



Challenges and Opportunities of Backyard Poultry Production in Ezha District, Gurage Zone of Ethiopia

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ABSTRACT

This study was conducted with the objective of assessing the opportunities and challenges of backyard poultry production at three villages in Ezha district, Gurage Zone of southern Ethiopia using a semi-structured questionnaire, field visit and interview with 150 randomly selected respondents. The dominant chicken production system in the study area was an extensive system (74%) with scavenging and seasonal supplementary feeding (53%). Grains are the main feed used. Almost 65% of poultry share the same room with the main house with perch, the rest 20%, and 15%, respectively, use the different shelters. Most of the farmers (80%) use traditional medicine to treat their chicken. The average age of first laying was 5 months, mean number of eggs per clutch was 12. The mean clutch size was 3.3 and the hatchability percentage was 72%. The result revealed that the main constraints of village poultry production in the study area, especially in village 2 were predator (48%), disease (33.7%), feed shortage (19.3%), market (10%), and the primary opportunity was extension (34%) followed by credit, (24.6%), market (23.4%) and feed access (18%) and, respectively. It is concluded that constraints and opportunities of village chicken production were identified. Controlling predators, improving the management practices, and educating the farmers are viable options to improve the livelihood of the households.

Keywords: Chicken, Ezha, Gurage Zone, Opportunities, Predators, Tigray, Ethiopia.

1. INTRODUCTION

In most African countries rural poultry alone provides 70% of poultry products and 20% of animal protein intake (Awuni et al., 2006). In Africa, village poultry production systems are mainly based on scavenging indigenous chickens found in almost all households in the rural areas. They are characteristically an integral part of the farming systems requiring low inputs with outputs accessible at both inter household and intra household levels (Kitalyi, 1997).

Ethiopia has large population of chicken, estimated to be 50.38 million (CSA, 2014). The Southern Nation, Nationalities and Peoples Region (SNNPR) contributed 7.69 million and holds about 19.8% of the total national chicken population. This region contributes about 18% of the total annual national egg and poultry meat production.

Out of the total regional chicken population, the rural areas comprise about 97.9% of the total regional chicken population while the urban areas constitute 2.1%. Together, *Sidama*, *Gurage* and *Hadiya* zones account for about 43.6% of the total regional indigenous chicken population of

SNNPR (FAO, 2007). From the total population, 99% are raised under the traditional backyard system of management with little or no inputs for housing, feeding or health care, while 1% is under intensive management system (Ashenafi and Eshetu, 2004).

Poultry are kept by about 60% of households. On average a household owns a flock comprising 6-10 birds which are almost entirely indigenous in the scavenging system. National poultry meat production is in the order of 76,000 tones and egg production approaches 80,000 tones (Halima, 2007; Halima et al., 2007). The low productivity of local birds coupled with the infancy of the commercial sector (only contributes less than 10% of the total poultry and poultry products) has resulted in a low supply of poultry meat and eggs to the nation. As a result, the capita egg and chicken meat consumption are about 57 eggs and 2.5 chickens per annum, these figures are very low by international standards (Alemu and Tadelle, 1997).

In developing countries, including Ethiopia, the semi-intensive (backyard) production system is generally based on the use of native chicken breeds. The village poultry production system is constrained using indigenous birds, which are small and low in meat and egg production. There is large number of chickens in Gurage zone, which is located at 200 kms southwest of Addis Ababa, the capital of Ethiopia.

In Gurage zone, therefore, there is a potential for chicken production under farmers level which could contribute to national economy as well as change the livelihood of farmers in the area. However, information is scarce or unavailable on chicken production system and constraints in the study area. The purpose of this study was to assess chicken production opportunities and challenges in the study area.

1.1. Study Area

The study was conducted from November 2016 to May 2017 in Ezha district of the Gurage zone. This zone has a land size of about 5932 square kilometers, and it consists of 15 districts, also called *woredas*. It is located at 200 kms southwest of Addis Ababa. Topographically, the zone lies in an elevation ranging from 1000 to 3600 meters above sea level. The zone has three agro-ecological zones *dega* (highland) (35%) *weynadega* (midland), (62%) and *kola* (lowland) (3%). The annual average temperature of the zone ranges from 13 to 30 degree Celsius and the mean annual rainfall ranges from 600-1600 mm.

2. MATERIALS AND METHODS

2.1. Sampling Procedure

Primary data were collected using semi-structured questionnaire (Appendix 1), field visit, interview and secondary data were collected from different documents from Agricultural Development Offices. A multistage sampling procedure was employed to select sample kebeles, the smallest administrative unit and households for the study. The district was first stratified as *kola, dega and weyna-dega* agro-ecologies. From 28 kebeles present in the district, 3 kebeles were randomly selected from each of the 3 agro-ecologies. 150 households per kebele that own, at least, one chicken was randomly selected. Thus, a total of 150 (50 household's × 3 villages) households were interviewed. A semi-structured questionnaire (Appendix 1) was used to gather the required information on major constraints and opportunities of village chicken production. In addition, data related to feeding system, housing condition, health care, credit etc., were also collected.

2.1. Data Analysis and Presentation

The survey results were reported using descriptive statistics and presented in the form of tables, graphs, and charts. The descriptive statistical method such as percentage, standard deviation and mean was utilized to data analysis.

Table 1. Socio-economic characteristics and respondents' profile.

| <i>Sex of Households</i> | <i>Respondents</i> | | | | <i>%</i> | | |
|-----------------------------------|--------------------|------------------|------------------|--------------|-------------|-----------|------|
| | <i>Village 1</i> | <i>Village 2</i> | <i>Village 3</i> | <i>Total</i> | <i>Mean</i> | <i>SD</i> | |
| Male | 18 (36) | 21(42) | 14 (28) | 53 | 17.6 | 3.51 | 35.4 |
| Female | 3 (64) | 29 (58) | 36 (72) | 97 | 32.3 | 3.51 | 64.6 |
| No. of Households | 50 | 50 | 50 | 150 | | | |
| <i>Educational Status</i> | | | | | | | |
| Illiterate | 10(20) | 16(32) | 13(26) | 39 | 13 | 3 | 26 |
| Read & write | 19(38) | 18(36) | 15(30) | 52 | 17.3 | 2 | 34.6 |
| 1 st – 4 th | 11(22) | 8(16) | 8(16) | 27 | 9 | 1.7 | 18 |
| 5 th -8 th | 6(12) | 5(10) | 9(18) | 20 | 6.6 | 2 | 13.4 |
| 9 th -12 th | 4(8) | 2(4) | 4(8) | 10 | 30.5 | 6.6 | |
| 12+3 | N/A | 1(2) | 1(2) | 2 | 1 | 0 | 1.4 |

3. RESULTS

3.1. Socio-economic Characteristics and Respondents Profile

The results indicate that most of the respondents are female headed (64.6%) compared to male headed (35.4%) (Table 1). Based on the educational status, 34.6% are capable of reading and

writing while 26% were illiterate. Among the literate respondents 18% obtained primary (1-4), 13.4% primary (5-8), 6.6% high school (9-12), and 1.4% diploma (10+3) education.

3.2. Type of Management

The results of the study showed that the dominant chicken production systems in the study area are scavenging (74%) and semi-intensive system (26%) (Fig 1).

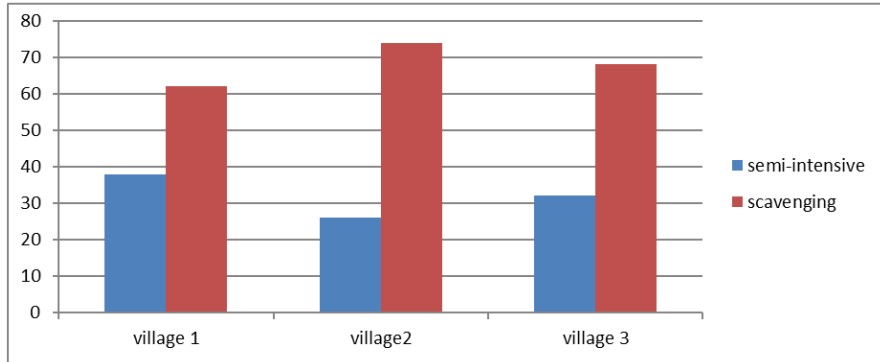


Figure 1. Type of management practiced in the study area.

3.3. Source of Flock in the Study Area

Majority of the respondents responded that their source of poultry was from agriculture office (42%), followed by purchasing from market (20%) and hatching home (18%) and from hatching and purchasing (20%) (Fig 2).

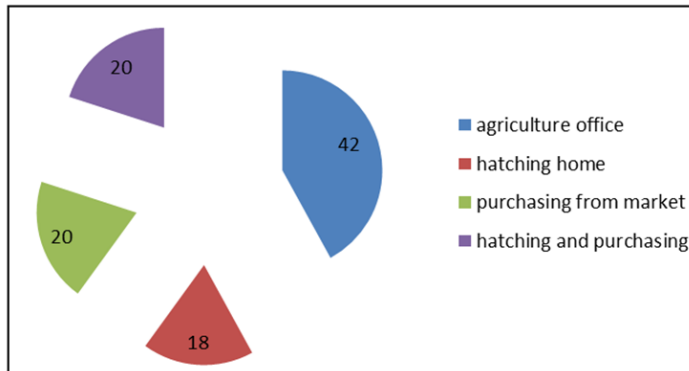


Figure 2. Source of flock in study area.

3.4. Housing System of Village Chicken

Majority of farmers were housed their chicken by sharing the same room with perch 65%. The rest 20% and 15% respondents were used different shelter in the same room with the families and separated entirely respectively (Table 2).

Table 2. Housing systems of village chicken.

| <i>Housing system</i> | <i>No respondents</i> | | | | | | <i>%</i> |
|----------------------------|-----------------------|------------------|------------------|--------------|-------------|-----------|----------|
| | <i>Village 1</i> | <i>Village 2</i> | <i>Village 3</i> | <i>Total</i> | <i>Mean</i> | <i>SD</i> | |
| Perch in the house | 38 | 30 | 29 | 97 | 32.3 | 4.9 | 65 |
| Separate room in the house | 9 | 13 | 9 | 31 | 10.3 | 2.3 | 20 |
| Separate entirely | 3 | 7 | 12 | 22 | 7.3 | 4.5 | 15 |
| Total | 50 | 50 | 50 | 150 | 50 | 0 | 100% |

3.5. Supplementary Feeding and Frequency of Feeding

The respondents are mainly depending on supplementing grains were the major (53%) of feeds stuffs supplemented by farmers food left over and kitchen waste (25%) and (22%) respectively were the main type of supplementary feeds in the study area (Table 3). Accordingly, about (40.6) of respondents provide supplementary feed once a day. About (40%) feed twice and (19.4%) of respondent provide supplementary three times per day.

Table 3. Supplementary feeding and frequency of feeding in the study area.

| <i>Types of supplementary feed</i> | <i>No of respondents</i> | | | | | | <i>%</i> |
|------------------------------------|--------------------------|------------------|------------------|--------------|-------------|-----------|----------|
| | <i>Village 1</i> | <i>Village 2</i> | <i>Village 3</i> | <i>Total</i> | <i>Mean</i> | <i>SD</i> | |
| Grains | 21 | 27 | 32 | 80 | 26.6 | 5.5 | 53 |
| Food leftover | 11 | 14 | 12 | 37 | 12.3 | 1.5 | 25 |
| Kitchen waste | 18 | 9 | 6 | 33 | 11 | 6.2 | 22 |
| Total | 50 | 50 | 50 | 150 | 50 | 0 | 100% |
| Frequency of feeding | | | | | | | |
| Once a day | 24 | 19 | 18 | 61 | 20.4 | 3.2 | 40.6 |
| Twice a day | 17 | 21 | 22 | 60 | 20 | 2.6 | 40 |
| Thrice a day | 9 | 10 | 10 | 29 | 9.6 | 0.5 | 19.4 |
| Total | 50 | 50 | 50 | 150 | 50 | 0 | 100% |

3.6. Production and Reproduction Performance

The chickens in the study area attain sexual maturity and start laying at age 5 month the number of eggs per clutch per hen the mean is 11.6. Frequency of hatching/hen/ year in the study area were 3.3 times in a year as although the average number of egg set/hatching were 8.

3.7. Constraints and Opportunities of Village Chicken

The major constraints of village poultry production in the study area especially in village 2 is predator (48%) (Table 4). The second serious problem of poultry production is disease (33.7%)

feed shortage (19.3%), market (10%) and from opportunities extension was the primary opportunity (34%) for the sector improvement followed (24.6%), (23.4%) and (18%) of opportunities for chicken production credit, market and feed access, respectively

3.8. Health Care Mechanism

As indicated in table 5, majority of the farmers about 80% were used traditional medicine on the other hand 20% of the respondents use modern medicine.

3.9. Cause of Mortality in the Study Area

The result revealed that 59.3% of the death was by predators and disease 37.3% and animal trampling effects were 3.4%. (Table 6).

Table 4. The major constraints and opportunities of village chicken production.

| <i>Constraints</i> | <i>No of respondents</i> | | | | | | <i>%</i> |
|----------------------|--------------------------|------------------|------------------|--------------|-------------|-----------|----------|
| | <i>Village 1</i> | <i>Village 2</i> | <i>Village 3</i> | <i>Total</i> | <i>Mean</i> | <i>SD</i> | |
| Feed shortage | 16 | 9 | 4 | 29 | 9.6 | 6 | 19.3 |
| Disease | 5 | 4 | 25 | 34 | 11.3 | 11.8 | 22.7 |
| Market | 3 | 4 | 8 | 15 | 5 | 2.6 | 10 |
| Predator | 26 | 33 | 13 | 72 | 24 | 10 | 48 |
| Total | 50 | 50 | 50 | 150 | 50 | 0 | 100 |
| Opportunities | | | | | | | |
| Credit | 12 | 15 | 10 | 37 | 12.3 | 2.5 | 24.6 |
| Feed access | 6 | 8 | 13 | 27 | 9 | 3.6 | 18 |
| Extension | 23 | 15 | 13 | 51 | 17 | 5.2 | 34 |
| Market | 9 | 12 | 14 | 35 | 11.6 | 2.5 | 23.4 |
| Total | 50 | 50 | 50 | 150 | 50 | 0 | 100 |

Table 5. The health care mechanism of village chicken.

| <i>Types of Medicine</i> | <i>No of respondents</i> | | | | | | <i>%</i> |
|--------------------------|--------------------------|------------------|------------------|--------------|-------------|-----------|----------|
| | <i>Village 1</i> | <i>Village 2</i> | <i>Village 3</i> | <i>Total</i> | <i>Mean</i> | <i>SD</i> | |
| Traditional medicine | 44 | 36 | 40 | 120 | 40 | 4 | 80 |
| Modern medicine | 6 | 14 | 10 | 30 | 10 | 4 | 20 |
| Total | 50 | 50 | 50 | 150 | 50 | 0 | 100 |

Table 6. Cause of mortality of village chicken production.

| <i>Causes of Mortality</i> | <i>No of respondents</i> | | | | | | <i>%</i> |
|----------------------------|--------------------------|------------------|------------------|--------------|-------------|-----------|----------|
| | <i>Village 1</i> | <i>Village 2</i> | <i>Village 3</i> | <i>Total</i> | <i>Mean</i> | <i>SD</i> | |
| Predators | 33 | 43 | 13 | 89 | 29.6 | 15.2 | 59.3 |
| Diseases | 16 | 4 | 36 | 56 | 18.6 | 16.1 | 37.3 |
| Animal trampling | 1 | 3 | 1 | 5 | 1.6 | 1.1 | 3.3 |
| Total | 50 | 50 | 50 | 150 | 50 | 0 | 100 |

4. DISCUSSION

Among the respondents, majority about 64.6% were female headed while the remaining (35.4%) of the respondents were male headed households. However, the proportions of female headed households (64%, 58% and 72%) were higher than male headed house households (36%, 42% and 28%) respectively, in lowland, midland and highland agro-ecologies of the study area (Table 1). However, contrasting results were reported from western zone of Tigray (Shishay, 2014) where the proportions of male headed households (80%, 86.3% and 85.1%) were higher than female headed households (20%, 13.7% and 14.9%) respectively in lowland, midland, and highland agro-ecologies of the study area. Analysis for educational status of the respondents disclosed that 34.6% of the respondents were found to be capable of reading and writing while 26% were illiterate. About 18%, 13.4%, 6.6% and 1.4% of the literate respondents went through primary first cycle (1-4), primary second cycle (5-8), high school (9-12) and diploma program (12 +3) respectively. The proportions of the educational status of the respondents were varied across agro-ecologies. The proportions of illiterate respondents in the lowland (20%) were lower than in midland (32%) and highland (26%). This indicates that households in the highlands have better access to educational services as compared with either of the agro-ecologies. Generally, the highest proportions of the respondents were those capable of reading and writing in each agro-ecology. Educational status identified under the current study was so much better compared to Halima (2007) who reported 82.12% as illiterate from northwest Ethiopia.

The results in the present study showed that the dominant (74%) chicken production system in the study area is scavenging. However, 26% of the respondent farmers practice semi-intensive type, that is, mixed scavenging and in-house chicken management using fences around their homestead. The findings of the study nearly agree with Abera and Hussen (2016) who indicated that 70% of the chicken production system in the study area is a scavenging or extensive type.

Majority of the respondents responded that their main source of poultry was from agriculture office (42%), followed by purchasing from market (20%) and hatching home (18%) and from hatching and purchasing (20%). This result totally disagrees with Salo et al. (2016) where the major source of stock is market purchased (46.7%), hatched (16.7%) and purchased (28.9%), and agricultural office (7.8%). The main reason for this variation in the present study area is agriculture office which is the main source of flock and mainly giving pullets with credit for the local peoples.

Housing is essential to chickens as it protects them against predators, theft, inclement weather (rain, sun, cold wind, dropping night temperatures) and to provide shelter for egg laying (Ndiilokelwa, 2011). The majority of farmers were housed their chickens by sharing the same room with perch 65%. The rest 20% and 15% respondents were used different shelter in the same room with the families and separated entirely respectively. This indicates that the owners are not aware of the importance of housing. The reason could be due to economical. That is, owners may not be able to afford to separate housing for their chicken. According to Molla (2010) such a situation might be attributed to the fact that women own and manage rural household poultry whereas construction of poultry house is the job of husbands (Molla, 2010). In addition, high disease prevalence especially new castle disease, poor extension service, poor marketing infrastructure, lack of marketing support, lack of market information and inappropriate feeding and different social and economic factors affect the village poultry production (Mwalusanya et al., 2002).

Most of the respondents are dependent on supplementing grains maize (*Zea mays*) about 53%. Main type of supplementary feed stuffs in the study area by the farmers is the food left over and kitchen waste (25%) and (22%) respectively (Table 3). But there are some variations on the type of feed used between the study areas as it seems mainly due to crop production availability. However, the primary use of these crops was for human consumption (Fisseha, 2009). In addition to grain, farmers also supplement food leftovers like *Enseteventricosum* products boiled *Enset* (*amicho*) and baked *Enset* (*kocho*). The result slightly agrees with the result of Salo et al. (2016) which indicates that home produced grains were the major ones (65.1%) (Table 3).

Regarding feeding about 40.6% of the respondents provide supplementary feed once a day, 40% twice and 19.4% thrice a day. Overall, 82% were feeding their chicken flock in group and the rest 18% feed separately to the different age classes of chickens. Results also showed that farmers provide supplementation for chickens at any time of the day both in the morning (42%), before scavenging (32%), and at any time of the day (26%). Results suggest that majority of the chicken attains sexual maturity at age 5 month and start laying but according to Mekonnen (2007) it is 7 months. This variation may be due to free water availability and feed supplementation of village chicken in the present study area. This finding agrees with (CSA, 2015) that indicated the national average egg-laying period per hen per year is about 4 periods for the local breeds. Average eggs per clutch per hen based on the survey result is 11.6. This result is in line with CSA (2015), which

is about 12 in the country level. The frequency of hatching/hen/ year in the study area was 3.3 times in a year as responded by the households. This finding agrees with CSA (2015) that the national average egg-laying period per hen per year is about 4 for the local breeds although the average number of egg set/hatching was 8.

The major constraints of village poultry production in the study area, especially in village 2 is predator (48%). This might be because of poor housing system, free scavenging feeding system and suitability of the area for presence of predators. Among challenges, problem of predators like baboons, and wild cat (Shelemetmat), and disease (33.7%) specifically Newcastle disease and gumboro are the main ones. However, there was a problem in identifying the real causes and the type of diseases that led to chicken deaths since most of the veterinary services given to the farmers were not supported with laboratory investigation feed shortage (19.3%), market (10%) are the other constraints that hinder the production.

Despite many constraints that affect poultry production in the study area, there were also some opportunities to improve village chicken production and productivity for the future such as extension service, credit, market, and feed access. Extension was the primary opportunities (34%) for the sector improvement followed by production credit (24.6%), market (23.4%), and feed access (18%) (Table 6). Health care is another issue which is a management aspect of village chicken production to improve chicken productivity. Many farmers about 80% were used traditional medicine by local herbs such as garlic, lemon and ginger with feeds and drinking water to cure chickens when they are infected (Table 7). On the other hand, 20% use modern medicine with the help of veterinarian. Farmers using modern medicine were lower probably because of lower veterinarian accessibility and lack of awareness and adaptability. Feleke et al. (2015) reported 78.3% of farmers as using traditional medicine and 21.7% modern medicine.

It was revealed that 59.3% of the deaths were due to predators mainly in village 2 and diseases such as New Castle Disease (NCD) and Gumboro (37.3%). At the same time, minimum deaths were observed by animal trampling effects (3.3%). The rate of deaths has a significant influence on the local people in rearing poultry and also impact on crop production. Molla (2010), on the other hand reported that NCD is one of the major causes of death of village chicken mortality in central high land of Ethiopia. This variation might be due to free scavenging feeding system and comfortable area for predators because of most of the land is occupied by forest and improper housing.

5. CONCLUSIONS

The results indicate that in the study area, chicken is mainly raised under traditional management practice and free scavenging (74%). They are having many problems such predators (48%) disease (33.7%) feed shortage (19.3%), market (10%). Availability of extension is the primary opportunity (34%) followed by credit (24.6%), market (23.4%) and feed access (18%). Better understanding of these constraints and good prospects of village chicken production is important to improve food security and improves the standard of living condition of the farmers. Incidence of predation in the area was about 59.3%, especially in village 2 which is the most serious constraint hindering poultry production. Most of the farmers are using traditional medicine (80%) to treat chicken. About 65% share the same room with the family due to absence of a separate housing of chickens. The chicken lay first egg at an average age 5 months. It is recommended to minimize or reduce free ranging feeding system, which exposes chicken to predators.

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The authors declare that there is no conflict of interest in any form.

7. CONFLICT OF INTEREST

There are no conflicts of interests.

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ANNEXURE 1

Questionnaire developed to collect data

(Challenges and opportunities of backyard poultry production in EzhaWoreda, Gurage zone, Southern Ethiopia)

1. Type of management

1. Semi-Intensive 2. Scavenging

2. Source of flock

1. Purchasing from market; 2. Hatching home; 3. Hatching and purchased; 4. Agriculture office

3. Practice, frequency, and supplementation of feeding system

3.1. Frequency of feeding

1. 1time 2. 2times 3. 3times

3.2. Way of supplementation

1. Separate to different classes 2. together the whole group

3.3. Way of offer of the supplement

1. In the morning before they go out before scavenging
2. Both in the morning and any time during day
3. Any time during day

3.4. Basis to give supplement

1. Egg yield 2. Meat yield 3. Broodiness

4. Type of supplementary feed

1. Grains 2. Food left over 3. Kitchen waste

5. Source of feed

1. From the house 2. purchased 3. purchased and from the house

6. Production and reproduction performance of village chicken in the study area

6.1 Age 1st egg laying (month)

1. 5month 2. 6month 3. 7month

6.2 Number of egg /clutch/hen

1. 11 2. 12 3. 13

6.3 No. of hatching/hen/ year

1. 2 2. 3 3. 4

6.4 No. of egg set/hatching

1. 7 2. 8 3. 9

6.5 No. of chicks hatched/hen

1. 6 2. 7 3. 8

7. Constraints of village poultry production in the study area

1. Feed shortage 2. Disease 3. Market 4. Predator

8. Opportunities of village poultry production in the study area
 1. Credit service
 2. Feed access
 3. Extension service
 4. Market
 5. None
9. Purpose of keeping poultry in the study area
 1. Reproduction
 2. Source of income
 3. Consumption
 4. Religious sacrifice
10. Housing system of poultry (%) in the study area
 1. Perch in the house
 2. Separate room in the house
 3. Separate entirely
11. Reason not to construct a separate house
 1. Lack of knowledge
 2. Fear of predators
 3. Shortage of material
 4. Lack of man power
12. Chickens and egg price in the study area
Sold variables
 1. Cockerel
 2. Pullet
 3. Cock
 4. Hen
 5. Egg
13. Water supplementation
 1. Yes
 2. No
14. Frequency of watering
 1. Once a day
 2. Twice a day
 3. Every other day
 4. Ad libitum
15. Source of water
 1. River
 2. Tap water
 3. Ground and spring water
16. Cause of mortality
 1. Predators
 2. Disease
 3. Animal trampling
17. Health care mechanism of chickens in the study area
 1. Modern Medicine
 2. Traditional Medicine
 3. Type of breed (%) in the study area
 1. Local
 2. Exotic
 3. Cross
 4. Feeding practice
 1. In the container
 2. Throw on ground