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Assessment of the Status and Challenges of Broiler Chicken Farming in Maidan Wardak Province, Afghanistan

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Abstruct

The Raising broiler chickens is essential for rural employment, economic development, and food security. This cross-sectional survey study assessed the status and challenges of broiler chicken farming in Maidan Wardak Province, Afghanistan, with a focus on farm physical infrastructure, feed management, and farmers' technical knowledge. A standardized questionnaire was administered to 104 broiler farm owners. Data were analyzed using descriptive statistics and Pearson correlation analysis in SPSS version 27. The results showed that most farms had generally satisfactory physical infrastructure conditions (mean = 3.80 ± 0.81), providing a relatively stable environment for poultry production, biosecurity, and health management. However, feed-related challenges remained moderate (mean = 2.35 ± 0.70), primarily due to high feed costs, limited availability, and inconsistent feed quality. Farmers' technical knowledge was also moderate (mean = 2.73 ± 0.83), reflecting limited access to formal education and training opportunities. Correlation analysis indicated significant positive relationships between farmers' technical knowledge and both physical infrastructure management and feed-related practices. The study concludes that improving farmer training programs, strengthening veterinary and extension services, and ensuring a reliable supply of quality feed are critical for enhancing broiler farm productivity and sustainability in Maidan Wardak Province. These findings provide evidence-based guidance for policymakers and agricultural development programs aimed at supporting sustainable poultry production in Afghanistan.

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INTRODUCTION

One of the most vibrant and quickly growing livestock subsectors globally is the production of broiler chickens, especially in developing countries where the need for reasonably priced animal protein is still growing (FAO, 2020). Broiler chickens have a number of benefits over other livestock species, such as short production cycles, quick growth rates, excellent feed

conversion efficiency, and comparatively minimal investment needs. For small and medium-sized farmers looking for rapid financial gains and reduced production risks, these features make broiler farming a desirable agricultural activity (Scanes, 2007; Mottet & Tempio, 2017). Therefore, both rural and peri-urban areas benefit greatly from broiler production in terms of food and nutritional security, job creation, and income diversification. According to Alders and Pym (2009) and Gueye (2000), the growth of the chicken business has also bolstered the value chain associated with feed production, veterinary care, transportation, and marketing.

Chicken meat is one of the most important and affordable sources of animal protein worldwide. Global poultry production has increased substantially over recent decades due to population growth, urbanization, and rising demand for affordable and nutritious foods. According to FAO (2020), poultry meat production exceeded 133 million tons in 2020, making poultry one of the fastest-growing livestock sectors globally. Because of its nutritional value, affordability, and wide cultural acceptance, poultry meat continues to play a crucial role in improving food security and human nutrition worldwide (FAO, 2020).

Because chicken farming is resilient and adaptable to limited production situations, it has become a critical agricultural activity in many low-income and post-conflict nations (Dilbert, 2001). Systems for producing poultry can be easily integrated into mixed agricultural systems and created with comparatively little expenditure. These factors have made chicken farming especially crucial for rural populations' livelihoods, household nutrition, and income creation. Poultry also contributes significantly to the empowerment of smallholder farmers and the creation of economic opportunities for women and young people in numerous emerging economies. For low-income households, poultry meat is frequently the most readily available and reasonably priced source of high-quality animal protein and is widely acceptable in cultural and religious contexts (FAO, 2019). In order to improve food security and lower rural poverty, national agricultural development policies often place a strong emphasis on bolstering the chicken industry.

Livestock farming remains to be a major component of Afghanistan's agricultural economy, contributing significantly to rural livelihoods, job opportunities, and national income (MAIL, 2021). Smallholder farmers who rely on agriculture and animal husbandry as their main source of income dominate Afghanistan's livestock production systems. Due to urbanization, fast population expansion, and shifting consumer dietary choices that favor poultry meat over red meat due to its perceived health benefits and lower cost, broiler chicken farming has grown in significance in recent years (Rahimi et al., 2021). As a result, poultry meat consumption has increased considerably in urban and peri-urban markets. Broiler farming enterprises have expanded gradually in provinces such as Maidan Wardak, where access to markets, transportation networks, and production inputs is relatively favorable. Despite this growth, the poultry sector continues to face numerous operational and structural constraints that limit productivity and profitability.

Despite the growing importance of broiler farming in Afghanistan, limited empirical studies have evaluated farm-level production conditions, management practices, and

operational challenges in specific provinces. This lack of localized evidence restricts the development of targeted interventions and evidence-based policies aimed at improving poultry production systems.

Available studies in Afghanistan have primarily focused on poultry sector development, disease control, and national production trends. However, province-level investigations assessing farm physical infrastructure, feed management practices, and farmers' technical knowledge remain scarce, particularly in Maidan Wardak Province. Consequently, there is a need for localized research to generate evidence that can support poultry development programs and policy decisions.

It is commonly acknowledged that one of the most important elements affecting the sustainability and productivity of broiler production systems is effective farm management. In order to improve bird health, growth performance, and feed conversion efficiency, proper management practices—such as suitable housing conditions, balanced feeding programs, avoiding diseases, sanitation, and stringent biosecurity measures—are essential (Muir, 1990); Scanes, 2007). Poor management practices can increase mortality rates, reduce productivity, and expose farmers to substantial economic losses associated with disease outbreaks. Therefore, strengthening farmers' technical knowledge, management skills, and access to extension services is critical for improving broiler production systems, particularly in developing countries where poultry farming is dominated by small-scale producers.

Several major challenges impacting broiler production systems have continuously been found by empirical research carried out in similar developing country contexts. High feed prices, frequent disease outbreaks, restricted access to veterinary care, poor infrastructure, and farmers' lack of technical expertise are some of these difficulties (Jambui et al., 2017; Adebowale et al., 2016). Among these limitations, feed costs account for the majority of production costs—typically between 60 and 70 percent of the total costs associated with producing broilers (FAO, 2019). As a result, changes in feed prices can have a big impact on the sustainability of output and farm profitability. Further deterring farmers from investing in better technologies and management techniques that could increase productivity are inadequate extension services, weak institutional support systems, and restricted credit availability (Baruwa & Idowu, 2021; Adebowale et al., 2016).

Therefore, this study was conducted to address the existing knowledge gap regarding broiler chicken farming in Maidan Wardak Province, Afghanistan.

The specific objectives of the study were:

1. To assess the status of farm physical infrastructure in broiler chicken farms.
2. To evaluate nutrition and feed-related challenges affecting broiler production.
3. To assess farmers' technical knowledge regarding broiler farm management.

METHOD AND MATERIALS

Study Area

This study was carried out in Afghanistan's Maidan Wardak province. Data collection was conducted between November and December 2025 through direct interviews with broiler farm owners in Maidan Wardak Province. Due to its close proximity to important consumer markets, such as Kabul, this province in the country's center has seen a steady growth in broiler farming. The majority of poultry farming in the province is small to medium-sized, with differing degrees of infrastructure and management techniques.

Study Design and Sampling Procedure

The current situation and production issues of broiler chicken farms were evaluated using a cross-sectional survey design. Using a purposive sampling strategy, Purposive sampling was employed because a complete and updated list of commercial broiler farms was not available in the study area. Furthermore, the study specifically targeted active commercial broiler farms with relevant production experience to ensure that respondents could provide reliable information regarding farm management practices and production challenges. The sample size for this study was determined using Cochran's formula for finite populations. The total population consisted of 143 registered commercial broiler farms operating in Maidan Wardak Province at the time of the study.

First, the initial sample size (n_0) for an infinite population was calculated using a 95% confidence level and a 5% margin of error, resulting in a value of 384.16. Because the study population was finite, the sample size was adjusted using Cochran's finite population correction formula:

$n = n_0 / [1 + (n_0 - 1)/N]$

where:
n=adjusted sample size,

n_0 = initial sample size (384.16),

N = population size (143).

$$n = \frac{n_0}{\frac{n_0 - 1}{N} + 1} = \frac{384.16}{\frac{384.16 - 1}{143} + 1} = \frac{384.16}{2.682 + 1} = \frac{384.16}{3.682} \approx 104.32$$

Therefore, the final sample size was rounded to 104 broiler farms. This sample size was considered statistically representative of the target population and sufficient to ensure reliable results for the study.

Data Collection Instrument

A structured questionnaire intended to evaluate the state and difficulties of broiler chicken farming in the province of Maidan Wardak was used to gather primary data for this study. Likert scale statements were used in the questionnaire to gather formers' opinions on many facets of broiler form management and production difficulties.

The questionnaire was divided into three main sections:

1. Farm physical infrastructure challenges
2. Nutritional management and feed related problem
3. Farmers' technical knowledge and management capacity

The instrument comprised 23 statements in all, 9 of which dealt with physical infrastructure, 6 of which addressed nutrition and feed-related issues, and 8 of which evaluated farm owners' level of knowledge. A five-point Likert scale, with 1 denoting a very high challenge and 5 denoting no challenges, was used to gauge responses.

Ten university professors were given the original questionnaire in order to evaluate its validity. After carefully reviewing their expert remarks and academic recommendations, the appropriate adjustments were made to improve the items' clarity and usefulness. This iterative process ensured the content validity of the instrument, and the revised version was subsequently authorized for distribution.

To ensure the reliability of the questionnaire, Cronbach's Alpha coefficient was calculated using SPSS software. The reliability values for the three constructs are presented in Table 1.

Physical infrastructure difficulties had a Cronbach's Alpha rating of 0.757, which indicates good reliability. With an Alpha value of 0.729, the nutrition and feed-related problems construct demonstrated acceptable internal consistency. Additionally, the farmer knowledge and management capability Cronbach's Alpha score was 0.800, showing high reliability. The questionnaire was deemed reliable for measuring the study variables since all results were higher than the widely recognized cutoff of 0.70. Experts in poultry science and agricultural research also evaluated the questionnaire's content validity to make sure the questions were pertinent to the study's objectives (Table 1).

Table 1. *Reliability Analysis of the Questionnaire Using Cronbach's Alpha*

Variables / Constructs	Number of Items	Cronbach's Alpha
Farm Physical Infrastructure Challenges	9	0.757
Nutrition and Feed-related Challenges	6	0.729
Farmers' Knowledge and Management Capacity	8	0.8

Data Analysis

Descriptive and inferential techniques were used to analyze the data. The degree of perceived difficulties among respondents was evaluated using frequency distribution, percentage analysis, and mean scores. Levels of challenge severity were categorized using the mean interpretation scale. Levels of challenge severity were categorized using the mean interpretation scale (table 2).

Table 2. *The interpretation of the challenge's severity*

Mean Score Range	Interpretation
1.00–1.80	Very High Challenge
1.81–2.60	High Challenge
2.61–3.40	Moderate Challenge
3.41–4.20	Low Challenge
4.21–5.00	Very Low or No Challenge

For inferential statistical analysis, the Shapiro–Wilk test was first used to determine whether the data were normally distributed. Based on the results, the appropriate statistical tests were applied. Since the data were normally distributed, Pearson's correlation analysis was conducted to examine the relationships among physical infrastructure challenges, nutrition- and feed-related challenges, and farmers' technical knowledge. All statistical analyses were performed using SPSS Statistics for Windows, version 27.

FINDINGS

Assessment of the Physical Structure and Environmental Challenges of the Farms

The overall mean score for the farms' environmental conditions and physical structure was 3.80± 0.81, indicating that the majority of farms had characteristics that are close to the desired criteria. Descriptive stats are shown in Figure 1 and table 3.

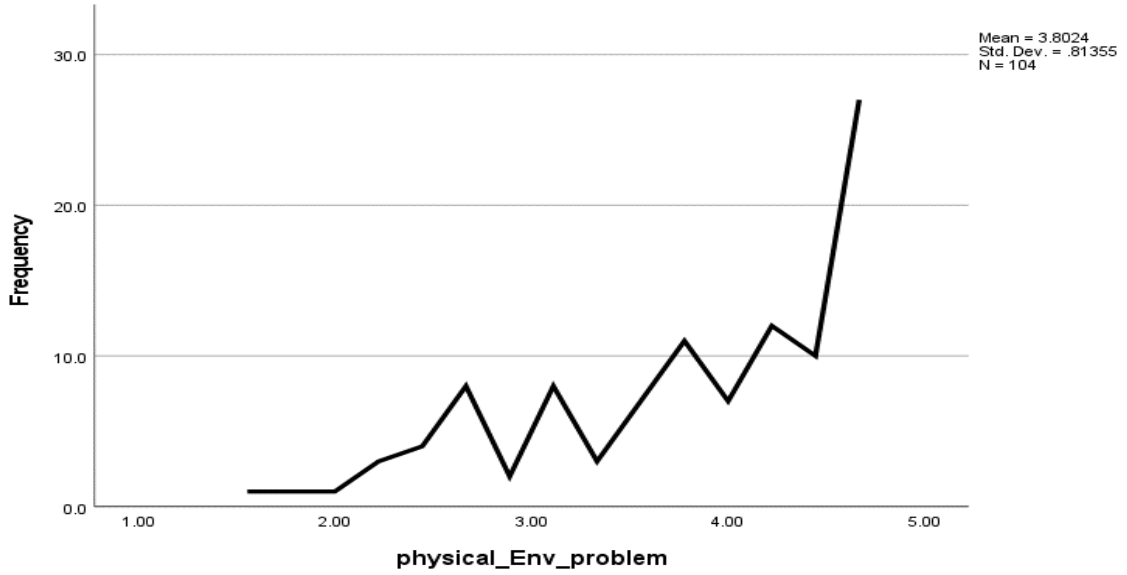


Figure 1. *Distribution of responses to Items of Physical Structure and Environmental Challenges of the Farms*

The relatively high mean score (3.80 ± 0.81) indicates that most broiler farms possess adequate physical infrastructure to support poultry production and biosecurity practices. This finding suggests that farm infrastructure is not a major constraint in the study area. However, the observed variation among farms indicates that some producers may still require improvements in housing facilities and farm management infrastructure.

Challenges Related to Farm Feeding and Nutritional Resources

The mean score for feeding and nutritional management challenges was 2.35, reflecting moderate challenges related to feed quality, cost, availability, and management practices. The median (2.00) and mode (2.00) indicate that most farms face similar limitations, and the standard deviation (0.70) shows low variability.

Table 3. *The proportion of participants' responses about Physical structure and Environmental challenges of farms*

Level	Number of Participants	Percentage
Very High Challenge	2	1.90%
High Challenge	8	7.70%
Moderate Challenge	25	24.00%
Low Challenge	45	43.30%
Very Low or No Challenge	24	23.10%

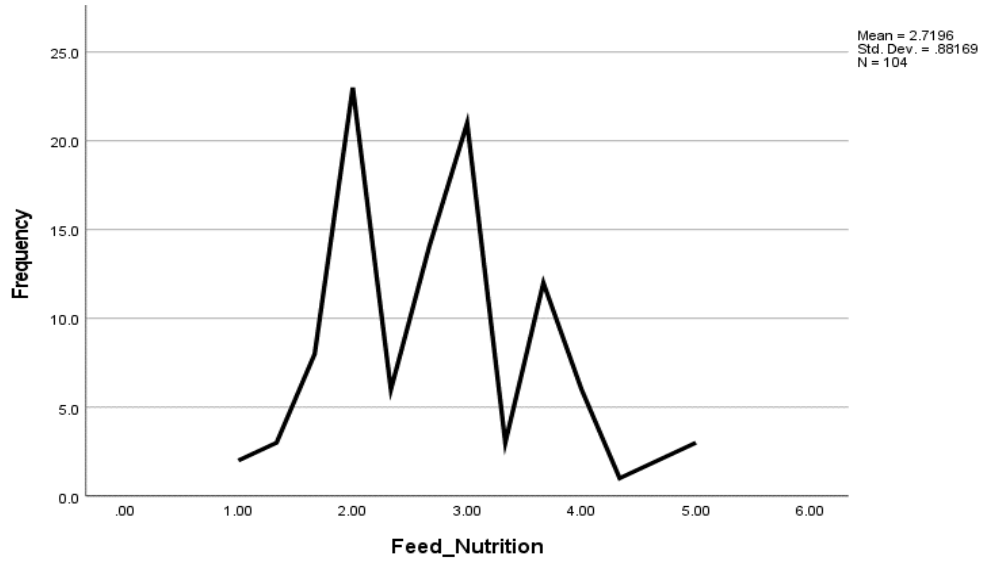


Figure 2. *Distribution of responses to Items of Feed and Nutritional Challenges of the Farms.*

A significant percentage of farmers face difficulties with feeding practices and access to nutritional supplies, according to the distribution of responses displayed in Figure 2 and table 4. The moderate mean score (2.35 ± 0.70) suggests that nutrition and feed-related challenges remain an important constraint for broiler farmers. High feed costs, inconsistent feed quality, and limited feed availability may negatively influence production efficiency and farm profitability. These findings highlight the need for improved feed supply systems and better nutritional management practices.

Table 4. *The proportion of responses about feed and nutritional challenges of farms*

Level	Number of Participants	Percentage
Very High Challenge	10	9.60%
High Challenge	35	33.70%
Moderate Challenge	30	28.80%
Low Challenge	20	19.20%
Very Low or No Challenge	9	8.70%

Assessment of Farm Owners' Knowledge Levels

A reasonable level of comprehension in disease identification, immunization schedules, nutrition, biosecurity, and farm management was indicated by the mean score of 2.73 for farm owners' technical knowledge. Figure 3 and table 5 display these descriptive data.

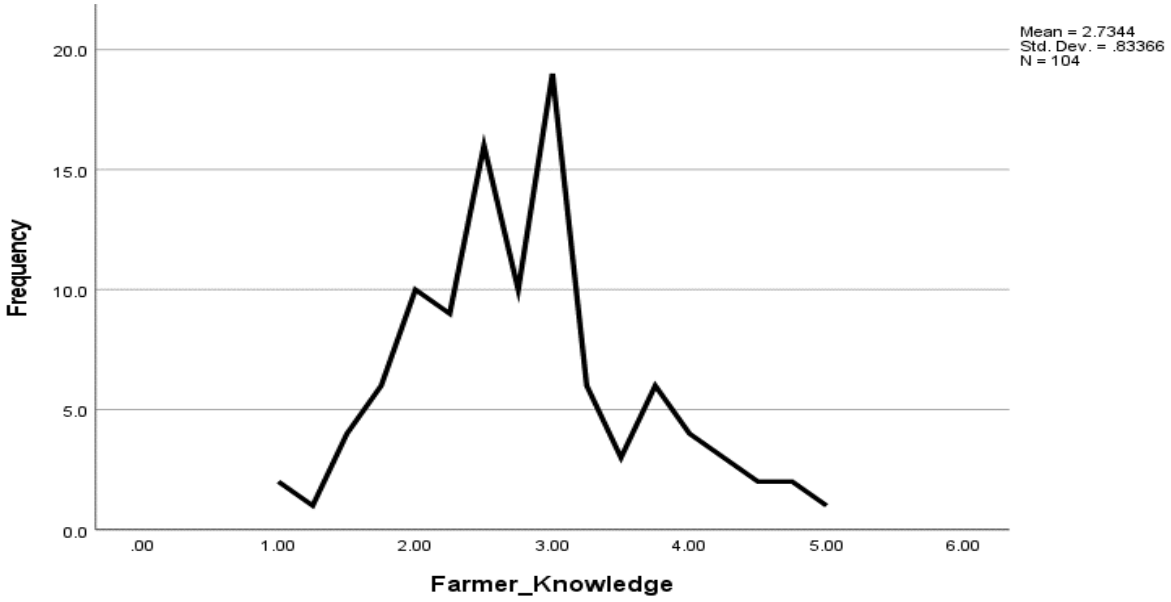


Figure 3. *Distribution of responses to Items of Farmer knowledge.*

The mean score of 2.73 ± 0.83 indicates a moderate level of technical knowledge among farm owners. This finding suggests that many farmers possess basic knowledge of broiler production; however, important gaps remain in areas such as disease management, biosecurity, feeding practices, and farm management. Strengthening extension services and training programs could improve farmers' technical capacity and production outcomes.

Table 5. *The level of knowledge of farmers (proportional)*

Level	Number of Participants	Percentage
Very low knowledge	10	9.60%
Low knowledge	25	24.00%
Moderate knowledge	31	29.80%
Good knowledge	22	21.20%
High knowledge	16	15.40%

Correlation Analysis among Key Variables

The results indicate a weak and non-significant positive relationship between physical infrastructure challenges and nutrition and feed-related challenges ($r = 0.124$, $p = 0.210$). This suggests that these two factors are largely independent in the study area.

A weak but statistically significant positive relationship was observed between physical infrastructure challenges and farmers' technical knowledge ($r = 0.252$, $p = 0.010$), indicating that improved farmer knowledge is slightly associated with better farm infrastructure conditions.

Furthermore, a moderate and highly significant positive relationship was found between nutrition and feed-related challenges and farmers' technical knowledge ($r = 0.391$, $p < 0.001$). This finding implies that farmers with higher technical knowledge are better able to manage feed-related practices and reduce associated constraints (Table 6).

Table 6. *Pearson Correlation Coefficients among Key Variables*

Variables	***Physical Environment***	***Feed Nutrition***	***Farmer Knowledge***
Physical Environment	1	0.124 (ns)	0.252*
Feed Nutrition	0.124 (ns)	1	0.391**
Farmer Knowledge	0.252*	0.391**	1
*Notes: *p < 0.05, **p < 0.001, ns = not significant*			

Overall, the correlation results suggest that farmers' technical knowledge plays a key role in improving both infrastructure management and feed-related practices in broiler production systems.

DISCUSSION

The three primary components of broiler chicken farming including physical infrastructure challenges, nutrition and feed-related challenges, and farmers' technical knowledge are the focus of the outcomes of this research. The sustainability and effectiveness of production depend on these factors.

The findings show that the farms often have reasonably appropriate environmental conditions and physical construction. This result is consistent with a research carried out in Tanzania by Mramba and Mapunda (2024), which found that environmental and managerial factors were important predictors of production efficiency. Although other overseas research, like Oyegunle et al. (2024) in Nigeria, have documented significant issues relating to infrastructure restrictions, our results do not show the presence of severe infrastructural shortcomings. This disparity could be explained by sample characteristics, investment levels, climate variations, and geographic factors. Therefore, regional differences still call for more thorough research even though physical features are usually sufficient.

The results show that feed quality, pricing, and management practices present major challenges. This finding aligns with worldwide patterns documented in earlier studies. According to a study conducted in India by Malarvizhi and Geetha (2015), feed expenditures make up the majority of the costs associated with producing broilers. Similarly, high feed costs and quality unpredictability were found to be the main issues limiting production efficiency by Anosike et al. (2018) and Osuji (2019). Our results provide more evidence that feed quality is directly impacted by market volatility and economic pressures. These challenges are likely driven by several underlying factors, including dependence on imported feed ingredients, limited local feed manufacturing capacity, unstable market prices, inadequate farmer training in feed storage and feeding practices, and restricted financial resources. Together, these factors increase production costs and reduce the profitability of broiler farming. As a result, feeding issues are directly related to market and economic structures rather than being purely technical. This analysis emphasizes how crucial it is for

production sustainability to improve feed management, provide availability to high-quality feed, and put cost-control measures in place. The findings should also be interpreted within the Afghan context. Broiler farmers in Afghanistan face unique constraints, including limited access to high-quality commercial feed, dependence on imported feed ingredients, inadequate veterinary services, weak agricultural extension systems, and restricted access to agricultural credit. In addition, prolonged economic instability, rising transportation costs, and limited investment in livestock infrastructure further affect farm productivity. These contextual factors likely contributed to the challenges identified in the present study and highlight the need for locally adapted interventions and stronger institutional support.

The results indicate a moderate level of farmers' technical knowledge, underscoring the importance of strengthening training programs and veterinary extension services to improve feed management, disease prevention, biosecurity practices, and overall broiler farm productivity. This moderate level of technical knowledge may reflect limited access to formal training programs, insufficient veterinary extension services, and a shortage of continuing education opportunities for poultry farmers, particularly in rural areas of Afghanistan.This result is consistent with research by Phiri et al. (2023) and Ramukhithi (2023), which highlighted access to extension services, experience, and educational attainment as important factors influencing production efficiency. Additionally, studies conducted in Zimbabwe show that small-scale farmers' profitability is significantly impacted by their ability to obtain loans and technical assistance (Phiri et al., 2023). Our findings also imply that improving knowledge can have a direct impact on feed management, disease control, and the successful application of biosecurity measures. Thus, stronger veterinary extension systems, hands-on training workshops, and capacity-building initiatives are critical components for this industry's advancement.

This study has several limitations that should be acknowledged. First, the research was conducted only in Maidan Wardak Province; therefore, the findings may not be generalizable to all broiler farms across Afghanistan. Second, the study relied on self-reported questionnaire data, which may be subject to response bias. Third, the cross-sectional study design identifies associations among variables but does not establish causal relationships. Future studies involving multiple provinces, larger sample sizes, and longitudinal research designs are recommended to provide more comprehensive evidence on the challenges affecting broiler production in Afghanistan.

CONCLUSION

This study assessed the status and challenges of broiler chicken production in Maidan Wardak Province, Afghanistan, focusing on farm physical infrastructure, feed management, and farmers' technical knowledge. The findings indicate that although farm infrastructure is generally adequate, significant constraints remain in feed management and farmers' technical capacity. Feed-related challenges, including high costs, inconsistent availability, and variable quality, represent the most serious constraint affecting production efficiency. In

addition, moderate levels of technical knowledge among farmers limit the effective implementation of improved management, biosecurity, and disease control practices. Overall, the study concludes that broiler production performance in the study area is influenced more by input constraints and human capacity limitations than by physical infrastructure conditions. Strengthening technical knowledge and improving access to quality feed are essential for enhancing productivity and sustainability.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. Strengthen veterinary and agricultural extension services to improve farmers' technical knowledge in broiler production, disease prevention, and biosecurity practices.
2. Improve access to affordable and high-quality feed through better supply chain management and support for local feed production industries.
3. Provide financial support mechanisms such as credit facilities to encourage investment in improved poultry housing and production systems.
4. Organize regular training programs and capacity-building workshops for broiler farmers at the provincial level.
5. Promote coordinated policy interventions integrating nutrition, technical training, and institutional support to enhance the sustainability of the poultry sector.

Ethical Considerations

Ethical approval for this study was obtained from Kabul University, Afghanistan. Participation was voluntary, and all respondents were informed about the objectives of the study before providing informed consent. The confidentiality of farm-level data was strictly maintained throughout the research process.

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Author Contributions

Rohullah Rahmani served as the lead author of this study. He was primarily responsible for identifying the research gap and formulating the research objectives and hypotheses. He collected and verified all data, conducted the data analysis, and interpreted the findings. Additionally, he drafted the initial manuscript and contributed to the literature review and reference management, ensuring the scientific accuracy of the content. Sayed Ibrahim Farkhary provided overall supervision throughout the research process. He played a key role in selecting and refining the research topic and guided the research design and methodological approach. He also reviewed and revised manuscript drafts to ensure clarity, consistency, and scientific rigor. Hayatullah Takal assisted in data collection and verification.

He contributed to the literature review and background research and provided critical feedback on the methodology, offering suggestions to improve research design and data integrity. Mohammad Ayub Hebat contributed to the data analysis and statistical interpretation. He also assisted in preparing tables, figures, and other visual representations of the results, ensuring that the findings were clearly and accurately presented.

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Conflict of Interest Statement

The authors declare that they have no conflict of interest related to this.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding authors upon reasonable request.

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