

Management and biosecurity practices in village chicken flocks in the Central-Northern region of Burkina Faso

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Summary

Background: Improvements in chicken management, husbandry, biosecurity, and hygiene can potentially secure and improve smallholders' livelihoods in two ways: by reducing flock exposure to foodborne and environmental pathogens, and by increasing production for sale and home consumption. Interventions to improve flock hygiene and productivity are often not adequately tailored to achieve maximal impact with limited resources. **Aim:** This study assessed the management and biosecurity practices of 483 village chicken producers in 23 villages in Burkina Faso. **Methods:** Multiple Factor Analysis (MFA) was carried out on 29 variables representing the main aspects of management and biosecurity practices that differentiate flocks. Hierarchical Cluster Analysis (HCA) was conducted on flock MFA scores using Ward's criteria for linkage. **Results:** Results revealed three clusters associated with chicken keeping type, waste management, and disease control practices. Although the clustering was weak, the practices that differentiated flock management practices, in order of importance, were frequency and methods of cleaning chicken shelters and household courtyards; animal health practices such as deworming and quarantining newly purchased birds; disposal of dead birds; and the use of feces as fertilizers for crops. Variables related to the purchase and sale of chickens, as well as the use of sales revenues, were less decisive in differentiating flock management practices. **Conclusions:** This understanding will make it possible to design local targeted interventions that meet the specific needs of each flock management cluster rather than relying on a one-size-fits-all approach. Findings from this study will inform the development of context-specific, resource-efficient strategies to strengthen biosecurity in village chicken production systems across rural Burkina Faso.

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■ INTRODUCTION

Village chicken production has long been crucial for human livelihoods, enhancing diets, household income, and food and nutrition security for resource-limited rural households (Alders & Pym, 2009). Chickens serve as critical assets for economic empowerment - especially for women - and support the resilience of disadvantaged groups. Valued for their hardiness and ability to survive and reproduce with minimal inputs, village chickens also provide important ecosystem services (Desta, 2020). This flexible, low-input livestock-production system is widespread across most of Africa and Asia (Hilmi *et al.*, 2011).

In Burkina Faso, village chickens are commonly referred to as "poulet bicyclette" literary translated by "bicycle chicken" (Sodjinou *et*

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al., 2015), a name that reflects how they are commonly transported from rural areas to urban markets by bicycle. Burkinabé take pride in “*poulet bicyclette*”, widely believed to have a superior appearance, taste, and texture compared to “exotic” western broiler breeds (CEVA, 2022). Beyond their culinary appeal, village chickens hold a deep cultural value and represent the cornerstone of rural livelihoods, contributing an estimated 15% to the national GDP (MRA, 2010). They are often the primary source of cash income for rural households, enabling access to essential services such as education and healthcare (MRA, 2008). Recognizing their socio-economic significance, the United Nations Development Programme in 2016 urged policymakers to expand their support to underdeveloped sectors like livestock production (PNUD, 2016).

Despite their importance, rising demand for poultry has not been matched by improvements in production systems, especially in the areas of health management and biosecurity. Village chicken producers face numerous challenges that limit flock productivity and pose risks to public health. Newcastle disease (ND) remains a leading cause of mortality, yet vaccination coverage is sparse. Basic infrastructure for shelter, watering, and hygiene remains inadequate. Similarly, slaughter and market-level hygiene and biosecurity are poor, leading experts to call for stronger regulation and oversight (Dione *et al.*, 2021). However, existing biosecurity guidelines, often developed for intensive poultry production, are difficult to implement in the prevailing low-input production systems. The government-mandated confinement of poultry proved unfeasible for many producers who did not have the resources to feed their birds under such conditions (Pousga & Boly, 2009). In areas where these low-input production systems are widespread, free-range poultry commonly interact with people from the same household, increasing the risk of pathogen transmission.

In Burkina Faso, decision makers often underestimate the economic value of village chicken production. Yet projects have demonstrated the potential of awareness campaigns and health interventions to

elevate the role of poultry in rural economies (Gelli *et al.*, 2017). Nonetheless, major gaps remain. Context-specific improvements in poultry husbandry, biosecurity, and hygiene have the potential to enhance livelihoods by increasing flock productivity, improving food safety, and reducing human exposure to zoonotic pathogens from the flock environment and contaminated foods.

This study aimed to characterize biosecurity practices among village chicken producers in the Central-Northern region of Burkina Faso. It also explored whether distinct flock management profiles could be identified based on production practices.

■ MATERIAL AND METHODS

Site selection

The study was implemented in Sanmentenga, one of the three provinces in the Central-Northern region of Burkina Faso. Among the provinces in the region, Sanmentenga has the highest poultry population and hosts the largest urban livestock market. The commune of Boussouma, located within Sanmentenga, was chosen as the project site due to its high concentration of poultry farming. Boussouma includes 60 villages with an estimated population of 106,253 inhabitants (53% women and 47% men) across 17,718 households. Twenty-three villages with the highest poultry densities were selected to participate in the project. The selection of sites also took into account the prevailing security conditions and accessibility during the rainy season (Figure 1).

The climate in Boussouma is Sudano-Sahelian, characterized by two seasons: an eight-month dry season (from October to May) and a four-month rainy season (June to September). Over the past five years, rainfall during the dry season has ranged from 600 to 1,100 mm. Rainfall is generally low, irregular, and unevenly distributed, which significantly influences agricultural and poultry production. Average monthly temperatures vary slightly, fluctuating between 24.4 and 32 °C.

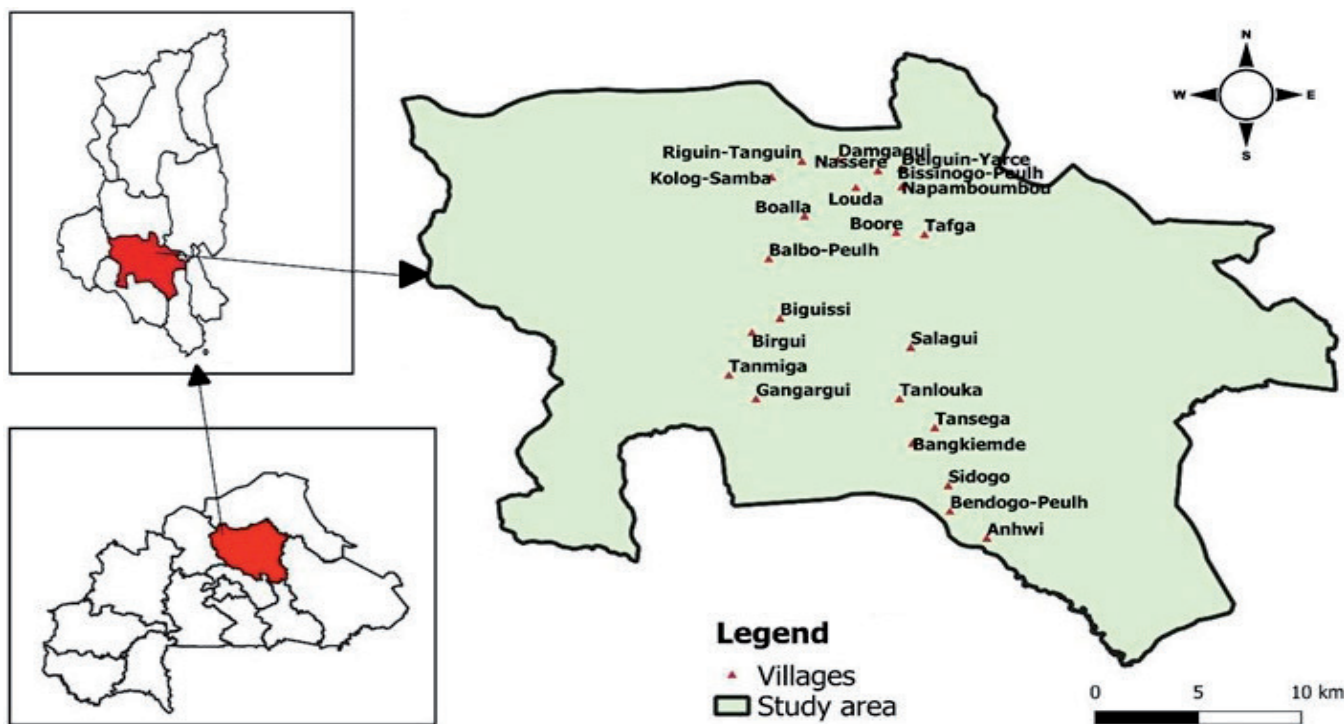


Figure 1: Map of Burkina Faso showing the selected region (green), commune and villages (red) // Carte du Burkina Faso indiquant la région sélectionnée (en vert), la municipalité et les villages (en rouge)

Data collection

A baseline survey was conducted from 27 August to 18 September 2023, involving 483 chicken-keeping households in the 23 selected villages (Table I). The survey collected data on production practices, economic indicators, flock and egg productivity, hygiene and health practices, consumption patterns, and household demographics. The sample size was determined to ensure adequate power for a baseline survey in a randomized controlled trial (RCT) assessing a combined intervention of vaccination and behavioral change communication (RCT results not reported here). Assuming a control group proportion of 0.5, the study aimed to include 175 households in each group. This sample size was calculated to detect a risk ratio (RR) of 1.4 or greater, with 80% power and a 95% confidence interval (CI), resulting in a minimum total sample size of 350 households. Households were selected via simple random sampling. In each village, a census of chicken keepers was conducted by local leaders, and households

Table I: List of villages and sample size in the commune of Bousouma, Burkina Fao /// *Liste des villages et taille de l'échantillon dans la commune de Bousouma, Burkina Faso*

| Village name ¹ | Number of households keeping chickens ² | Number of households sampled ³ | % of households sampled ⁴ |
|---------------------------|--|---|--------------------------------------|
| Bisnogo-peulh | 19 | 2 | 1 |
| Kolog-Samba | 21 | 3 | 1 |
| Anhwi | 31 | 4 | 1 |
| Balbo-peulh | 39 | 5 | 1 |
| Tafga | 47 | 6 | 1 |
| Benogo-peulh | 75 | 9 | 2 |
| Righin-tanghin | 30 | 10 | 2 |
| Tanlouka | 86 | 11 | 2 |
| Tansega | 98 | 12 | 2 |
| Boalla | 108 | 13 | 3 |
| Gangargui | 123 | 15 | 3 |
| Nassere | 59 | 23 | 5 |
| Damgagui | 65 | 24 | 5 |
| Sidogo | 197 | 24 | 5 |
| Salagui | 64 | 25 | 5 |
| Napamboumbou | 70 | 28 | 6 |
| Tamiga | 91 | 29 | 6 |
| Birgui | 242 | 30 | 6 |
| Boore | 90 | 33 | 7 |
| Bangkiemde | 100 | 37 | 8 |
| Delguin yarce | 147 | 37 | 8 |
| Louda | 336 | 41 | 8 |
| Biguissi | 167 | 62 | 12 |
| Total | 2305 | 483 | |

¹ Village name: Name of the village where households were surveyed; ² Number of households keeping chickens: Number of households participating in smallholder poultry production per village; ³ Number of households sampled: Number of poultry-producing households sampled per village; ⁴ % of households sampled: Percentage of poultry-producing households sampled per village /// ¹ *Nom du village : nom du village où les ménages ont été interrogés ;* ² *Nombre de ménages élevant des poulets : nombre de ménages participant à la production avicole à petite échelle par village ;* ³ *Nombre de ménages échantillonnés : nombre de ménages produisant de la volaille échantillonnés par village ;* ⁴ *% de ménages échantillonnés : pourcentage de ménages produisant de la volaille échantillonnés par village*

were randomly drawn from these lists. Where feasible, the number of households surveyed was increased to mitigate potential data loss, yielding the final sample of 483 households (Table I).

Descriptive, multivariate and multiple factor analysis (MFA)

Descriptive analysis focused on characterizing flock management, feeding strategies, disease occurrence, biosecurity and hygiene practices, waste disposal, vaccination knowledge, and access to health inputs among chicken-producing households. Multiple factor analysis (MFA) is a dimensionality reduction technique used to explore relationships among groups of qualitative variables (Escofier & Pages, 1994). It enables graphical representation in Euclidean space of individuals, variables, and variable groups, offering a synthetic overview of the dataset's structure.

MFA treats all variable groups with equal weight, allowing for the detection of underlying dimensions that explain variance across complex, multivariate data. Each factor – defined as a linear combination of variables – is associated with an eigenvalue representing the amount of variance (or inertia) it explains. The first factor captures the most variance, with subsequent factors capturing the remaining unexplained variation. Active variables contribute to axis construction, while supplementary variables are projected onto the factor space to interpret their association with the dimension without influencing factor construction.

For this study, MFA was applied independently to each group of variables. Individual scores were normalized by dividing by the square root of the first eigenvalue to ensure comparability across groups. These normalized datasets were then merged, and a final MFA was conducted in which all groups contributed equally.

The analysis included 29 variables describing management and biosecurity practices. Variables with a response category reported by fewer than 5% of respondents were excluded. For example, if a variable with three response categories (e.g., “always,” “sometimes,” “never”) had fewer than 5% responses in one category (e.g., “always”), it was removed from the analysis to retain only variables with meaningful distributions.

Chicken production and poultry-related income were also classified using quantiles. Production value was divided into five categories, and income was grouped into three categories using the same method.

The MFA was used to identify key biosecurity and management practices that distinguish flock profiles. The number of retained factors was determined based on a scree plot, identifying a point of inflection that separates high eigenvalue factors from low eigenvalue factors. Only the two factors with the largest eigenvalues were retained for interpretation.

Hierarchical cluster analysis (HCA)

The HCA was applied to flock-level MFA scores using Ward's linkage method. This approach groups flocks to minimize within-cluster variance and maximize between-cluster variance. Management practices that significantly distinguished between clusters were identified by calculating test-values (Morineau, 1984).

Data processing, tabulation, and descriptive analyses were performed using Stata 14 (Statistical Software: Release 14, Stata Corp., College Station, TX, USA). Multivariate analyses were performed with statistical software R 4.2.3 (R Development Core Team, 2023), with MFA performed using the *ade4* package (Chessel *et al.*, 2004; Dray *et al.*, 2007).

■ RESULTS

Descriptive statistics

Data on management and biosecurity practices were collected from 483 poultry-producing households. Table II presents the distribution of socio-demographic and flock characteristics across the surveyed households.

Socio-demographic characteristics: The majority of respondents were male household heads (93.8%), most of whom had no formal education (69.8%). Crop farming was the primary activity for most

(79.5%), while only 13.0% identified poultry production as their primary activity. The average flock size was 20 chickens, with men owning more birds (11.8) compared to women (4.6; Table II).

Flock Management: Most (64.2%) households did not confine their chickens at night. Over half of the flocks (53.0%) roosted within compounds, while 18.2% were kept in wooden cages, and 28.8% shared space inside the dwellings of household members. While only 36.0% of farmers did not consistently feed their chickens, relying primarily on letting them scavenge for food, 59.0% of farmers did not provide their chickens water (Table III).

Table II: Socio-demographic characteristics of poultry farmers and flock characteristics // *Caractéristiques sociodémographiques et caractéristiques du troupeau*

| Variable | Category | Frequency (n=483) |
|--|--|-------------------|
| Gender | Female | 6.2% |
| | Male | 93.8% |
| Age group | Young (< 35 years old) | 14.1% |
| | Adults (35 to 65 years old) | 39.5% |
| | Old (> 65 years old) | 46.4% |
| Education | No formal education | 69.8% |
| | Formal education | 17.6% |
| | Adult literacy | 12.6% |
| Marital status | Not married/Divorced/Widowed | 7.5% |
| | Married monogamous | 59.8% |
| | Married polygamous | 32.7% |
| Primary activity | Poultry farming | 13.0% |
| | Crop farming | 79.5% |
| | Other | 7.5% |
| Income from chicken (based XOF per year) | Low income (≤33rd percentile) | 33.5% |
| | Moderate income (34th-66th percentile) | 49.3% |
| | High income (≥67th percentile) | 17.2% |
| Income from chicken in XOF/USD (mean) | | 43844.21/72.1 |
| Years of experience -mean [min-max] | | 17.9 [1 – 70] |
| Age mean [min-max] | | 49.1 [20 – 82] |
| Livestock herd/flock size (mean number of animals) | Small ruminants | 11.7 [0 – 45] |
| | Cattle | 1.0 [20 – 25] |
| | Chickens | 20.6 [1 – 155] |
| | Other | 0.8 [0 – 111] |
| Chicken ownership (mean number of birds) | Men | 11.8 [0 – 138] |
| | Women | 4.6 [0 – 90] |
| | Joint ownership | 1.0 [0 – 60] |
| | Youth | 3.1 [0 – 104] |
| Size of production, based on last 12 months* | [1 ; 10[| 11.2% |
| | [10 ; 20[| 28.8% |
| | [20 ; 30[| 16.6% |
| | [30 ; 40[| 11.6% |
| | [40 ; +[| 31.9% |

*The classification of producers into size categories (Micro, Small, Medium, Large, Very Large) was constructed using quintiles (20% percentiles) of production volume distribution over the last 12 months // *La classification des producteurs en catégories de taille (micro, petite, moyenne, grande, très grande) a été établie à partir des quintiles (20 % des centiles) de la répartition du volume de production au cours des 12 derniers mois.*

Table III: Flock management practices /// *Pratiques de gestion des élevages de volailles*

| Variable | Category | Frequency (n=483) |
|-------------------------|--------------------|-------------------|
| Night-time confinement | No | 64.2% |
| | Yes | 35.8% |
| Location of confinement | Compound | 53.0% |
| | Chicken shelter | 18.2% |
| | Household dwelling | 28.8% |
| Scavenging | No | 64.0% |
| | Yes | 36.0% |
| Access to water | No | 59.0% |
| | Yes | 41.0% |

Biosecurity and hygiene: Key practices, such as the quarantine of new birds, the provision of chicken shelters, the disinfection of feeding equipment, and the disposal of manure and dead animals, were largely absent (Table IV). While 65.4% of households cleaned chicken feces from the compound daily, only 15.3% cleaned feces in the confinement areas with the same frequency. Cleaning in confinement areas was performed once a month or less by 69.2% of respondents. Most farmers used a broom (84.9%) to clean chicken feces, while others used grass, leaves, or ashes. The majority of chicken farmers repurpose chicken feces as crop fertilizer (49.1%); however, few compost the feces (12%). The carcasses of dead birds were either buried (47.4%) or discarded in the bush (53.4%). Hand-washing after handling birds was a common practice (89.4%) among farmers (Table IV).

Disease occurrence and management: A majority (82.8%) of farmers reported disease incidents within their flock in the previous three months. Most farmers (79.5%) did not deworm their birds and

Table IV: Hygiene and biosecurity practices /// *Pratiques d'hygiène et de biosécurité*

| Variable | Category | Frequency (n=483) |
|---|----------------------------------|-------------------|
| Quarantine new flock/birds | No | 85.3% |
| | Yes | 14.7% |
| Regular cleaning of poultry house | No | 71.0% |
| | Yes | 29.0% |
| Disinfecting feeding equipment | No | 88.4% |
| | Yes | 11.6% |
| Cleaning of compound | No | 65.6% |
| | Yes | 34.4% |
| Disposing of dead animals | No | 78.9% |
| | Yes | 21.1% |
| Disposing of chicken feces | No | 71.2% |
| | Yes | 28.8% |
| How often do you clean the chicken feces in their confinement area? | Daily | 15.3% |
| | Weekly | 15.5% |
| | Monthly or less often | 69.2% |
| How do you clean the chicken feces in their confinement area? | Sweep | 85.9% |
| | Other | 14.1% |
| Frequency of cleaning chicken feces in compound | Daily | 65.4% |
| | Weekly | 21.3% |
| | Monthly or less often | 13.3% |
| | Never | 0.0% |
| Type of cleaning chicken feces in compound | Sweep | 84.9% |
| | Other | 15.1% |
| Waste management including disposal of dead birds, feces and bedding | | |
| Burying | No | 52.6% |
| | Yes | 47.4% |
| Disposing in bushes | No | 46.6% |
| | Yes | 53.4% |
| Disposing outside compound (near fence line) | No | 84.1% |
| | Yes | 15.9% |
| Disposing outside compound (far from fence line) | No | 70.4% |
| | Yes | 29.6% |
| Composting for use as fertilizer | No | 88.0% |
| | Yes | 12.0% |
| Using as crop fertilizer | No | 50.9% |
| | Yes | 49.1% |
| Cleaning hands after handling birds or bird feces | Immediately after handling | 89.4% |
| | Immediately after handling/never | 10.6% |

had limited access to veterinary care – only 8.1% consulted community animal health workers (CAHWs). Eight per cent of farmers reporting they vaccinated against ND. Farmers were more likely to obtain pharmaceuticals through CAHWs (71.4%) than veterinarians or para-veterinarians (40.6%). Advice on poultry health came primarily from CAHWs (60.5%), followed by fellow farmers and mass media. However, 9.9% had received training or extension support in the past year, and just 6.6% had access to support services (Table V).

Multiple factor analysis (MFA)

Inertia and variance explained: The global display of the MFA highlights the relative contribution of each variable group to flock

differentiation. Greater inertia on Axes 1 and 2 indicates stronger discriminatory power. The MFA conducted on 483 flocks revealed a total inertia of 1.103. Axis 1 accounted for 12.0% of the variance (inertia = 0.133), Axis 2 for 9.5% (inertia = 0.104). Together, these two axes explained 21.5% of the total variance, providing low but sufficient justification for their use in further analysis. This two-dimensional representation is notably efficient, considering the initial 32 dimensions of the dataset (Figure 2).

Differentiating variables: The most influential practices distinguishing flocks, in order of importance, included: frequency and methods of cleaning the chicken shelter and the household compound; animal health measures such as deworming and quarantining of newly acquired birds; disinfection practices; the disposal of dead birds; and

Table V: Disease occurrence and management /// *Incidence et gestion des maladies*

| Variable | Category | Frequency (n=483) |
|---|-------------------|-------------------|
| Chickens with clinical signs of disease during the last 3 months | No | 17.2% |
| | Yes | 82.8% |
| Practiced Deworming | No | 79.5% |
| | Yes | 20.5% |
| Consult community animal health workers for treatment of sick animals | No | 91.9% |
| | Yes | 8.1% |
| Call a vet for vaccination | No | 78.3% |
| | Yes | 21.7% |
| Aware of fowl pox disease | No | 19.7% |
| | Yes | 80.3% |
| Vaccinate your chicken against ND | No | 19.9% |
| | Yes | 80.1% |
| Pharmaceuticals sourced from veterinarian/para-veterinarian | No | 59.4% |
| | Yes | 40.6% |
| Pharmaceuticals sourced from community animal health worker | No | 28.6% |
| | Yes | 71.4% |
| Clinical signs in flock compatible with disease | Newcastle disease | 59.0% |
| | Fowl pox | 2.7% |
| | Both | 32.5% |
| | Neither | 5.8% |
| Obtain chicken health advice from veterinarian/paraveterinarian | No | 62.5% |
| | Yes | 37.5% |
| Obtain chicken health advice from CAHWs | No | 39.5% |
| | Yes | 60.5% |
| Obtain chicken health advice from fellow farmers | No | 74.9% |
| | Yes | 25.1% |
| Sources of chicken health advice is via mass media (TV/radio) | No | 69.6% |
| | Yes | 30.4% |
| Have received extension visits or training in the last 12 months | No | 90.1% |
| | Yes | 9.9% |
| Have access to any support services available in their local area | No | 93.4% |
| | Yes | 6.6% |

the use of feces as crop fertilizer. In contrast, practices related to the sale of chickens and the use of income generated from these sales for household needs were less influential in differentiating flock profiles.

Hierarchical cluster analysis (HCA)

The HCA, applied to MFA scores using Ward’s method, did not strongly distinguish the clusters of flocks. Figure 3 shows the groupings of flocks based on the first two MFA factors, with each group representing a distinct management profile. The main characteristics of the management profiles are summarized below and detailed in Table VI.

Cluster 1 (Farmers with high flock density and good flock management practices): Farmers in this group demonstrated relatively good management practices, including regular confinement at night and consistent disposal of feces. However, they were less likely to deworm flocks and disinfect the chicken shelter. Their larger flock sizes may necessitate more formalized management routines.

Cluster 2 (Farmers with scavenging chickens, low veterinary input and limited hygiene): These poultry farmers followed more traditional and less extensive practices. Chickens were rarely confined and hygiene practices such as cleaning and disinfection were infrequent. Despite high disease occurrence, there was minimal use of deworming or sanitation. Nevertheless, many farmers in this group vaccinated against ND, indicating some awareness of poultry health.

Cluster 3 (Farmers with low flock density, with poultry farming as major activity, are experienced, but have little or no formal education): This group consisted of experienced farmers, often older and focused primarily on poultry farming. Despite having smaller flocks, they exhibited more advanced biosecurity practices, including deworming, appropriate disposal of manure and dead birds, and frequent consultations with CAHWs. Most had limited or no formal education, suggesting that experience may compensate for formal training in the adoption of good practices.

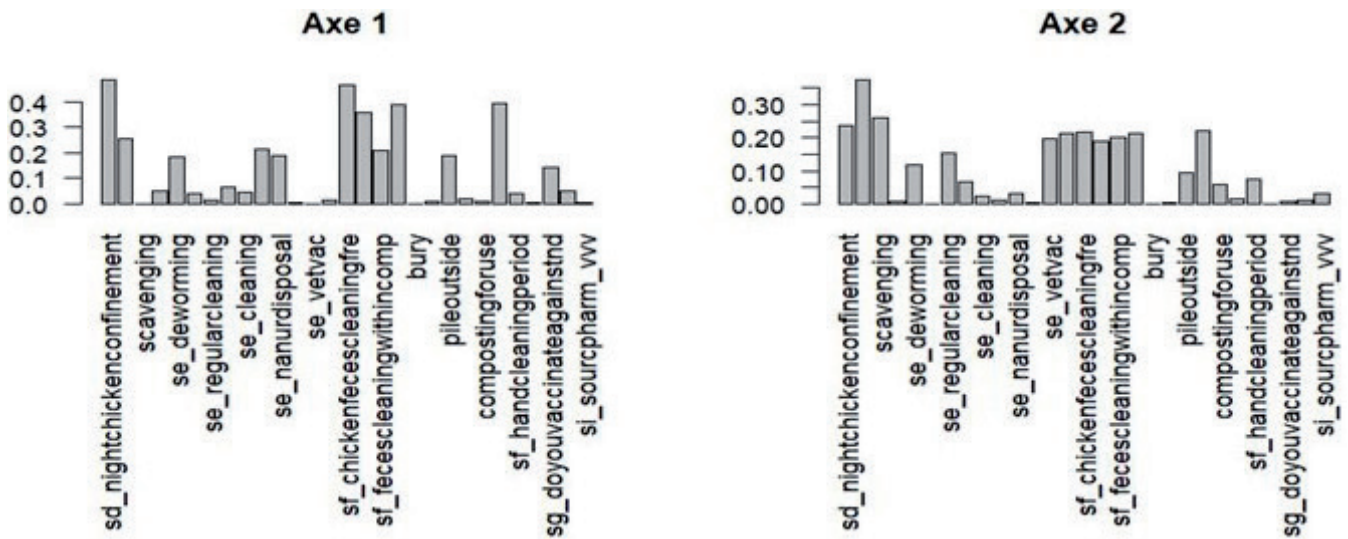


Figure 2: Global display of the two groups of variables on the two first factors of MFAs for all observations /// Représentation des deux groupes de variables sur les deux premiers facteurs des AFM pour toutes les observations

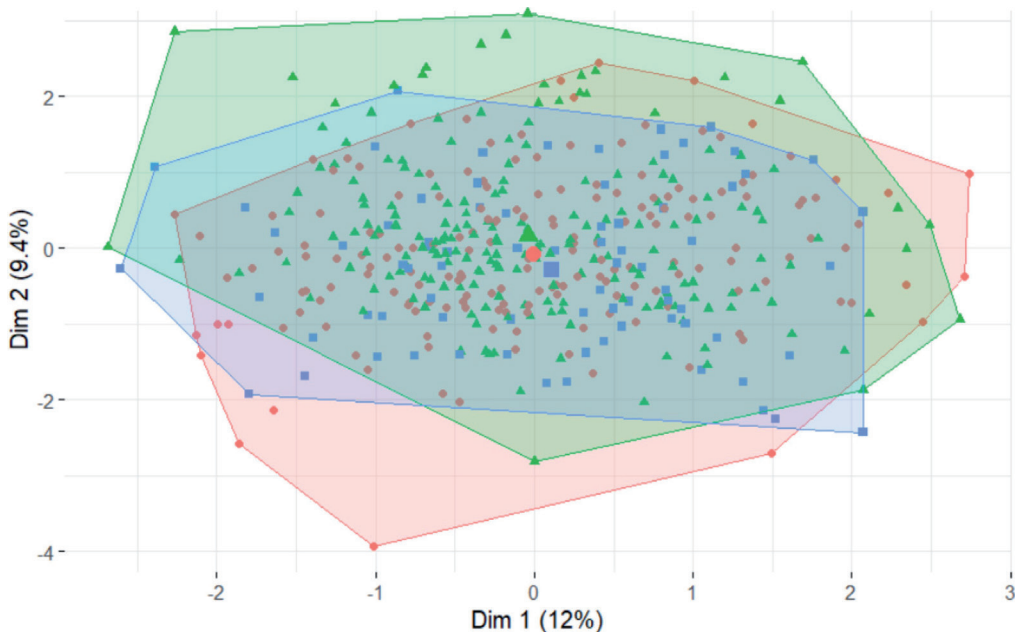


Figure 3: Representation of poultry flocks in the two-dimensional space defined by the first two factors of the MFA performed on all flocks (n = 483). Points represent flocks and the distance between them is an indication of their similarity in terms of biosecurity practices /// Représentation des troupeaux de volailles dans l’espace bidimensionnel défini par les deux premiers facteurs de l’analyse factorielle multiple (AFM) effectuée sur tous les troupeaux (n = 483). Les points représentent les troupeaux et la distance entre eux indique leur similitude en termes de pratiques de biosécurité

Table VI: Management and biosecurity practices (using 29 variables) in the 3 clusters identified with the hierarchical cluster analysis of 483 chicken flocks // Pratiques de gestion et de biosécurité (illustrées par 29 variables) dans les 3 groupes identifiés à l'aide de l'analyse hiérarchique de 483 troupeaux de poulets

| Variable | Cluster 1 (n=180) | Cluster 2 (n=222) | Cluster 3 (n=81) | All (n=483) |
|---|--|----------------------|---------------------|----------------|
| Do you confine your chickens during the night? | No 28 15.6% | 211 95.0% | 71 87.7% | 310 64.2% |
| Yes | 152* 84.4% | 11* 5.0% | 10* 12.3% | 173 35.8% |
| Where do most of your chickens spend the night? | Chicken coop/wooden cage 82* 45.6% | 3* 1.4% | 3* 3.7% | 88 18.2% |
| In shared space with household members | 65 36.1% | 34 15.3% | 40 49.4% | 139 28.8% |
| In the courtyard | 33 18.3% | 185 83.3% | 38 46.9% | 256 53.0% |
| Feeding practice: Scavenging | No 117 65.0% | 114 51.4% | 78 96.3% | 309 64.0% |
| Yes | 63 35.0% | 108* 48.6% | 3* 3.7% | 174 36.0% |
| Health status: Disease occurrence | No 42 23.3% | 40 18.0% | 1 1.2% | 83 17.2% |
| Yes | 138 76.7% | 182 82.0% | 80* 98.8% | 400 82.8% |
| Disease/health: Deworming | No 161 89.4% | 189 85.1% | 34 42.0% | 384 79.5% |
| Yes | 19* 10.6% | 33 14.9% | 47* 58.0% | 99 20.5% |
| Disease/health: Quarantine of new flock/birds | No 127 70.6% | 208 93.7% | 77 95.1% | 412 85.3% |
| Yes | 53* 29.4% | 14* 6.3% | 4* 4.9% | 71 14.7% |
| Disease/health: Regular cleaning of poultry house | No 117 65.0% | 171 77.0% | 55 67.9% | 343 71.0% |
| Yes | 63 35.0% | 51 23.0% | 26 32.1% | 140 29.0% |
| Disease/health: Disinfection of feeding equipment | No 131 72.8% | 221 99.5% | 75 92.6% | 427 88.4% |
| Yes | 49* 27.2% | 1* 0.5% | 6 7.4% | 56 11.6% |
| Disease/health: Cleaning the compound | No 132 73.3% | 147 66.2% | 38 46.9% | 317 65.6% |
| Yes | 48 26.7% | 75 33.8% | 43* 53.1% | 166 34.4% |
| Disease/health: Disposal of dead animals | No 163 90.6% | 178 80.2% | 40 49.4% | 381 78.9% |
| Yes | 17* 9.4% | 44 19.8% | 41* 50.6% | 102 21.1% |
| Disease/health: Manure disposal | No 136 75.6% | 179 80.6% | 39 48.1% | 354 73.3% |
| Yes | 44 24.4% | 43* 19.4% | 52* 64.2% | 139 28.8% |
| Disease/health: Animal health workers for treatment of sick animals | No 166 92.2% | 212 95.5% | 66 81.5% | 444 91.9% |
| Yes | 14 7.8% | 10 4.5% | 15* 18.5% | 39 8.1% |
| Disease/health: Call a vet for vaccination | No 155 86.1% | 148 66.7% | 75 92.6% | 378 78.3% |
| Yes | 25* 13.9% | 74* 33.3% | 6* 7.4% | 105 21.7% |
| Disease/health: Providing water | No 109 60.6% | 116 52.3% | 60 74.1% | 285 59.0% |
| Yes | 71 39.4% | 106 47.7% | 21* 25.9% | 198 41.0% |
| How often do you clean the chicken feces in their confinement area? | Daily 64* 35.6% | 4* 1.8% | 6* 7.4% | 74 15.3% |
| Weekly | 72 40.0% | 2 0.9% | 1 1.2% | 75 15.5% |
| Monthly or less | 44 24.4% | 216 97.3% | 74 91.4% | 334 69.2% |

Table VI (continued): Management and biosecurity practices (using 29 variables) in the 3 clusters identified with the hierarchical cluster analysis of 483 chicken flocks // *Pratiques de gestion et de biosécurité (illustrées par 29 variables) dans les 3 groupes identifiés à l'aide de l'analyse hiérarchique de 483 troupeaux de poulets*

| Variable | Cluster 1 (n=180) | Cluster 2 (n=222) | Cluster 3 (n=81) | All (n=483) |
|--|----------------------|----------------------|---------------------|----------------|
| How do you clean the chicken feces in their confinement area? | | | | |
| Sweep | 178* | 210* | 27* | 415 |
| Other | 2 | 12 | 54 | 68 |
| How often do you clean the feces within the compound (in addition to the family sleeping rooms)? | | | | |
| Daily | 108* | 192* | 16* | 316 |
| Weekly | 56 | 23 | 24 | 103 |
| Monthly or less | 16 | 7 | 41 | 64 |
| How do you clean the chicken feces within the compound? | | | | |
| Sweep | 177* | 211* | 22* | 410 |
| Other | 3 | 11 | 59 | 73 |
| Bury | | | | |
| No | 106 | 100 | 48 | 254 |
| Yes | 74 | 122 | 33 | 229 |
| Throw in the bush | | | | |
| No | 82 | 117 | 26 | 225 |
| Yes | 98 | 105 | 55* | 258 |
| Pile outside the compound, but near the fence | | | | |
| No | 163 | 204 | 39 | 406 |
| Yes | 17* | 18* | 42* | 77 |
| Throw into the environment (outside the compound) | | | | |
| No | 142 | 128 | 70 | 340 |
| Yes | 38* | 94* | 11* | 143 |
| Composting for use as fertilizer | | | | |
| No | 171 | 173 | 81 | 425 |
| Yes | 9* | 49* | 0* | 58 |
| Use as fertilizer in the crop field | | | | |
| No | 43 | 130 | 73 | 246 |
| Yes | 137* | 92 | 8* | 237 |
| When do you clean your hand after handling birds and their waste | | | | |
| Immediately after handling | 176* | 178* | 78 | 432 |
| Only before eating/Never | 4 | 44 | 3 | 51 |
| Are you aware of fowl pox (use local name)? | | | | |
| No | 39 | 37 | 19 | 95 |
| Yes | 141 | 185 | 62 | 388 |
| Do you vaccinate your chickens against Newcastle disease? | | | | |
| No | 16 | 42 | 38 | 96 |
| Yes | 164* | 180 | 43* | 387 |
| Sources of pharmaceuticals: Veterinarian/para-veterinarian | | | | |
| No | 134 | 118 | 35 | 287 |
| Yes | 46* | 104 | 46* | 196 |
| Sources of pharmaceuticals: Community Animal Health Worker | | | | |
| No | 53 | 72 | 13 | 138 |
| Yes | 127 | 150 | 68* | 345 |

*Significant

■ DISCUSSION

Key findings and their implications

This study used multivariate and cluster analysis to identify patterns in the management and biosecurity practices of village chicken farmers in the Central-Northern region of Burkina Faso. Our results revealed three slightly differentiated clusters of farmer practices. Overall, clusters differed in flock size, sanitation practices, animal health practices, and reliance on community animal health services. The practices that most differentiated clusters among farmers were the frequency and method of cleaning chicken shelters and household compounds, disinfection and deworming practices, the disposal of dead birds, and the use of manure as fertilizer. In contrast, practices related to poultry sales and the use of income generated by these sales were less decisive in separating producer profiles.

The first cluster comprised farmers with larger flock sizes and overall good sanitation practices, such as confining chickens at night and regular feces removal. However, they were less likely to disinfect the chicken shelters or deworm the birds. The second cluster represented traditional, low-input farmers with minimal confinement, hygiene, or veterinary care, despite high disease occurrence. The final cluster included older, more experienced producers who focused primarily on poultry to secure their livelihoods, demonstrated better biosecurity practices, and were more likely to consult CAHWs. Notably, these differences were not associated with economic outputs or marketing behaviors (frequency of sales, the type of buyers and the reason for the sale), but with waste management, hygiene, and access to health services, offering critical entry points for One Health interventions.

Waste management and hygiene

In this study, the waste management and hygiene measures implemented by most of the participating farmers were generally weak. The cleaning of poultry shelters and confinement areas was infrequent, while compound-level cleaning - often motivated by household aesthetics or odor control - was more commonly practiced. Most producers relied on basic cleaning tools such as brooms or brushes, and few engaged in any form of disinfection. Additionally, manure was frequently dumped in nearby bushes or applied directly to fertilize crops without being composted. Such practices pose environmental and zoonotic risks due to potential pathogen transmission between chickens, humans, other domestic animals, and wildlife. Poultry feces can harbor a range of zoonotic agents, including *Salmonella*, *Campylobacter*, and *Escherichia coli*. When improperly managed, these can contaminate household environments, water sources, and food systems (Carrique-Mas & Bryant, 2013; FAO, 2016). In Burkina Faso and other West African countries, the proximity of animals to human dwellings - particularly in scavenging systems - has been linked to elevated microbial loads within household compounds and water reservoirs, increasing the risk of enteric disease in children under five (Headey & Palloni, 2019). Free-roaming birds also often encounter wild avian populations and contaminated surfaces, facilitating the maintenance and spread of avian influenza and other diseases (Koch & Elbers, 2006; Conan *et al.*, 2012).

Vaccination

Although 80.1% of farmers reported vaccinating their chickens against ND, disease occurrence remained high. ND is one of the most significant endemic poultry diseases in sub-Saharan Africa, with unvaccinated flock mortality rates often exceeding 50–100% (Dimitrov *et al.*, 2016). In many African countries, ND outbreaks have been associated with substantial economic losses (FAO, 2022). The persistence of ND-like symptoms despite reported vaccination raises concerns about vaccine quality, improper handling or cold

chain failures, incorrect timing of vaccine administration, or misdiagnosis with other diseases presenting similar clinical signs, such as fowl cholera or highly pathogenic avian influenza (HPAI), which has previously affected the region (Koch & Elbers, 2006). Although 80.3% of respondents reported being able to recognize the clinical signs of fowl pox, this knowledge did not consistently lead to preventive measures. Most farmers chose not to vaccinate against fowl pox, citing the disease's low perceived mortality and its limited impact on productivity as reasons for this decision. This situation reflects a gap between awareness and behavior, and highlights the importance of health communication strategies that are not only informative but also aligned with farmers' perceptions, priorities, and decision-making processes.

Access to health services

Access to professional veterinary care remains limited among poultry farmers. Only 8.1% of respondents reported consulting a CAHW, even though CAHWs are the most common source of poultry health advice overall, with 60.5% of farmers mentioning them. Most respondents (71.4%) obtained pharmaceuticals through CAHWs, while only 40.6% sourced medications from veterinarians or para-veterinarians.

This pattern reflects a broader trend in many low- and middle-income countries (LMICs), where formal veterinary infrastructure is under-resourced, and CAHWs serve as the de facto frontline for animal health services, especially in rural and remote areas (Leyland *et al.*, 2014). CAHWs play a critical role in administering vaccines, providing basic treatments, and delivering advisory services for poultry and small ruminants (WOAH, 2024). However, the effectiveness of CAHWs is often undermined by limited training, lack of supervision, and inconsistent access to quality-assured medicines (Catley *et al.*, 2004).

One of the primary challenges in rural areas is the shortage of veterinary professionals (Liwei, 2025). Then farmers often turn to informal networks or rely on previous experience, which can lead to inappropriate treatments, misuse of antibiotics, or failure to manage disease outbreaks effectively (Sawadogo *et al.*, 2023). Tailoring interventions for specific farmers can reduce poverty, and enhance agricultural and environmental sustainability (Touch *et al.*, 2024).

These findings suggest that strengthening CAHW systems - through improved training curricula, regular supervision, and reliable supply chains - could greatly enhance the reach and reliability of poultry health services. Integrating CAHWs more formally into veterinary public health frameworks has been shown to improve disease detection and vaccine delivery outcomes, particularly in resource-limited settings (Catley *et al.*, 2004). From a One Health perspective, empowering community-based health actors is essential not only for animal welfare and productivity, but also for reducing zoonotic transmission risks and building more resilient rural health systems.

Barriers to change

Despite the growing awareness of poultry-related health risks, the limited adoption of biosecurity measures among smallholder poultry farmers in Burkina Faso and similar settings continues to be a challenge (Ajewole & Akinwumi, 2014; Otieno *et al.*, 2023). Management practices range from bird confinement to disinfection of housing and tools, but these are frequently perceived as impractical, unaffordable, or incompatible with free-range production systems that dominate rural settings. For instance, night-time confinement requires investment in shelters and supplemental feeding, both of which incur financial and labor costs. Access to disinfectants and veterinary-grade cleaning products is often limited or prohibitively

expensive, particularly in remote areas with underdeveloped agro-veterinary markets (Dione *et al.*, 2020).

Compounding these constraints is that free-range poultry keeping is widely practiced across sub-Saharan Africa and is deeply embedded in rural livelihoods and culture. However, this practice increases exposure to pathogens from the environment, other animals, and humans, augmenting the risk of disease outbreaks (Dione *et al.*, 2018). In such systems, changes to established practices are not merely technical decisions but complex trade-offs involving labor, household economics, and cultural norms.

This highlights the need for interventions that are not only biologically effective but also socio-economically feasible and socially acceptable (Otte *et al.* 2023). As Otte *et al.* (2023) argue, biosecurity practices can have strong positive externalities - such as reducing zoonotic disease spillover - and thus may justify public investment or subsidies to promote wider adoption. For example, pilot programs in Uganda have shown that subsidizing biosecurity kits and linking them to training on pig health can significantly improve uptake and reduce flock mortality (Dione *et al.*, 2020).

Moreover, effective change depends on how information is communicated and by whom. Research in Nigeria, Kenya, and Tanzania consistently shows that training delivered by trusted local actors – such as CAHWs or experienced peer farmers – is more likely to result in sustained behavior change than externally led campaigns alone (Ajewole & Akinwumi, 2014). Community-based, participatory approaches that integrate local knowledge and highlight tangible benefits like reduced losses or improved household income have been especially successful in generating interest from stakeholders (Boyd, 2014).

To foster meaningful change, future efforts should therefore integrate social, economic, and behavioral insights into the design of poultry health interventions. Building partnerships between public health actors, local governments, and farming communities will be critical for ensuring that biosecurity becomes not only technically sound, but also practical, affordable, and locally owned.

Study limitations

This study relied on self-reported data, which can introduce recall and social desirability bias. Farmers may overstate adherence to recommended practices, particularly regarding vaccination or cleaning routines. Direct observational methods would have enhanced data accuracy; however, these were not feasible due to logistical constraints, including security issues and resource limitations. Nevertheless, survey tools were developed by researchers familiar with the local context and administered by trained enumerators fluent in the local languages. Enumerators also explained the purpose of the study and emphasized the non-judgmental nature of the data collection to minimize response bias.

In addition, the village sampling was not proportionate to the population size. Although this could affect population-level estimates, it does not compromise the internal structure required for multivariate analysis, which aims to describe behavioral typologies rather than generate nationally representative estimates. As such, our findings offer valid insights into the diversity of management practices within rural settings.

Numerous One Health studies have emphasized that the full spectrum of the animal–human–environment interface must be addressed to improve health outcomes in these rural settings. Interventions targeting only one domain – such as veterinary services – without addressing environmental hygiene are unlikely to achieve sustained impact (Zinsstag *et al.*, 2011; Destoumieux-Garzón *et al.*, 2018). Instead, holistic and locally adapted strategies are needed to strengthen waste

management, promote feasible hygiene practices, and reduce the risk of pathogen transmission both within households and in the wider community.

We assume that practices are more likely to differ between regions (due to factors such as population density, climate, other agricultural activities, access to materials/buildings, etc.). As all farms in our study were selected from the same commune, and therefore were more likely to also have similar access to markets, this may have reduced the level of differentiation among clusters.

CONCLUSION

Strengthening smallholder poultry systems is not a matter of applying uniform solutions, but of recognizing and responding to the diversity of farmer practices, capacities, and constraints. This study's identification of farmer profiles for flock management and biosecurity suggests a need for tailored interventions rather than one-size-fits-all approaches.

The persistence of hygiene and health service gaps - despite relatively reported high vaccinations rates - reflects broader systemic and behavioral challenges that cannot be addressed by knowledge transfers alone. Effective change requires context-specific strategies that are economically feasible, culturally acceptable, and aligned with farmers' realities.

From a One Health perspective, these findings show the importance of differentiated, locally embedded solutions that integrate animal, human, and environmental health. Strategic management of poultry health in such settings must be grounded in community engagement, decentralized service delivery, and the co-design of interventions that offer clear value to farmers while advancing public health goals. By embracing complexity and heterogeneity, One Health initiatives can move from reactive control to proactive resilience, and build stronger, more equitable systems for health and livelihoods.

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Conflicts of interest

The study was carried out without any conflict of interest.

Author contributions

MD: Funding acquisition, conceptualization, methodology, supervision, formal analysis, writing original draft; CG: Funding acquisition, methodology, writing review & editing; AK: Supervision, writing

review & editing; AAO: Formal analysis, validation; RA: Funding acquisition, conceptualization, methodology; GI: Investigation, writing review & editing; BO: Investigation, writing review & editing, validation; TKJ: Funding acquisition, conceptualization.

Ethical considerations

This study was approved by the International Livestock Research Institute Institutional Research Ethics Committee under reference ILRI-IREC2022-57, and the National Ethical Committee for Health Research of Burkina Faso under reference 2022-11-232.

Data availability

The data were not deposited in an official repository. The data that support the study findings are available from the authors upon request.

Declaration of Generative AI in the writing process

The authors did not use any artificial intelligence-assisted technologies in the writing process.

REFERENCES

- Ajewole, O. C., & Akinwumi, A. A. (2014). Awareness and Practice of Biosecurity Measures in Small Scale Poultry Production in Ekiti State, Nigeria. *IOSR Journal of Agriculture and Veterinary Science* 7(11), 24-29. <https://doi.org/10.9790/2380-071112429>
- Alders, R. G., & Pym, R. A. E. (2009). Village poultry: still important to millions, eight thousand years after domestication. *World's Poultry Science Journal*, 65(2), 181-190. <https://doi.org/10.1017/S0043933909000117>
- Boyd, M. R. (2014). 24 Community-Based Research: Understanding the Principles, Practices, Challenges, and Rationale. In: Leavy, P. (ed). *The Oxford Handbook of Qualitative Research* (pp. 498-517). Oxford Academic. <https://doi.org/10.1093/oxfordhb/9780199811755.013.006>
- Carrique-Mas, J. J., & Bryant, J. E. (2013). A review of foodborne bacterial and parasitic zoonoses in Vietnam. *Ecohealth*, 10(4), 465-489. <https://doi.org/10.1007/s10393-013-0884-9>
- Catley, A., Chibunda, R. T., Ranga, E., Makungu, S., Magayane, F. T., Magoma, G., Madege, M. J., Vosloo, W. (2004). Participatory diagnosis of a heat-intolerance syndrome in cattle in Tanzania and association with foot-and-mouth disease. *Preventive Veterinary Medicine*, 65(1-2), 17-30. <https://doi.org/10.1016/j.prevetmed.2004.06.007>
- CEVA. (2022). Le Poulet du Faso, 2016-2021. Improving traditional poultry genetics and health in Burkina Faso. https://www.ceva.com/wp-content/uploads/2022/09/POULET-DU-FASO_Lien-vid%C3%A9o%81oL.pdf
- Chessel, D., Dufour, A. B., & Thioulouse, J. (2004). The ade4 package. I. Onetable methods. *R News*, 4, 5-10. <https://pbil.univ-lyon1.fr/JTHome/ref/ade4-Rnews.pdf>
- Conan, A., Goutard, F. L., Sorn, S., & Vong, S. (2012). Biosecurity measures for backyard poultry in developing countries: a systematic review. *BMC Veterinary Research*, 8(1), 240. <https://doi.org/10.1186/1746-6148-8-240>
- Desta, T. T. (2020). Indigenous village chicken production: a tool for poverty alleviation, the empowerment of women, and rural development. *Tropical Animal Health and Production*, 53(1), 1. <https://doi.org/10.1007/s11250-020-02433-0>
- Destoumieux-Garzón, D., Mavingui, P., Boetsch, G., Boissier, J., Darriet, F., Duboz, P., Fritsch, C., et al. (2018). The One Health Concept: 10 Years Old and a Long Road Ahead. *Frontiers in Veterinary Science*, 5, 14. <https://doi.org/10.3389/fvets.2018.00014>
- Dimitrov, K. M., Ramey, A. M., Qiu, X., Bahl, J., & Afonso, C. L. (2016). Temporal, geographic, and host distribution of avian paramyxovirus 1 (Newcastle disease virus). *Infection, Genetics and Evolution*, 39, 22-34. <https://doi.org/https://doi.org/10.1016/j.meegid.2016.01.008>
- Dione, M., Masembe, C., Akol, J., Amia, W., Kungu, J., Lee, H. S., Wieland, B. (2018). The importance of on-farm biosecurity: Sero-prevalence and risk factors of bacterial and viral pathogens in smallholder pig systems in Uganda. *Acta Tropica*, 187, 214-221. <https://doi.org/10.1016/j.actatropica.2018.06.025>
- Dione, M., Dohoo, I., Ndiwa, N., Poole, J., Ouma, E., Amia, W. C., Wieland, W. (2020). Impact of participatory training of smallholder pig farmers on knowledge, attitudes and practices regarding biosecurity for the control of African swine fever in Uganda. *Transboundary and Emerging Diseases*, 67(6), 2269-3076. <https://doi.org/10.1111/tbed.13587>
- Dione, M., Diarra, S., Ilboudo, G., Konkobo-Yameogo, C., Lallogo, V. R., Roesel, K., Grace, D., et al. (2021). Value chain assessment of animal-source foods and vegetables in Ouagadougou, Burkina Faso—Considering food safety, quality and hygiene perceptions and practices. ILRI Research Report 87. Nairobi, Kenya: ILRI. <https://hdl.handle.net/10568/117352>
- Dray, S., Dufour, A. B., & Chessel, D. (2007). The ade4 package. II. Two-table and K-table methods. *R News*, 7, 47-52. <https://cran.r-project.org/web/packages/ade4/ade4.pdf>
- Escofier, B., & Pages, J. (1994). Multiple factor analysis (Afmult Package). *Computational Statistics & Data Analysis*, 18(1), 121-140. [https://doi.org/10.1016/0167-9473\(94\)90135-X](https://doi.org/10.1016/0167-9473(94)90135-X)
- Otieno, W. A., Nyikal, R., Mbogoh, S. G., Rao, E. J. O. (2023). Adoption of farm biosecurity practices among smallholder poultry farmers in Kenya – An application of latent class analysis with a multinomial logistic regression. *Preventive Veterinary Medicine*, 217, 105967. <https://doi.org/10.1016/j.prevetmed.2023.105967>
- FAO. (2016). Drivers, dynamics and epidemiology of antimicrobial resistance in animal production. FAO Animal Production and Health Report No. 7. Rome. <https://www.fao.org/3/i6209e/i6209e.pdf>
- FAO. (2022). Farmer field schools for family poultry producers – A practical manual for facilitators. FAO, IFAD. <https://openknowledge.fao.org/server/api/core/bitstreams/f0d77416-8a74-44e0-8455-891a0b1ead8f/content>
- Gelli, A., Becquey, E., Ganaba, R., Headey, D., Hidrobo, M., Huybregts, L., Verhoef, H., et al. (2017). Improving diets and nutrition through an integrated poultry value chain and nutrition intervention (SELEVER) in Burkina Faso: study protocol for a randomized trial. *Trials*, 18(1), 412. <https://doi.org/10.1186/s13063-017-2156-4>
- Headey, D., & Palloni, G. (2019). Water, Sanitation, and Child Health: Evidence From Subnational Panel Data in 59 Countries. *Demography*, 56(2), 729-752. <https://doi.org/10.1007/s13524-019-00760-y>
- Hilmi, M., Dolberg, F., & Alders, R. (2011). Products and profits from poultry. Diversification booklet number 3 Second edition. Rural Infrastructure and Agro-Industries Division, Food and Agriculture Organization of the United Nations Rome. <https://openknowledge.fao.org/server/api/core/bitstreams/acebabd6-2d3a-47f2-b449-2dd856bd453a/content>
- ILRI. (2022). Poultry losses and One Health (POLOH): Reducing losses and zoonotic risks along the Burkina Faso poultry value chain through a One Health approach. <https://www.ilri.org/research/projects/poultry-losses-and-one-health-poloh-reducing-losses-and-zoonotic-risks-along>
- Koch, G., & Elbers, A. R. W. (2006). Outdoor ranging of poultry: a major risk factor for the introduction and development of High-Pathogenicity Avian Influenza. *NJAS - Wageningen Journal of Life Sciences*, 54(2), 179-194. [https://doi.org/https://doi.org/10.1016/S1573-5214\(06\)80021-7](https://doi.org/https://doi.org/10.1016/S1573-5214(06)80021-7)
- Leyland, T., Lotira, R., Abebe, D., Bekele, G., & Catley, A. (2014). Community-based Animal Health Workers in the Horn of Africa: An Evaluation for the US Office for Foreign Disaster Assistance. Feinstein International Center, Tufts University Africa Regional Office, Addis Ababa and Vetwork UK. https://fic.tufts.edu/wp-content/uploads/TUFTS_1423_animal_health_workers_V3online.pdf
- Liwei, M. (2025). Improving access to veterinary care in rural and underserved areas: Challenges and solutions. *Journal of Veterinary Medicine and Allied Science*, 9(1), 175. <https://www.alliedacademies.org/articles/improving-access-to-veterinary-care-in-rural-and-underserved-areas-challenges-and-solutions.pdf>
- Morineau, A. (1984). Note sur la caractérisation statistique d'une classe et les valeurs tests. *Bulletin Technique du Centre de Statistique et d'informatique appliquées*, 2(1-2), 20-27. <https://pdfcoffee.com/valeur-test-critere-de-caracterisation-statistique-pdf-free.html>
- MRA. (2005). Les statistiques du secteur de l'élevage au Burkina Faso. Service des statistiques animales. Direction des études et de la planification, Ministère des ressources animales, Ouagadougou, Burkina Faso. 39 p. http://www.cns.bf/IMG/pdf/SE_2005.pdf
- MRA. (2008). Statistiques du secteur de l'élevage de la Direction des statistiques animales, Ministère des ressources animales, Ouagadougou, Rapport, Burkina Faso. 39 p.
- MRA. (2010). Politique Nationale de Développement Durable de l'Élevage au Burkina Faso 2010-2025. Ministère des Ressources Ouagadougou, Rapport, Burkina Faso. Animales. <https://faolex.fao.org/docs/pdf/bkf146068.pdf>
- PNUD. (2016). Rapport sur le développement humain 2016. Rapport du PNUD, 43 p. <http://www.undp.org>

Pousga, S., & Boly, H. (2009). Overview of research on poultry in Burkina Faso. *Family Poultry*, 18(1-2).

Sawadogo, A., Kagambèga, A., Moodley, A., Ouedraogo, A. A., Barro, N. & Dione, M. (2023). Knowledge, attitudes, and practices related to antibiotic use and antibiotic resistance among poultry farmers in urban and peri-urban areas of Ouagadougou, Burkina Faso. *Antibiotics*, 12(1), 133. <https://doi.org/10.3390/antibiotics12010133>

Sodjinou, E. A., Henningsen, D. O., Koudande, D. O., Biaou, G., & Mensah, G. A. (2015). Consumers' preferences for «bicycle poultry» in Benin: Implications for the design of breeding schemes. *Revue d'Études en Agriculture et Environnement*, 96(3), 389-409. https://www.persee.fr/doc/reae_1966-9607_2015_num_96_3_2202

Touch, V., Tan, D. K. Y., Cook, B. R., Liu, D. L., Cross, R., Tran, T. A., Utomo, A., et al. (2024). Smallholder farmers' challenges and opportunities: Implications for agricultural production, environment and food security. *Journal of Environmental Management*, 370, 122536. <https://doi.org/10.1016/j.jenvman.2024.122536>

WOAH. 2024. *Competency and Curriculum Guidelines for Community Animal Health Workers*. World Organisation for Animal Health. <https://doi.org/10.20506/woah.3535>

Zinsstag, J., Schelling, E., Waltner-Toews, D., & Tanner, M. (2011). From "one medicine" to "one health" and systemic approaches to health and well-being. *Preventive Veterinary Medicine*, 101(3-4), 148-156. <https://doi.org/10.1016/j.prevetmed.2010.07.003>

Résumé

Dione M., Ganser C., Kagambèga A., Ouedraogo A.A., Alders R., Ildoudo G., Ouedraogo B., Knight-Jones T. Pratiques de gestion et de biosécurité dans les élevages villageois de poulets dans la région Centre-Nord du Burkina Faso

Contexte : L'amélioration de la gestion, de l'élevage, de la biosécurité et des pratiques d'hygiène des poulets a le potentiel de sécuriser et d'améliorer les moyens de subsistance des petits exploitants grâce à une augmentation de la production pour la vente et la consommation domestique, et à une réduction de l'exposition aux agents pathogènes zoonotiques d'origine alimentaire et environnementale. Souvent, les interventions visant à améliorer l'hygiène et la productivité des troupeaux ne sont pas adaptées de manière adéquate pour obtenir un impact maximal avec des ressources limitées. **Objectif** : Cette étude a permis de déterminer les profils socio-économiques de 483 producteurs villageois de poulets, ainsi que leurs pratiques de gestion et de biosécurité, dans 23 villages en milieu rural traditionnel au Burkina Faso. **Méthodes** : L'analyse multifactorielle (AMF) a été réalisée sur 29 variables représentant les principaux aspects des pratiques de gestion et de biosécurité qui font la distinction entre les troupeaux. Une analyse hiérarchique par grappes (AHC) a été effectuée sur les scores d'AMF du troupeau, à l'aide des critères de couplage de Ward. **Résultats** : Les résultats ont révélé trois types d'élevage associés aux pratiques d'élevage de poulets, à la gestion des déchets et aux pratiques de contrôle des maladies. Bien que le regroupement ait été faible, les pratiques qui différenciaient les pratiques de gestion des troupeaux, par ordre décroissant d'importance, étaient la fréquence et les méthodes de nettoyage des abris des poules et des cours des maisons ; les pratiques de santé animale, telles que le déparasitage et la mise en quarantaine des oiseaux nouvellement achetés, l'élimination des oiseaux morts et l'utilisation d'excréments comme engrais pour les cultures. En revanche, les variables liées à l'achat et à la vente de poulets, ainsi qu'à l'utilisation des revenus de vente, sont moins déterminantes pour différencier les pratiques de gestion des troupeaux. **Conclusions** : Cette compréhension permet de concevoir des interventions ciblées alignées sur les besoins distincts de chaque groupe de gestion des troupeaux, plutôt que de s'appuyer sur une approche unique. Les résultats de cette étude éclaireront l'élaboration de stratégies spécifiques au contexte et économes en ressources pour renforcer la biosécurité dans les systèmes de production villageoise de poulet dans les zones rurales du Burkina Faso.

Mots-clés : volaille, sécurité alimentaire, petite agriculture, méthode d'élevage, Burkina Faso

Resumen

Dione M., Ganser C., Kagambèga A., Ouedraogo A.A., Alders R., Ildoudo G., Ouedraogo B., Knight-Jones T. Prácticas de gestión y bioseguridad en las aves de corral de las aldeas de la región centro-norte de Burkina Faso

Contexto: La mejora en la gestión, la cría, la bioseguridad y las prácticas de higiene de los pollos puede asegurar y mejorar los medios de subsistencia de los pequeños agricultores gracias a un aumento en la producción para la venta y el consumo doméstico, y a una reducción de la exposición a los agentes patógenos zoonóticos de origen alimentario y ambiental. A menudo, las intervenciones que pretenden mejorar la higiene y la productividad de los rebaños no se adaptan de la manera adecuada para obtener el máximo efecto con recursos limitados. **Objetivo**: Este estudio ha permitido determinar los perfiles socioeconómicos de 483 productores, así como sus prácticas de gestión y bioseguridad, en 23 aldeas del medio rural tradicional de Burkina Faso. **Métodos**: Se realizó un análisis multifactorial (AMF) de 29 variables, que representan los principales aspectos de las prácticas de gestión y bioseguridad para distinguir a los rebaños. Se analizaron jerárquicamente por grupos (AHC) los resultados del AMF del rebaño, utilizando los criterios de acoplamiento de Ward. **Resultados**: Los resultados revelaron tres grupos asociados a las prácticas de cría de pollos, a la gestión de los residuos y a las prácticas de control de enfermedades. Aunque el agrupamiento resultó reducido, las prácticas que diferencian la gestión de los rebaños, por orden decreciente de importancia, fueron: la frecuencia y los métodos de limpieza de los gallineros y los patios de las casas; las prácticas relacionadas con la salud animal, tales como la desparasitación y la puesta en cuarentena de las aves acabadas de comprar, la eliminación de las aves muertas y el uso de excrementos como abono para los cultivos. En cambio, las variables relacionadas con la compra y la venta de pollos, así como la utilización de los ingresos obtenidos con la venta, son menos determinantes para diferenciar las prácticas de gestión de los rebaños. **Conclusiones**: Entender esto permite concebir intervenciones focalizadas para las diferentes necesidades de cada grupo de gestión de rebaño, en lugar de basarse en un enfoque único. Los resultados del estudio servirán para elaborar estrategias específicas para el contexto y ahorradoras de recursos con el objetivo de reforzar la bioseguridad en los sistemas de producción de pollos en las aldeas de las zonas rurales de Burkina Faso.

Palabras clave: ave de corral, seguridad alimentaria, pequeña explotación, método de crianza, Burkina Faso

