

Research Article



Assessment on Constraints of Commercial Poultry Farms by Garrett's Ranking Technique in Dambi Dollo and its Surroundings, Western Ethiopia

SORESA SHUMA^{1,2*}, DEMISSU HUNDIE SENBETA³, MALATJI DIKELEDI PETUNIA¹

¹Department of Agriculture and Animal Health, College of Agriculture and Environmental Science, University of South Africa, South Africa; ²Department Animal Science, College of Agriculture and Natural resources, Dambi Dollo University, Dambi Dollo, Ethiopia; ³Department of Animal Science, Faculty of Agriculture, Shambu Campus, Wollega University, Ethiopia.

Abstract | The findings of the study showed that scale and commercial poultry farming engagement are closest to being linked with the socio-demographic traits of a farmer. Gender, age, education level, and years of experience all were shown to be statistically significant relationships ($p^* < 0.05$). Surprisingly, female farmers tended to work on considerably larger flock sizes (mean ~735 chicks) than did male farmers. Statistical tests (χ^2 , ANOVA) and Garrett's ranking were employed in the study to examine these correlations and identify the primary constraints. Regarding operational constraints, the most critical challenges ranked from 1 to 10 included: (1) cost of feed, (2) availability of improved birds, (3) high cost of birds, (4) lack of financing, (5) land/space availability, (6) electric disturbances, (7) high bird morbidity rates, (8) unavailability of feed ingredients, (9) disease outbreaks, and (10) high mortality rates. To address these challenges and enhance poultry production, targeted interventions are demanding. These include facilitating accesses to an affordable feed, promoting improved poultry breeds, granting land access, and "providing credit facilities" to farmers. Furthermore, addressing these constraints do not only boost productivity but also ensure sustainable growth in the commercial poultry sector.

Keywords | Commercial Poultry, Flock size, Poultry Farms, Ranking Technique

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***Correspondence** | Soresa Shuma, Department of Agriculture and Animal Health, College of Agriculture and Environmental Science, University of South Africa, South Africa; **Email:** 21008590@mylife.unisa.ac.za

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INTRODUCTION

Poverty reduction and food security are major concerns in Ethiopia's development strategy, as around 29% of the populace exists under the countrywide insufficiency line (Kassegn and Endris, 2021). Furthermore, improper nutrition due to small energy and protein intake remains a persistent problem (Zahid *et al.*, 2024), since protein deficits in particular are well-documented across Africa (Bayala-Yai *et al.*, 2024). To address this, animal protein sources play a

crucial role, with poultry meat and eggs being particularly important (Abera Geleta, 2022). Consequently, focusing on poultry production is essential for achieving nutrition self-support and reducing hunger in Ethiopia (Agazhi and Meda, 2022).

Moreover, poultry production contributes significantly to poverty reduction, "Contributing to". rapid economic development, especially for vulnerable populations. Additionally, poultry farming requires

minimal capital investment while providing quick returns (Viswanath, 2020). Currently, Ethiopia's poultry population exceeds 60 million (Mohammed, 2021), with production systems ranging from backyard to large-scale commercial operations. However, the commercial sector primarily consists of commercial chicken farms, with few intermediate to big operations (Barre *et al.*, 2023).

Despite the growing number of marketable chicken homesteads in Dambi Dollo and its contributions to livelihoods and food security (Tembo *et al.*, 2023), the sector's economic contribution remains modest at 2-3% (Yuyya, 2023). This limitation stems from various challenges, yet there is limited information about constraints facing commercial farms in Dambi Dollo. Therefore, this study was aimed to identify key challenges affecting the sustainability of commercial poultry farms in the region.

MATERIALS AND METHODS

DESCRIPTION OF THE STUDY AREA

Dambi Dollo, the capital town of the Kellem Wollega Zone in the Oromia Region, is 642 km to the west of Addis Ababa. The zone measures 987,457 hectares in width and is surrounded by the West Wollega and Buno Bedele Zones, Ilu A/Bora Zone, and Gambella region. Its topography is extremely diverse with altitudes ranging from 200 to 3,450 meters above sea level, which constitutes three agro-ecological zones: Highland (26.1%), midland (41.4%), and lowland (32.5%). The region possesses a wide range of temperatures (10°C to 34°C) and high annual rainfall levels, between 1,400 mm and 3,200 mm (Kumsa *et al.*, 2024).

SAMPLE SIZE

Cross-sectional study design was employed to identify the major challenges faced by commercial poultry farms in Dambi Dollo and surrounding areas. Due to the limited number of such farms in the region, purposive sampling was used to ensure the inclusion of active producers with relevant experience. This approach, while non-random, was necessary to obtain meaningful data and allowed for the inclusion of farms varying in size, experience, and management style, thereby enhancing regional representativeness.

According to local agricultural and microenterprise office records, approximately 52 commercial poultry farms were registered at the time of the study. Although a full census was considered, resource and time limitations prevented reaching all farms. Nonetheless, by including all accessible farms, the study closely approximates a census and offers highly representative insights.

SAMPLING DESIGN

To systematically gather information on production constraints, a checklist was developed, and farm leaders or heads of households were purposively selected as key informants due to their direct involvement and decision-making roles in farm management. These participants were then asked to rank the identified issues in order of perceived priority using Garrett's Ranking Technique, enabling clear identification of the most critical challenges faced by the sector.

DATA COLLECTION AND ANALYSIS

Data was collected through personal interviews using a pretested, semi-structured questionnaire administered to farm heads or owners organized under the commercial poultry and microenterprise offices. The aim was to identify the key constraints perceived by commercial poultry producers. The 28 constraint items were developed through a combination of literature review and a scoping study conducted during the pilot phase. Open-ended interviews with a purposive sample of extension officers and poultry farmers helped generate an initial list, which was then refined into a structured format for the main survey. This process ensured both contextual relevance and practical applicability. The finalized questionnaire is now included as supplementary material. To analyze the data, Chi-square tests were used to examine associations between socio-demographic variables and engagement in commercial poultry farming, rather than comparing observed to theoretical distributions. The high p-values reported reflect targeted statistical analyses (Chi-square and ANOVA), conducted using SPSS, to assess relationships between socio-demographic characteristics and key constraints or performance indicators. Cross-tabulations were also performed to explore group differences (e.g., by education level or experience), and the findings have been integrated into the discussion section accordingly. The heads or leaders of farms were compelled to rank the reasons for which poultry production was being hindered. The reasons were put to Garrett's ranking technique on six steps for explaining results. These were:

Step 1: Rankings provided by the respondents for each factor were considered.

Step 2: Rankings given by each respondent on their own were converted into percentage position based on the following formula: Where; R_{ij} = Ranking given for the i th factor by the j th person, N_j = Number of factors ranked by the j th person.

Step 3: Percentage position scores were obtained with the assistance of Garrett's Ranking Conversion Table, and every percentage position was converted into a score using Garrett's Table (Shanjeevika *et al.*, 2022).

Step 4: The complete mark of every factor was obtained by summing up the scores of all respondents who had ranked that factor.

Step 5: Mean scores were obtained by dividing the total score with the number of respondents.

Step 6: Mean scores of all the factors were ranked in descending order to find the most influential factors according to their ranks assigned.

RESULT

SOCIO-DEMOGRAPHIC CHARACTERISTICS

The socio-demographic characteristics of commercial poultry farmers in and around Dambi Dollo are presented in Table 1. The survey revealed distinct socio-demographic patterns, showing that the majority of respondents were male (73.1%) and fell within the 15–30 age group (53.8%). Additionally, 75% of the respondents were married. In terms of occupation, 61.5% were primarily farmers, while 50% were household members. Furthermore, experience levels varied, with 75% of farmers having prior poultry experience; of these, 59.6% had 1–3 years of experience.

Table 1: Socio demographic characteristics of commercial poultry farms in and around Dambi Dollo.

Variable	Category	N	%	X2	P value
Sex of respondents	M	38	73.1	11.077 ^a	.001
	F	14	26.9		
Age of respondents	<15	3	5.8	29.077 ^b	.001
	15–30	28	53.8		
	31–45	15	28.8		
	46–60	6	11.5		
Marital status of commercial producers	Married	39	75.0	70.154 ^b	.001
	Single	7	13.5		
	Divorced	3	5.8		
	Widowed	3	5.8		
Occupation of commercial producers	Farmers	32	61.5	24.269 ^c	.001
	Private job	17	32.7		
	Government employees	3	5.8		
Family size	1–3	26	50.0	23.692 ^b	.001
	4–6	16	30.8		
	More than 6	10	19.2		
Experience in year	<3	31	59.6	21.038 ^c	.001
	3–6	17	32.7		
	More than 6	4	7.7		
Educational level	Illiterate	4	7.7	27.692 ^d	.001
	Read and write	5	9.6		
	Grade 1–4	3	5.8		
	Grade 5–8	9	17.3		
	High school	11	21.1		
	College and University	20	38.5		

Regarding education levels, 38.5% held college or university degrees. Meanwhile, family sizes were relatively small, with

50% of the respondents were household heads, consisting of 1–3 members. Additionally, 61.5% of respondents were solely engaged in agriculture, while 32.7% combined farming with trade, and a small proportion (5.8%) had other secondary occupations.

Hence, statistical testing through chi-square tests showed considerable differences ($p^* < 0.001$) for all the socio-demographic variables. These were gender ($p^* < 0.05$), marriage status ($p^* < 0.05$), and educational level ($p^* < 0.05$), which showed considerable effects on poultry farm operations.

FLOCK SIZE OF CHICKS IN COMMERCIAL POULTRY FARMS IN AND AROUND DAMBI DOLLO

As shown in Table 2, the study examined flock size and birds breeds across 52 commercial poultry farms in and around Dambi Dollo town. The results revealed a mean flock size of 734.6 ± 20.9 birds, with female chicks (654.8 ± 24.5) significantly outnumbering males (569.2 ± 32.7). In terms of breed composition, Bovans Brown dominated (55.8%, mean: 905.8), followed by Saso T44 (23.1%, mean: 554.6) and mixed breeds (21.2%, mean: 589.6). However, statistical analysis showed no significant influence of breed on mean flock size ($P > 0.05$).

Table 2: Flock size and breeds of chicks in small scale poultry farms in and around Dambi Dollo, Oromia Region, Ethiopia in June 2025.

Variables	N(%)	Mean(SEM)
Flock size	52(100)	734.6154 (20.89343)
Sex	Female birds	654.83 (24.499) ^a
	Male birds	569.23 (32.700) ^b
Breed	Bovans brown (egg type)	905.7692 (17.24053) ^a
	Saso T44	554.6154 (15.07513) ^a
	Mixed	589.6154 (12.89814) ^a

Note: N (%) describes number or percent of producers; SEM-standard error of mean, means with the different letter of superscript in the same column did differ significantly ($P < 0.05$).

CHALLENGE OF COMMERCIAL POULTRY FARM RANKING

As presented in Table 3, the ranked limitations faced by commercial chicken farms in Dambi Dollo reveal critical operational challenges. The data shows that feed cost is the foremost constraint (Mean Score: 65.36), followed closely by inaccessibility of improved birds (64.28) and high bird prices (64.01), highlighting significant procurement difficulties. Additionally, financial constraints (63.01) and land scarcity (59.90) further hinder operations, underscoring the dual challenges of capital and space availability. These top five constraints collectively suggest that affordable inputs and better resource access would enhance sustainability and productivity.

Table 3: Rank of constraints faced in Commercial poultry farms in and around Dambi Dollo, Oromia Region, Ethiopia.

Constraints	Total score	Mean score	Garretts rank
Cost of feed	3399	65.36	1
Non Availability of improved birds in a time	3343	64.28	2
High cost of birds	3329	64.01	3
Lack of finance	3277	63.01	4
un availability of land/space	3115	59.90	5
Electric disturbance	3098	59.57	6
High rate of morbidity birds	3025	58.17	7
Un availability of feed and feed ingredients	3002	57.73	8
Disease outbreak	2938	56.5	9
mortality of adult birds, mortality of day old chicken	2929	56.32	10
Lack of training	2873	55.25	11
Cannibalism	2864	55.07	12
High cost of medicine vaccine	2800	53.84	13
Inability to pay constant attention	2758	53.03	14
Lack of veterinary care	2752	52.92	15
Market linkage and promotion problems	2730	52.5	16
lack of technical know-how handling	2712	52.15	17
In ability to diagnose sick birds	2624	50.46	18
High initial investment	2596	49.92	19
Poor credit facility	2569	49.40	20
Labor problem	2251	43.28	21
High rate of interest for loans	2172	41.76	22
Losses due to change in environmental conditions	2166	41.65	23
Un availability of waste disposal	2046	39.34	24
Lack of equipment etc.	2000	38.46	25
difficulty for water	1949	37.48	26
lack of extension service	1681	32.32	27
Loss of birds and eggs due to predators	1365	26.25	28

Beyond these primary concerns, electric disturbances (59.57) and high morbidity rates (58.17) pose operational risks, while feed shortages (57.73) and disease outbreaks (56.50) directly threaten flock health. Furthermore, mortality issues (56.32) and inadequate training (55.25) exacerbate these challenges, revealing gaps in knowledge and infrastructure. Other significant hurdles include cannibalism (55.07) and costly medicines (53.84), which point to the need for improved health management practices. Addressing these mid-tier constraints could substantially boost farm efficiency and animal welfare.

At the lower-priority end, weak market linkages (52.50) and technical knowledge gaps (52.15) reflect systemic support deficiencies. Moreover, difficulties in disease recognition (50.46) and high startup costs (49.92) discourage new entrants, whereas limited credit access (49.40) restricts expansion. Labor shortages (43.28) and high loan interest rates (41.76) further strain operations, emphasizing the need for financial and workforce interventions to sustain poultry farming livelihoods.

Among the least urgent but still impactful constraints are environmental losses (41.65), waste disposal issues (39.34), and equipment shortages (38.46). Infrastructure-related challenges like water access (37.48) and poor extension services (32.32), along with minor predator threats (26.25), complete the list. Although these rank lower, their resolution could improve overall farm conditions. A comprehensive approach addressing both high- and low-priority constraints would enhance the resilience and productivity of poultry farming in the region.

DISCUSSION

The predominance of male farmers (73.1%) is consistent with broader patterns in African agriculture, where men often control productive resources and farm ownership (Adbaru, 2024). However, the notable involvement of youth (15–30 years) reflects a shift, with poultry increasingly seen as a viable livelihood option for younger generations (Anon, 2024). This demographic trend could be leveraged to modernize the sector, especially since educated youth (38.5% with diplomas/degrees) bring higher adoption potential for technology and improved practices (Giredaguo, 2023). Importantly, education showed a significant influence ($p < 0.05$) on farm performance, reinforcing the need for targeted training programs that build technical and managerial capacity.

Experience also played a crucial role, as 75% of farmers had prior exposure to poultry, supporting McAreavey *et al.* (2023), who emphasized experience as a key productivity driver. However, despite this, farmers still face a complex network of interrelated constraints that hinder optimal output. For instance, financial constraints (Rank 4) directly affect the ability to purchase quality feed (Rank 1), which accounts for up to 75% of production costs (Al-Shuwaysh *et al.*, 2023). Inadequate feeding leads to poor bird health, increasing vulnerability to disease outbreaks especially where biosecurity and vaccination are weak. This cycle explains why health-related challenges remain prevalent despite farmer experience.

Bird availability and cost (Ranks 2 and 3) are also closely tied to financial capacity. Without sufficient funds or access

to credian issue faced by over 70% of commercial farms in similar contexts (Akpabio *et al.*, 2023) farmers cannot source high-quality chicks, further affecting productivity and survival rates (Assefa *et al.*, 2023). Moreover, the significant proportion of farmers engaged in secondary businesses (32.7%) suggests that income from poultry alone may be insufficient, prompting diversification as a coping strategy rather than as an economic opportunity.

The interplay between land scarcity (Rank 5), urban expansion, and energy insecurity (Rank 6) further exacerbates productivity challenges. Limited space restricts biosecure housing, while power cuts (Mugabe, 2025) disrupt brooding and feeding systems, increasing mortality. These infrastructural issues are particularly damaging for urban and peri-urban farmers, where population density limits expansion and investment.

Despite 75% of farmers having prior experience, the low rank of training access (Rank 11) signals a critical gap. This aligns with Lyanga (2023), who found that only a quarter of Tanzanian poultry farmers accessed extension services. Training directly influences farmers' ability to manage feed quality, disease outbreaks, and record-keeping factors that collectively determine economic viability (Mateos-González *et al.*, 2024). Our findings suggest that experience alone is insufficient without continuous learning and support, particularly in the face of evolving challenges like climate variability.

Market constraints, while ranked lower (Rank 16), still impact profitability. Middlemen dominate value chains, capturing a significant share of revenue (Amarender and Naresh, 2023), while rising drug prices (Lysholm *et al.*, 2025) reduce the feasibility of effective disease control. These structural inefficiencies reflect a broader lack of farmer bargaining power, highlighting the need for cooperative models or government intervention.

Environmental challenges, though currently ranked low (Rank 23), are projected to worsen. Thornton *et al.* (2022) predict increased heat stress mortality by 2030, and youth outmigration from agriculture (Kropff *et al.*, 2023) could erode the labor base needed to adapt. These trends emphasize the need for climate-smart infrastructure and automation to future-proof the sector.

Overall, our findings confirm several known constraints (e.g., feed cost, chick quality), while adding nuance to others, such as the growing role of educated youth and the underappreciated importance of training. Unlike some studies that treat constraints in isolation, we demonstrate how financial, technical, and infrastructural challenges are deeply interconnected. Addressing these through integrated strategies combining credit access,

training, input supply chains, and infrastructure will be key to transforming small-scale commercial poultry into a resilient and profitable enterprise in Ethiopia.

CONCLUSION

The study revealed that the most significant constraints to commercial poultry farms in Dambi Dollo include high feed costs, low access to improved breeds, financial gaps, land scarcity, and high rates of disease outbreaks. To alleviate these constraints, context. Accordingly, we have rephrased the sentence for clarity and conciseness to: Essential interventions include feed subsidies, improved breeding programs, and accessible credit facilities. Additionally, land allocation schemes and better veterinary services are required to address space and health challenges. Furthermore, increasing farmers' training and improving market linkages will enhance productivity. In addition, investment in infrastructure such as solar power for uninterrupted electricity will support sustainable operations.

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Not applicable.

NOVELTY STATEMENT

This study particularly highlights Assessment on Constraints of Commercial Poultry Farms by Garrett's Ranking Technique. Through the integration of statistical analysis with Garrett's ranking, it provides a ranked picture of constraints to operation and gives evidence-based information for priority-intervention based improvements in poultry productivity and sustainability.

AUTHOR'S CONTRIBUTION

All authors contributed equally to data interpretation, manuscript writing, and reviewing the manuscript.

DATA AVAILABILITY

Data available on request from authors.

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There was no funding for this research.

ETHICS STATEMENT

For human subjects research (the farmers) Ethics Committee of South Africa University, College of Environmental sciences_ (Approval No.2024/CAES_ AREC/5937).

We didn't use any tools for AI. All conclusions, interpretations, and all final editing were done by the authors to ensure academic originality and integrity.

CONFLICT OF INTEREST

The authors have declared no conflict of interest.

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