

Evaluation of Indigenous Chicken Rearing Practices in Selected Districts of the Silt'e Zone, Central Ethiopia

Abstract

Indigenous chickens are important for rural life in Ethiopia because they provide income, animal protein, and social and cultural benefits. But village chickens still don't produce much because of old-fashioned management systems and other problems with production. This study examined traditional methods of raising chickens and found major problems with production in some districts of the Silt'e Zone in Central Ethiopia. A cross-sectional survey was executed employing a multistage sampling method, encompassing 150 households. Data were gathered via structured questionnaires, field observations, and focus group discussions, and subsequently analyzed using descriptive statistics. The average number of birds per household was 9.9 ± 2.5 , and hens made up the largest part of the flock. Most people kept chickens to make money (55%), and the next most common reason was to eat eggs at home (30%). Most farmers used scavenging-based feeding systems and added grains and leftovers from their own homes. Most of the time, the housing was bad, and chickens were often kept in kitchens or family homes instead of separate poultry houses. Newcastle disease was found to be the most common disease that affected chickens in the area being studied. Other big problems were not enough food, attacks by predators, and not enough veterinary care. Many reports have come out of Ethiopia and other developing countries about similar problems that are hurting village poultry production. The research indicates that the production of native chickens in the examined region remains predominantly traditional and constrained by inadequate management practices. Improving feeding strategies, housing systems, disease control measures, and extension services could greatly improve the productivity and long-term viability of village poultry production systems.

Keywords: Native chickens; production problems; scavenging system; village poultry

1. INTRODUCTION

In many developing countries, raising chickens in villages is a big part of improving rural livelihoods, food security, and household income. Indigenous chickens make up most of the poultry population in sub-Saharan Africa. They are especially important for smallholder farmers because they can adapt to different environmental conditions, don't need much input, and can obtain food on their own [12, 23]. Ethiopia has one of the largest poultry populations in Africa, with more than 60 million birds. More than 80–90% of these birds are native chickens raised in traditional extensive management systems [5, 8].

Indigenous chickens are a big part of the diet of many families because they provide eggs and meat. They are also an easy way for rural families, especially women and young people, to make money [1, 23]. Most rural areas don't need a lot of money to start raising chickens, and they can make money quickly compared to other types of livestock. Also, native chickens are well-suited to harsh environments, are resistant to disease, and are excellent at brooding. This makes them a viable choice for low-input production systems that are common in rural Ethiopia [16].

Indigenous chicken production systems in Ethiopia are important for the economy and society, but they have many problems that make them less productive. Some of these problems are bad

1 housing, not enough food, a lot of diseases, attacks by predators, and lack of access to veterinary
2 care [14, 22]. Chickens in most traditional production systems obtain most of their food by
3 scavenging, with little extra food. Such behavior often leads to slow growth and poor egg
4 production [8].

5
6 To come up with beneficial ways to help village poultry production, you need to know how
7 smallholder farmers manage their farms. Research done in different parts of Ethiopia has shown
8 that the way people raise chickens is completely unique depending on the agro-ecological zone,
9 the socio-economic conditions, and the culture [1, 22]. Consequently, localized evaluations are
10 essential to discern the distinct challenges and opportunities inherent in each production system.

11
12 In Central Ethiopia's Silt'e Zone, mixed crop and livestock farming systems are common.
13 Indigenous chickens are an important part of rural households' livelihoods. But little is known
14 about native chicken care, production goals, or issues in this area. To create effective poultry
15 improvement plans, we need accurate information on these issues.

16
17 This study aimed to examine the methods employed by residents in specific districts of the Silt'e
18 Zone in Central Ethiopia for raising native chickens. This study's results should help us
19 understand how things are currently run, what problems there are with production, and what
20 opportunities there are to improve indigenous poultry production in the area.

21
22 While there have been numerous studies on village chicken production systems in Ethiopia, the
23 majority have focused on broader regional or national levels rather than specific locations.
24 Depending on the local agro-ecological conditions, cultural traditions, market access, and the
25 socio-economic status of the household, the way indigenous people raise chickens can be
26 completely unique. Because of these differences, it is not always possible to directly apply
27 findings from other areas to specific local situations.

28
29 There aren't many real-world studies that look at how indigenous people in the Silt'e Zone raise
30 chickens. Most of the research that has been done on poultry production in Ethiopia has been
31 about genetic characterization, evaluating the performance of improved breeds, or looking at
32 how poultry is raised in other parts of the country, like Tigray, Amhara, and Oromia. Therefore
33 there isn't much written evidence about the management practices, feeding systems, housing
34 conditions, breeding practices, disease control measures, and major production problems that
35 affect indigenous chickens in the Silt'e Zone.

36
37 Furthermore, earlier research hasn't looked at how raising chickens in this area helps people
38 make money and get enough food. Without this kind of localized information, it is challenging
39 for policymakers, extension services, and development programs to discover effective solutions
40 that work for the farmers in the area.

41
42 There is a clear lack of research on how people in the Silt'e Zone raise native chickens in a
43 systematic way. To fill this gap, we need to obtain basic information that will help us make
44 better management plans, support programs for sustainable poultry development, and make
45 native chickens more productive and valuable to rural households.

This study's goal is to fill this gap by giving a full picture of how indigenous chickens are raised in certain districts of the Silt'e Zone. The results will help us learn more about how poultry is currently managed and will help us identify ways to improve productivity, farmer income, and nutrition in the region.

2. OBJECTIVES

2.1 General Objective

- To look at how people in the Silt'e Zone of Central Ethiopia raise native chickens and determine the most significant problems with production in certain districts.

2.2 Specific objectives

- To look at the social and economic traits of families that raise indigenous chickens.
- To look at how indigenous chickens are cared for, including how they are fed, housed, bred, and kept healthy.
- To find out how many indigenous chickens live in a village and how productive they are.
- To identify the major problems that hinder indigenous chicken production in the study area.
- To find out how indigenous chickens help families make money and stay fed.

3. MATERIALS AND METHODS

3.1 The Study Area

The research took place in the Dalocha, Silti, and Wulbareg districts of the Silt'e Zone in Central Ethiopia. The zone is in the southern part of the country and is known for its mixed crop and livestock farming systems. There are many different types of agro-ecological conditions in the area, including midland and highland environments.

The average temperature ranges from 15°C to 25°C, and the average yearly rainfall is between 900- and 1200-mm. Crop production is the main type of farming, but raising animals, like poultry, is also an important way to make a living.

Indigenous chickens are often raised in traditional scavenging systems that don't need a lot of outside help.

3.2 Study Design

A cross-sectional survey study design was utilized to gather data on indigenous chicken production systems and management practices.

Structured household questionnaires, field observations, and group discussions with farmers were used to gather both quantitative and qualitative data.

1 **3.3 How to Sample**

2 We used a multi-stage sampling method.

3 Step 1: Choosing a district

4 Three districts (Dalocha, Silti, and Wulbareg) with a lot of native chickens were chosen on
5 purpose.

6 Step 2: Choosing Kebeles

7 Five kebeles were chosen at random from each district.

8 Step 3: Choosing a Household

9 Systematic random sampling was used to choose 10 households from each kebele, for a total of
10 150 households.

11 Finding the Sample Size

12 The formula below was used to figure out the sample size:

13 $n = Z^2P(1-P)/d^2$, where n is the size of the sample.

14 $Z = 1.96$ (level of confidence: 95%)

15 $P = 0.5$ and $d = 0.05$

16 So, the survey included 150 homes.

17 **3.4 Ways to Collect Data**

18 1. A structured questionnaire

19 We used a questionnaire that had been tested before to get information on:

20 • Features of the household

21 • The size and make-up of the flock

22 • How you feed them

23 • Systems for housing

24 • Ways of breeding

1 • Taking care of health

2 • Goals for production

3 • Ways to market

4 • Limits on production

5 2. Observation in the Field

6 We did direct observations to make sure: • Living conditions • Providing food and water

7 • Cleanliness and health

8 3. Group Discussions

9 We talked with farmers and extension workers in groups to find out what the biggest problems
10 and chances are in raising native poultry.

11 3.5 Data Analysis

12 We put the data into SPSS (Version 25) and used descriptive statistics to look at it.

13 We did the following analyses:

14 • How often and what percent

15 • The average and the standard deviation

16 • An index for ranking production limits

17 We used the following formula to figure out the ranking index:

18
$$\text{Index} = \sum (\text{Rank} \times \text{Number of responses}) / \text{Total score}$$

19

20 4. RESULTS AND DISCUSSIONS

21 This study examined indigenous chicken-rearing practices in specific districts of the Silt'e Zone,
22 Central Ethiopia. The results indicate that village poultry production constitutes a significant
23 livelihood activity conducted within traditional scavenging systems, relying on minimal external
24 inputs. The average family size in this study (8.03 ± 2.8 people) shows that families in the study
25 area are relatively large. This could mean that people will want more foods that come from
26 animals, like eggs and chicken. In different parts of Ethiopia, village chicken production systems
27 have reported similar household sizes. Chickens are essential for making sure that families have

enough food and for making money [1, 22]. This study found that the average flock size was 9.9 ± 2.5 birds per household. This is similar to what has been found in other village poultry systems in Ethiopia, where flock sizes usually range from 6 to 12 birds per household [8, 14].

Table 1: Socio-Economic Characteristics of Respondent Households

Parameter	Category	Silti	Dalocha	Wulbareg	Overall	χ^2
Sex (%)	Male	25.0	27.5	25.0	25.8	0.1
	Female	75.0	72.5	75.0	74.2	
Age group (%)	15-30 years	17.5	25.0	15.0	19.2	5.4
	31-60 years	77.5	75.0	85.0	79.2	
	Above 60 years	5.0	0	0	1.7	
Education (%)	Illiterate	42.5	40.0	45.0	42.5	2.4
	Read & Write	25.0	25.0	27.5	25.8	
	Grade 1-4	17.5	27.5	17.5	20.0	
	Grade 5-8	15.0	10.0	10.0	11.7	
Family size	Mean $\pm$ SD	8.2 $\pm$ 2.9	8.1 $\pm$ 2.8	7.8 $\pm$ 2.4	8.03$\pm$2.8	0.8
Farmland size (%)	< 0.5 ha	30.0	0	7.5	18.3	9.1
	0.5-1 ha	45.0	55.0	65.0	55.0	
	1-2 ha	25.0	27.5	25.0	25.8	
	2-3 ha	0	17.5	2.5	0.8	
Wealth status (%)	Medium	17.5	27.5	37.5	27.5	4.0
	Poor	82.5	72.5	62.5	72.5	

$\chi^2 = \text{chi-square}$

Table 2: Flock Structure and Purpose of Keeping Indigenous Chickens

Parameter	Category	Silti (Mean $\pm$ SD)	Dalocha (Mean $\pm$ SD)	Wulbareg (Mean $\pm$ SD)	Overall (Mean $\pm$ SD)
Flock composition					
Chicks		1.6 $\pm$ 2.1	2.2 $\pm$ 2.4	3.1 $\pm$ 2.6	2.3$\pm$2.1
Cockerels		0.4 $\pm$ 0.7	0.5 $\pm$ 0.8	0.4 $\pm$ 0.6	0.4$\pm$0.7
Pullets		0.8 $\pm$ 1.1	0.8 $\pm$ 1.0	0.7 $\pm$ 1.0	0.7$\pm$1.1
Cocks		1.0 $\pm$ 0.6	1.1 $\pm$ 0.6	1.4 $\pm$ 0.7	1.2$\pm$0.6
Hens		5.3 $\pm$ 1.3	5.4 $\pm$ 1.2	5.2 $\pm$ 1.3	5.3$\pm$1.3
Total flock size		9.1$\pm$2.5	9.9$\pm$2.6	10.7$\pm$2.6	9.9$\pm$2.5
Purpose of keeping chickens		(%)	(%)	(%)	(%)
	Income generation				55
	Household egg consumption				30
	Meat consumption				13
	Cultural purposes				2

Table 3: Source of Chickens, Marketing, and Future Expansion Plans

Parameter	Category	Silti (%)	Dalocha (%)	Wulbareg (%)	Overall (%)	χ^2
Source of foundation stock	Gift from family/friends	0	0	5.0	1.7	4.8
	Hatched at home	40.0	32.5	30.0	34.2	
	Local market	60.0	67.5	65.0	64.2	

Source of replacement	Hatched at home	92.5	90.0	92.5	91.7	6.5
	Local market	7.5	10.0	7.5	8.3	
Intent to expand production	Yes	97.5	97.5	95.0	96.7	0.5
	No	2.5	2.5	5.0	3.3	
Barriers to expansion	Lack of proper housing	82.5	85.0	90.0	85.8	0.9
	Other reasons	17.5	15.0	10.0	14.2	
Who sells eggs?	Women	100.0	100.0	100.0	100.0	0
Marketing problem	Demand seasonality	100.0	100.0	100.0	100.0	0
Price of egg (Birr)	At household	3.5±0.4	3.5±0.3	3.6±0.3	3.5±0.3	
	During off-season	3.0±0.4	3.1±0.3	3.1±0.3	3.0±0.3	

The majority of the flock was made up of hens. This pattern shows how village poultry systems work: hens are kept mostly for laying eggs and naturally incubating them, while cocks are often sold or eaten sooner. It has been shown that village systems for raising chickens in Ethiopia and other sub-Saharan African countries have similar flock compositions [16]. The socio-economic characteristics of the respondents indicate that smallholder farmers engaged in both crop cultivation and livestock rearing predominantly oversee poultry production. Most of the people who answered the survey didn't have much formal education. This could affect how they learn to take better care of their chickens, which could make their chickens less productive and healthy, ultimately leading to lower income and food security for their households. Other research in Ethiopia has also shown that people who raise chickens don't read or write very elegantly. This problem is often caused by not having access to technical knowledge and extension services [1], which limits the ability of chicken farmers to improve their practices and ultimately affects the health and productivity of their flocks.

Table 4: Feeding and Water Management Practices

Parameter	Category	Silti (%)	Dalocha (%)	Wulbareg (%)	Overall (%)	χ^2
Feeding system	Scavenging only				57	
	Scavenging + grain				31	
	Semi-intensive				12	
Supplementation practice	Yes	100.0	100.0	100.0	100.0	0
Type of supplements	All types (grain, concentrate, leftovers)	67.5	67.5	65.0	66.7	2.0
	Grain + leftovers	20.0	17.5	12.5	16.7	
	Grain + concentrate	12.5	15.0	22.5	16.7	
Method of feed provision	Throw on ground for adults	10.0	0	0	3.3	13.9
	Container for young/nursing	10.0	7.5	0	5.8	
Frequency of feeding	Both methods	80.0	92.5	100.0	90.8	
	All times (morning, noon, evening)	42.5	47.5	15.0	35.0	11.5
	Morning and noon	42.5	32.5	55.0	5.0	
Limitations to feeding	Morning only	15.0	20.0	30.0	60.0	
	Unavailability of feeds	82.5	85.0	80.0	82.5	8.8
	Lack of cash/credit	10.0	10.0	0	6.7	
Water source	Lack of awareness	7.5	5.0	20.0	10.8	
	River	42.5	32.5	32.5	35.8	1.2
	Tap/pipe	57.5	67.5	67.5	64.2	

Type of drinker	Plastic	80.0	70.0	67.5	72.5	10.6
	Clay	0	2.5	7.5	3.3	
	Stone	10.0	17.5	25.0	17.5	
	Wooden	10.0	10.0	0	6.7	

1 **Table 5: Housing Systems and Hygiene Management**

Parameter	Category	Silti (%)	Dalocha (%)	Wulbareg (%)	Overall (%)	χ^2
Housing type	Separate poultry house	5.0	2.5	7.5	7	13.9
	Kitchen/animal house	57.5	75.0	87.5	73	
	Perch inside family house	25.0	12.5	5.0	20	
Night enclosure	Kitchen/animal house	57.5	75.0	87.5	73.3	13.9
	Room inside main house	25.0	12.5	5.0	14.2	
	Purpose-built house	5.0	2.5	7.5	5.0	
	Handwoven material	12.5	10.0	0	7.5	
Frequency of cleaning	Every day	90.0	87.5	95.0	90.8	1.4
	Every three days	10.0	12.5	5.0	9.2	

2

3 The study area primarily depended on scavenging for sustenance, augmented by locally available
4 feed resources such as grains, kitchen scraps, and agricultural by-products. Even though all of
5 the people who answered said they gave their animals extra food, the kind and amount varied a
6 lot from one household to the next. This finding corroborates earlier studies that demonstrate
7 village chickens in Ethiopia predominantly depend on scavenged feed resources, supplemented
8 occasionally based on household resource availability [8, 23]. Because they rely on scavenging
9 feed resources, they often end up with nutritional deficiencies, which can slow their growth and
10 egg production. The study found that supplementary feeds could be maize, wheat, leftover food
11 from the home, like "*injera firfir*," or byproducts from processing grains. Rural families often
12 use these locally available feed resources because they are easy to obtain and cheap. Other
13 village poultry systems in Ethiopia and Africa have also reported similar feeding practices [14,
14 22]. But the study area's irregular feeding frequency shows that feeding management is mostly
15 based on chance rather than a plan. People who kept indigenous chickens usually didn't do a
16 satisfactory job of housing them. Instead of putting their chickens in separate poultry houses,
17 most farmers kept them in the kitchen, animal houses, or inside the family home. A small
18 number of people who answered said they had a separate chicken house. These kinds of homes
19 put chickens at risk from predators, diseases, and dirty conditions. Previous studies in Ethiopia
20 have indicated that village chickens are often kept in kitchens or homes because there aren't any
21 special buildings for chickens [16, 14].

22 **Table 6: Disease Prevalence and Health Management**

Parameter	Category	Silti (%)	Dalocha (%)	Wulbareg (%)	Overall (%)	χ^2
Disease outbreaks experienced	Yes	100.0	100.0	100.0	100.0	0

Most common diseases	Newcastle disease				71	
	Coccidiosis				15	
	Fowl pox				11	
	Others				3	
Actions when chicken sick	Treat with all means	90.0	82.5	80.0	84.2	5.4
	Sell immediately	7.5	10.0	5.0	7.5	
	Call veterinarian	2.5	5.0	7.5	5.0	
	Other actions	0	2.5	7.5	3.3	
Type of medicine used	Traditional/local	55.0	62.5	50.0	55.8	6.2
	Modern without prescription	45.0	35.0	40.0	40.0	
	Modern with prescription	0	2.5	10.0	4.2	
Season for NCD occurrence	Short rainy season (Belg)	87.5	82.5	70.0	80.0	5.6
	End of rainy season	12.5	15.0	22.5	16.7	
Local treatment for NCD	Mixture of enjera, oil, herbs, garlic, lemon	50.0	57.5	70.0	59.2	3.3
	Possible combinations	50.0	42.5	30.0	40.8	
Major constraints	Diseases (esp. NCD)	32.5	15.0	0	1	17.8
	Both diseases and predators	40.0	45.0	42.5	2	
	Feed shortage				3	
	Poor housing				4	
	Lack of veterinary services				5	

1

2 Chickens can become sick, not work as diligently and die more often if they live in poor housing.
3 The results indicated that diseases are the main thing that limits the production of native chickens
4 in the area studied. The majority of respondents indicated that Newcastle disease (NCD) was the
5 most prevalent. This finding is consistent with several studies conducted in Ethiopia and other
6 developing countries, which identify Newcastle disease as the most significant threat to village
7 chicken production [23, 22]. The high number of NCDs in traditional poultry production systems
8 leads to many deaths and lowers productivity. Farmers didn't know how to take care of their
9 health very well. Some people said they used modern veterinary medicines, but many of them
10 used traditional remedies like herbal treatments and combinations of ingredients that were easy
11 to find in their area, which may not always be effective in treating the high number of NCDs that
12 lead to deaths and lower productivity in poultry. In rural Ethiopia, where veterinary care is hard
13 to get and commercial medicines are expensive, traditional medicine is often used to raise
14 chickens in villages [1]. Along with diseases, predators were also a big problem for native
15 chicken farming. Aerial and terrestrial predators are known to attack birds in traditional poultry
16 systems where they can scavenge during the day [14]. People who rely on native chicken
17 farming are more likely to be preyed upon if they live in inadequate housing and don't have any
18 ways to keep predators away. This can lead to big economic losses and less food security.
19 Despite these challenges, rural residents depend on native chickens for their livelihood. In the
20 country, chickens are a source of food, money, and social value. Families make some money by
21 selling live chickens and eggs, and eggs and meat are beneficial for their health. Many places in
22 Ethiopia and sub-Saharan Africa have written about the same social and economic roles that
23 village chickens play [12]. The lack of substantial differences among the three study districts in
24 most parameters indicates that indigenous chicken production systems are fairly uniform across

the districts examined. This could be because the Silt'e Zone has households with similar agro-ecological conditions, farming systems, and socio-economic traits. The findings of this study indicate that indigenous chicken farming in the examined area remains predominantly traditional, constrained by insufficient management, disease outbreaks, and limited access to veterinary and extension services. Enhancing feeding management, housing conditions, and disease control measures could significantly boost the productivity and sustainability of village poultry production in the area.

Table 7: Chicken Productivity and Reproductive Performance

Parameter	Silti (Mean ± SD)	Dalocha (Mean ± SD)	Wulbareg (Mean ± SD)	Overall (Mean ± SD)
Age at first egg (months)	5.8±0.5	5.9±0.5	5.9±0.4	5.8±0.5
Number of eggs per clutch	13.9±2.2	14.4±1.9	14.1±1.7	14.1±2.2
Clutch number per hen/year	3.05±0.6	3.05±0.5	3.05±0.5	3.05±0.6
Eggs per set	11.3±1.5	11.4±1.4	11.1±1.3	11.2±1.5
Number of chicks hatched	10.3±1.4	10.5±1.3	9.9±1.5	10.3±1.4
Hatchability (%)	92.3±11.9	93.2±10.5	90.1±13.7	91.9±12
Number of chicks surviving	5±1.3	5.3±1.2	5.3±1.4	5.2±1.3
Survivability (%)	48.5±9.6	50.2±8.3	52.7±11.1	50.5±9.6
Frequency of incubation/year				
Twice (%)	57.5	67.5	82.5	69.2
Thrice (%)	35.0	25.0	17.5	25.8
Four times (%)	7.5	7.5	0	5.0
Incubation material				
Wood made with straw (%)	77.5	77.5	85.0	80.0
Clay made with straw (%)	15.0	15.0	15.0	15.0
Other materials (%)	7.5	7.5	0	5.0
Culling practice				
Practice culling (%)	0	2.5	25.0	9.2
Do not cull (%)	100.0	97.5	75.0	90.8
Reason for culling				
For sale (%)	92.5	95.0	87.5	91.7
For consumption (%)	7.5	5.0	12.5	8.3
Culling age				
2 years (%)	97.5	95.0	85.0	92.5
2.5 years (%)	2.5	5.0	15.0	7.5

5. CONCLUSION

This research evaluated indigenous chicken husbandry practices in specific districts of the Silt'e Zone, Central Ethiopia. The results show that raising chickens in villages is an important way to help people in rural areas live on giving them money, food, and social services. Most of the time, indigenous chickens are raised in traditional scavenging production systems that don't use many inputs, which limits their growth and reproductive performance compared to more intensive farming methods. This makes them less productive and healthy than more intensive farming

methods, which often provide better nutrition and veterinary care, leading to higher yields and improved overall flock health. The study area had small flocks on average, and most of the flock structure was made up of hens. People usually fed their animals by scavenging and adding grains and leftovers from their homes. Most chickens lived in kitchens or family homes instead of purpose-built poultry houses. This made housing systems generally inadequate. The major problem for native chicken farming was disease outbreaks, especially Newcastle disease. Farmers also said that diseases, insufficient food, predator attacks, and inaccessibility of veterinary and extension services were big problems. Despite these issues, native chickens are still crucial for improving nutrition and income in rural areas. Therefore, better management and stronger poultry extension services could make poultry production in the study area much more productive and long-lasting.

6. RECOMMENDATIONS

The results of this study indicate the following recommendations:

Regular vaccination programs, especially against Newcastle disease, should be put in place to lower the death rate in village chickens. It is also important to make sure that veterinary services are better at the local level.

Farmers should be encouraged to build simple, cheap chicken houses out of materials that are easy to find in their area. This will protect the chickens from predators, bad weather, and diseases.

Extension services should use feed resources that are available in the area, like grains, crop leftovers, and by-products of agriculture and industry, to encourage better feeding practices. This will make things more productive.

Farmers should be taught how to take care of their chickens, including how to feed them, keep them healthy, and breed them. Agricultural extension services should set up programs to do this.

Governments and development groups should make it easier for people to get credit, better breeds, and supplies for raising chickens to help the industry grow.

Future research should focus on improving the genetics of native chickens, finding better ways to feed them using feed resources that are available in the area, and creating sustainable poultry production systems for villages.

REFERENCES

1. Abegaz, S., & Tadesse, D. (2022). Village poultry production systems and constraints in rural Ethiopia. *Livestock Research for Rural Development*, 34(2), 45–54.
2. Alemayehu, T., Bruno, J., Getachew, F., & Dessie, T. (2018). Socio-economic, marketing and gender aspects of village chicken production in Ethiopia. *Tropical Animal Health and Production*, 50, 197–203.

3. Bekalu, M., Taye, M., Dessie, T., Wondim, D., Kebede, D., & Tenagne, A. (2024). Selection criteria and husbandry practices of indigenous chicken producers in northwest Ethiopia. *Heliyon*, 10(16), e36094.
4. Birhan, K., Alemayehu, K., Mengistie, T., Kebede, A., Wondmeneh, E., Dessie, T., & Hanotte, O. (2025). Genetic diversity of Ethiopian indigenous chickens: A basis for sustainable genetic improvement. *Agricultural Reviews*, 46(6), 877–884.
5. Central Statistical Agency (CSA). (2023). *Agricultural sample survey: Livestock and livestock characteristics*. Addis Ababa, Ethiopia.
6. Chaimiso, S. (2018). Review on village/backyard poultry production system in Ethiopia. *Pacific International Journal*, 1(3), 105–110.
7. Chaka, H., et al. (2012). Seroprevalence of Newcastle disease in backyard chickens in Ethiopia. *Poultry Science*.
8. Dana, N., Van der Waaij, L. H., Dessie, T., & Van Arendonk, J. (2010). Production objectives and trait preferences of village poultry producers of Ethiopia. *Tropical Animal Health and Production*, 42, 1519–1529.
9. Demeke, T. (2020). Characterization of village chicken production and marketing systems in Chiro district, Ethiopia. *Advances in Bioscience and Bioengineering*, 8(3), 56–62.
10. Desta, T. T., & Wakeyo, O. (2024). Reproductive characteristics of indigenous village chickens under traditional management systems. *Poultry Science and Management*, 1(2), 1–9.
11. Eskindir, A., Amanuel, D., & Shanku, E. (2025). Production system and egg quality of village chickens under traditional management in southern Ethiopia. *BMC Veterinary Research*.
12. FAO. (2020). *Poultry sector Ethiopia review*. Rome: Food and Agriculture Organization.
13. Fentie, T., Abebe, B., & Kassa, T. (2013). Small-scale family poultry production in Northwest Ethiopia. *Livestock Research for Rural Development*.
14. Fisseha, M., Azage, T., & Tadelle, D. (2010). Indigenous chicken production and marketing systems in Ethiopia. *Livestock Research for Rural Development*, 22.
15. Gueye, E. F. (2021). The role of family poultry in poverty alleviation, food security and gender empowerment. *World's Poultry Science Journal*, 77(2), 389–400.
16. Halima, H., Naser, F., Van Marle-Koster, E., & De Kock, A. (2007). Phenotypic variation of indigenous chicken populations in Northwest Ethiopia. *Tropical Animal Health and Production*, 39, 507–513.
17. Hassen, H., Naser, F. W., & De Kock, A. (2018). Indigenous chicken production and marketing systems in Ethiopia. *Poultry Science*, 97, 1743–1750.
18. Hunduma, D., et al. (2019). Village chicken production systems and constraints in Ethiopia.
19. Kassa, B., Alemayehu, K., Mengistie, T., et al. (2025). Genetic diversity of Ethiopian indigenous chickens: A basis for sustainable genetic improvement. *Agricultural Reviews*.
20. Mariye, M. (2023). Assessment of indigenous and exotic chicken production performance in East Gojam, Ethiopia. *American Journal of Agriculture and Forestry*.
21. Markos, S., Belay, B., & Dessie, T. (2024). Characterization of village chicken production systems in Western Tigray, northern Ethiopia. *American Journal of Aquaculture and Animal Science*, 3(1), 9–24.
22. Mekonnen, H., Mulatu, W., & Dessie, T. (2018). Assessment of village chicken production systems in Ethiopia.

23. Melesse, A. (2014). Significance of scavenging chicken production in rural communities of Africa. *Animal and Veterinary Sciences*, 2(4), 120–126.
24. Melkam, T. (2023). Assessment of indigenous and exotic chicken production performance and constraints in East Gojam district, Ethiopia. *American Journal of Agriculture and Forestry*, 11(3), 98–104.
25. Mossie, T. (2018). Newcastle disease in Ethiopia: Epidemiology and control.
26. Mulatu, W., & Sahile, Z. (2021). Indigenous chicken production practices and constraints in central Oromia, Ethiopia. *Tropical Animal Health and Production*, 53, 245–253.
27. Negasa, T., Oli, S., & Gobena, G. (2025). Productivity of indigenous and exotic chickens under semi-scavenging systems in Western Oromia, Ethiopia. *Poultry Science and Management*.
28. Resom, M., & Belay, S. (2024). Chicken rearing practices in Tigray region, northern Ethiopia. *Asian Journal of Research and Review in Agriculture*, 6(1), 199–214.
29. Tadelle, D., Ogle, B., & Peters, K. (2001). Village chicken production systems in the central highlands of Ethiopia. *Tropical Animal Health and Production*.
30. Taye, M. (2023). Indigenous chicken production performance in East Gojam, Ethiopia. *American Journal of Agriculture and Forestry*.
31. Taye, M., & Dessie, T. (2022). Characterization of indigenous chicken production systems in Ethiopia: Implications for genetic improvement programs. *Journal of Animal Breeding and Genetics*, 139, 276–286.
32. Teklewold, H., Dadi, L., Yami, A., & Dana, N. (2021). Determinants of adoption of poultry technologies in Ethiopia. *Agricultural Systems*, 190, 103097.
33. Tesfaye, E., & Negussie, E. (2023). Constraints and opportunities of village chicken production in Ethiopia: A review. *International Journal of Livestock Production*, 14(2), 45–55.
34. Tsadik, E., Tamir, B., & Sahile, Z. (2015). Husbandry practices of village poultry in Central Oromia. *Livestock Research for Rural Development*.
35. Wondmeneh, E., Dessie, T., & Mwai, O. (2016). Village chicken production systems in Ethiopia.
36. Worku, Z., Melesse, A., & Tadelle, D. (2022). Indigenous chicken production systems and performance in Ethiopia. *African Journal of Agricultural Research*, 18(5), 650–659.
37. Yitbarek, M. B., & Getachew, T. (2021). Review on village poultry production systems in Ethiopia. *International Journal of Poultry Science*, 20(1), 1–7.
38. Zeleke, G., & Gebremedhin, B. (2022). Economic importance of village poultry production for rural households in Ethiopia. *Agricultural Economics Review*, 23(1), 112–120.