vaccination against infectious bronchitis	75 (94.9)
Practice of vaccination against infectious bursal disease	76 (96.2)
Practice of vaccination against avian pox	70 (88.6)
Compliance with vaccination instructions	71 (89.9)
Recording of health data	68 (86.1)

Table 6. Factors associated with a satisfactory level of biosecurity in poultry farms in the Hauts-Bassins region, Burkina Faso, 2022

Variables	Number	Frequency number of those with a satisfactory level (%)	p-value
Farm capacity			
Small	14	5 (35.7)	0.068
Medium	54	31 (57.4)	
Large	11	9 (81.8)	
Age of farm			
0-5 years	46	24 (52.2)	0.462
5-10 years	18	10 (55.6)	
> 10 years	14	10 (71.4)	
Poultry training			0.0008
Never	32	11 (34.4)	
Yes	47	34 (72.3)	
Experience in the activity			0.452
10 years and less	61	32 (52.4)	
More than 10 years	18	13 (72.2)	
Number of buildings			
Less than 5	70	39 (55.7)	0.532
More than 5	9	6 (66.7)	
Gender			
Woman	11	7 (63.6)	0.749
Man	68	38 (55.9)	
Age			
< 30 years	10	6 (60.0)	0.251
30-50	56	29 (51.8)	
> 50	13	10 (76.9)	
Study			
Formal education	66	38 (57.6)	0.803
No formal education	13	7 (53.8)	
Location			
Bobo Dioulasso and surrounding areas	25	14 (56.0)	0.906
Far from Bobo-Dioulasso	54	31 (57.4)	

DISCUSSION

The study provided a comprehensive understanding of the biosecurity measures implemented in the Haut-Bassins Region, Burkina Faso. The present findings revealed that farms are mainly managed by men. Some socio-cultural factors, such as patriarchal family management in Burkina Faso, mean men are given the right to be responsible for and manage the family (Gueye, 1998). The average age of poultry farmers was between 30 and 50 years old. Most farmers prioritized poultry farming as their primary activity due to its profitability. Many farmers had experience in poultry farming, while a few had participated in at least one biosecurity training provided by private veterinarians, breeding technicians, or occasionally managers from foreign pharmaceutical companies. Laying hens were the most important breeding animals on farms, consistent with the findings of Tsegaye et al. (2023) in the Arsi and East Showa zones of Ethiopia. In the present study, most buildings had a capacity above 1000, and farm capacity ranged from 1000 to 10,000 individuals. The current findings were lower than those reported by Kouam et al. (2018) in the Western Highlands of Cameroon in Central Africa, where an average flock size of 1181.37 was documented. According to the conceptual biosecurity indicators, the majority of farms were located more than 300 m from the main road. The finding was

considered satisfactory given the elevated risk of pathogen contamination via ambient air, particularly during poultry transport on public roads, including *Mycoplasma* spp. and Newcastle disease virus, which can be transmitted by wind and remain infectious for a long time (Levisohn and Kleven, 2000). Elbers et al. (2022) reported that keeping farms far from main roads is a protective measure that reduces contamination of poultry by windborne pathogens, which is consistent with the present findings. Farms were generally located within 500 meters of each other, which contradicted the recommendation of Gelaude et al. (2014), who stated that farms should be at least 500 meters apart. Most farms were located close to dwellings, between 20 and 200 m, increasing the risk of contamination and hygiene and public health issues for surrounding populations exposed to pathogens from poultry farms. However, Poulsen et al. (2018) recommend greater distances between farms and neighboring homes to reduce contamination risk. Many farms in the present study were not located near stagnant water, which was inconsistent with the study of Kouam et al. (2018), who reported that most farms in Cameroon were located less than 500 m from a watercourse. Because rivers and stagnant water can act as long-term environmental reservoirs that facilitate the spread of infectious bursal disease virus to new farms, keeping farms near watercourses increases the risk of disease transmission (Ahmad et al., 2022).

Therefore, it is imperative to eliminate stagnant water near agricultural areas and establish farms at a considerable distance from watercourses, which also serve as drinking sites for wild birds that may carry important pathogens, including HPAI virus (Fang et al., 2026). In the present study, most buildings were constructed with impermeable materials, and most farms had wire mesh fences. In the present study, buildings were generally well oriented perpendicular to the prevailing winds, which helped reduce humidity and temperature. Supporting the present findings, Oloyo and Ojerinde (2019) reported that this orientation reduced the sidewall exposure to direct sun radiation and limited heat stress in birds. Few farms had a functional tire bath at the entrance, but most had a functional footbath at the entrance of poultry buildings. The limited use of tire baths may be due to poultry farmers' neglect or the cost of installing this equipment, increasing the risk of pathogen entry on farms through vehicle movement from outside (Dorea et al., 2010). Similar observations have been documented in Côte d'Ivoire, where footbaths were reported in only 30.3% of farms (Kadja et al., 2021). Nasr et al. (2018) emphasized the importance of footbath disinfection and designated footwear and clothing on farms prior to entering poultry houses to minimize the risk of pathogen transmission via humans. Rodent and wild-animal control was poorly implemented, as only a few farms safeguard their buildings from domestic and wild birds and animals; therefore, farms may have been exposed to pathogens, as wild birds can carry pathogens, including Newcastle disease virus, *Mycoplasma* spp., *Campylobacter* spp., and *Mycobacterium avium*, which are transmissible to poultry (Chaves Hernández, 2014).

The lack of farm-specific footwear and apparel for both staff and visitors was a notable deficiency. Comparable findings have been reported in Cameroon (Kouam et al., 2018) and Ethiopia (Tsegaye et al., 2023), where there was an absence of designated shoes and clothing for personnel. Poor waste management has been observed in the present study, which was linked to the lack of space for waste storage and treatment. Improper storage of poultry waste, such as manure, dead birds, and litter, can cause serious infections, including those caused by *Salmonella*, *Escherichia coli*, and the HPAI virus (Mozhiarasi and Natarajan, 2022; Rahman et al., 2022). Consistent with the present findings, Ismael et al. (2021) reported that, in Ethiopia, 61.36% of farms lacked a suitable place to dispose of poultry litter and waste. In the present study, only a limited number of farms had signage restricting access to certain areas of their farm, aligning with findings of Ismael et al. (2021) in Ethiopia. Without signage, drivers generally had direct access to buildings, increasing the risk of external pathogen introduction (Tsegaye et al., 2023). In the present study, 45 farms (56.9%) had a satisfactory biosecurity level. Gemeda et al. (2026) reported similar findings, noting that 61.25% of farms in Sebeta town, Ethiopia, achieved a biosecurity score above 50%. However, Ismael et al. (2021) found that only 25% of farms in Bishoftu Town, Ethiopia, implemented adequate biosecurity practices. The satisfactory biosecurity level was notably associated with staff training in poultry farming. In the present study, farmers who attended biosecurity training implemented biosecurity practices at much higher rates than those who had not been trained.

CONCLUSION

The present findings indicated that farms in the Hauts-Bassins region of Burkina Faso implemented different biosecurity practices, but only 56.9% of farms had a satisfactory biosecurity level. The current results indicated the need to train poultry farmers and assess the relationship between biosecurity measures and farm infection. The main limitation of the study was the inaccessibility of certain areas of the region due to insecurity and poor road conditions. Future studies should assess the impact of biosecurity measure implementation on the prevalence of diseases such as Newcastle disease, avian colibacillosis, and avian coccidiosis.

DECLARATIONS

Acknowledgments

The authors would like to express their gratitude to the farmers and other agricultural personnel for their cooperation during the field investigations. The authors also thank the local veterinary staff for their collaboration and assistance throughout the activities.

Authors' contributions

Laibané Dieudonné Dahourou designed the study. Bali Joël Wilfried Bama, Madi Savadogo, and B. Ido Apollinaire Bako conducted the field survey and drafted the statistical analysis. Laibané Dieudonné Dahourou verified the statistical analysis, which was validated by Amadou Traore and Mireille Catherine Kadja Wonou. Laibané Dieudonné Dahourou and Bali Joël Wilfried Bama prepared the draft of the manuscript. All authors contributed to revising the manuscript. All authors read and approved the final edition of the manuscript.

Availability of data and materials

The data from the present study are available upon reasonable request from the corresponding author.

Competing interests

The authors declare no competing interests.

Ethical considerations

All authors thoroughly reviewed the ethical considerations, including issues related to plagiarism, consent for publication, misconduct, data fabrication and/or falsification, duplicate publication and/or submission, and redundancy before submission. No AI tools/applications were used to conduct, write, or prepare any part of the study. The authors confirmed the data's originality before submission and after publication.

Funding

The present study was supported by financial contribution from the authors. No external funding has supported the study.

REFERENCES

Adesola RO, Idris I, and Bakre AA (2025). Implementation of national poultry improvement plan in poultry disease control in Africa: current perspectives, challenges, and prospects. Bulletin of the National Research Centre, 49: 10. DOI: https://www.doi.org/10.1186/s42269-025-01302-w

Ahmad S, Koh K, Yoo D, Suh G, Lee J, and Lee CM (2022). Impact of inland waters on highly pathogenic avian influenza outbreaks in neighboring poultry farms in South Korea. Journal of Veterinary Science, 23(3): e36. DOI: https://www.doi.org/10.4142/jvs.21278

Chaves Hernández AJ (2014). Poultry and avian diseases. Encyclopedia of agriculture and food systems, pp. 504-520. DOI: https://www.doi.org/10.1016/B978-0-444-52512-3.00183-2

Dione M, Ilboudo G, Ouedraogo AA, Ima SA, Ouedraogo B, Knight-Jones T, Kagambèga A, and Alders R (2025). Characteristics of chicken production systems in rural Burkina Faso: A focus on One Health related practices and food security. PLOS ONE, 20(2): e0317898. DOI: https://www.doi.org/10.1371/journal.pone.0317898

Dorea FC, Berghaus R, Hofacre C, and Cole DJ (2010). Survey of biosecurity protocols and practices adopted by growers on commercial poultry farms in Georgia, U. S. A. Avian Diseases, 54(3): 1007-1015. DOI: https://www.doi.org/10.1637/9233-011210-Reg.1

Elbers ARW, Gonzales JL, Koene MGJ, Germeraad EA, Hakze-van der Honing RW, van der Most M, Rodenboog H, and Velkers FC (2022). Monitoring wind-borne particle matter entering poultry farms via the air-inlet: Highly pathogenic avian influenza virus and other pathogens risk. Pathogens, 11(12): 1534. DOI: https://www.doi.org/10.3390/pathogens11121534

Fang K, Li J, Zhao H, Bahati J, Zhao Z, Song W, and Chen T (2026). Assessing HPAI-H5 transmission risk across wild bird migratory flyways in the United States. Nature Communications, 17: 2524. DOI: https://www.doi.org/10.1038/s41467-026-69344-w

Food and agriculture organization (FAO) (2018). Livestock production systems spotlight: Burkina Faso cattle and poultry sectors. Africa Sustainable Livestock 2050. Food and Agriculture Organization. Available at: http://www.fao.org/3/i8492en/I8492EN.pdf

Food and agriculture organization (FAO) (2008). Revue du secteur avicole [Poultry sector review]. FAO animal production and health division. Food and Agriculture Organization, Burkina Faso, pp. 1-61. Available at: https://www.fao.org/4/ak770f/ak770f00.pdf

Gelaude P, Schlepers M, Verlinden M, Laanen M, and Dewulf J (2014). Biocheck. UGent: A quantitative tool to measure biosecurity at broiler farms and the relationship with technical performances and antimicrobial use. Poultry Science, 93(11): 2740-2751. DOI: https://www.doi.org/10.3382/ps.2014-04002

Gemeda DG, Negese YK, Lamecha AC, Hassen BM, and Nugusse DR (2026). Assessment of biosecurity status in commercial chicken farms found in Sebeta Town, Shaggar City, Oromia Regional State, Ethiopia. Veterinary Medicine and Science, 12(1): e70782. DOI: https://www.doi.org/10.1002/vms3.70782

Gueye EHF (1998). Village egg and fowl meat production in Africa. World's Poultry Science Journal, 54(1): 73-86. DOI: https://www.doi.org/10.1079/wps19980007

Hoffmann V, Awonon J, and Gelli A (2020). Poultry production in Burkina poultry production in Burkina Faso: Potential for poverty reduction and women's empowerment. International Food Policy Research Institute., Washington DC., pp 1-42. Available at: https://gender.cgiar.org/publications/poultry-production-burkina-faso-potential-poverty-reduction-and-womens-

empowerment?__goaway_challenge=header-refresh&__goaway_id=d7db5b4050528262c85af97231c1aa54&__goaway_referer=https%3A%2F%2Fgender.cgiar.org%2F

Institut national de la statistique et de la démographie (INSD) [National institute of statistics and demography] (2021). Annuaire statistique 2020 [Statistical Yearbook 2020]. Institut national de la statistique et de la démographie [National institute of statistics and demography], Burkina Faso, pp. 66-78. Available at: https://www.mdenp.gov.bf/fileadmin/user_upload/storages/documents/Annuaire_statistique_2020_VF.pdf

Ismael A, Abdella A, Shimelis S, Tesfaye A, and Muktar Y (2021). Assessment of biosecurity status in commercial chicken farms found in Bishoftu Town, Oromia Regional State, Ethiopia. Veterinary Medicine International, 2021(1): 5591932. DOI: https://www.doi.org/10.1155/2021/5591932

Kadja MC, Sabi SS, N'guessan C, Laleye FX, Kane Y, and Kaboret Y (2021). Biosecurity practices and potential biological risks in poultry farms in Agnibilekrou and in Peri Urban Areas of Abidjan. Asian Journal of Medicine and Health, 19(6): 26-35. DOI: https://www.doi.org/10.9734/ajmah/2021/v19i630335

Kouam MK, Jacouba M, Nsangou IN, and Teguia A (2018). Assessment of biosecurity level in small-scale broiler farms in the Western highlands of Cameroon (Central Africa). Tropical Animal Health and Production, 50(7): 1529-1538. DOI: https://www.doi.org/10.1007/s11250-018-1591-x

Levisohn S and Kleven SH (2000). Avian mycoplasmosis (*Mycoplasma gallisepticum*). OIE Revue Scientifique et Technique, 19(2): 425-442. DOI: https://www.doi.org/10.20506/rst.19.2.1232

Mozhiarasi V and Natarajan TS (2022). Slaughterhouse and poultry wastes: Management practices, feedstocks for renewable energy production, and recovery of value-added products. Biomass Conversion and Biorefinery, 15: 1705-1728. DOI: https://www.doi.org/10.1007/s13399-022-02352-0

Ministère des Ressources Animales (MRA) [Ministry of Animal Resources] (2011). Contribution de l'élevage à l'économie et à la lutte contre la pauvreté [The contribution of livestock farming to the economy and poverty reduction]. Ministère des Ressources Animales [Ministry of Animal Resources] , Ouagadougou, pp. 1-69. Available at: https://www.inter-reseaux.org/wp-content/uploads/etude_contribution_elevage_v_imprimerie-1.pdf

Ministry of Animal Resources/ Directorate General for Veterinary Services (MRA/DGSV) (2006). Flash 03: Le plan Burkinabe de prévention et de riposte contre l'influenza aviaire hautement pathogène (IAHP) [The Burkinabe prevention and response plan against highly pathogenic avian influenza (HPAI)]. Ministère des Ressources Animales/Direction Générale des Services Vétérinaires [Ministry of Animal Resources/Directorate General for Veterinary Services]. Centrale d'information. Burkina Faso, pp. 77-78.

Ministère des Ressources Animales et Halieutiques (MRAH) [Ministry of Animal and Fishery Resources] (2019). Rapport annuel d'activités 2018 du MRAH [2018 Annual activities report from the MRAH]. Ministère des Ressources Animales et Halieutiques [Ministry of Animal and Fishery Resources]. Burkina Faso, pp. 61-63. Available at: https://www.mra.gov.bf/fileadmin/user_upload/stockage/documents/Rapport_d_activites__MRAH__2018_post_CASEM.pdf

Nasr SAE, Ismael E, Laban SE, Ismail EM, Hamoud MM, Zaki MM, and Zahran OMK (2018). Effectiveness of some disinfectants commonly used in footbaths inside poultry farms. Journal of Agriculture and Veterinary Science, 11(9): 1-6. DOI: https://www.doi.org/10.9790/2380-1109020106

Oloyo A and Ojerinde A (2019). Poultry housing and management. Poultry- An advanced learning. IntechOpen., Nigeria, pp. 1-17. DOI: https://www.doi.org/10.5772/intechopen.83811

Poulsen MN, Pollak J, Sills DL, Casey JA, Rasmussen SG, Nachman KE, Cosgrove SE, Stewart D, and Schwartz BS (2018). Residential proximity to high-density poultry operations associated with campylobacteriosis and infectious diarrhea. International Journal of Hygiene and Environmental Health, 221(2): 323-333. DOI: https://www.doi.org/10.1016/j.ijheh.2017.12.005

Rahman MdM, Hassan A, Hossain I, Jahangir MMR, Chowdhury EH, and Parvin R (2022). Current state of poultry waste management practices in Bangladesh, environmental concerns, and future recommendations. Journal of Advanced Veterinary and Animal Research, 9(3): 490-500. DOI: https://www.doi.org/10.5455/javar.2022.i618

Tsegaye D, Tamir B, and Gebru G (2023). Assessment of biosecurity practices and its status in small- and medium-scale commercial poultry farms in Arsi and East Showa Zones, Oromia, Ethiopia. Poultry, 2(2): 334-348. DOI: https://www.doi.org/10.3390/poultry2020025

Van Limbergen T, Dewulf J, Klinkenberg M, Ducatelle R, Gelaude P, Méndez J, Heinola K, Papasolomontos S, Szeleszczuk P, and Maes D (2018). Scoring biosecurity in European conventional broiler production. Poultry Science, 97(1): 74-83. DOI: https://www.doi.org/10.3382/ps/pex29