Food Science and Quality Management
ISSN 2224-6088 (Paper) ISSN 2225-0557 (Online)
Vol.121, 2023

Assessment of Chicken Production and Productive Performance in Pawe District, Beneshangul Gumuz Regional State, Ethiopia

Dejene Teshome Biratu
Department of Animal Sciences, College of Agriculture and Veterinary Sciences,
Assosa University, P.O.Box:18, Assosa, Ethiopia
*corresponding author.dteshome19@gmail.com

Abstract
The study was conducted with the overall objective to assess of chicken production systems and identify the productivity performance related to chicken production under village/traditional production system in pawe district of Beneshangul Gumuz Regional State, Ethiopia. A total of 80 respondents were purposively selected from four purposively selected kebeles in the study areas based on the accessibility and the potential in chicken production. All the collected data were analyzed using SPSS version of 20. Results of the study revealed that the average flock size of local chickens was (13.8 ± 0.20) per household in the study areas. The average age at first egg laying for the local chickens was (6.18 ± 0.024month). The survey indicated that the average egg production of the local chicken breeds was (60 ± 0.123 eggs per hen per year). The study also revealed that the average number of eggs set for brooding/incubation was 10.65 ± 0.03 per hen, from which relatively fair percentage of chicks (81.50 %) was hatched from local chickens. High proportion of chicken mortality up to age of 8 weeks was reported which might indicate high prevalence of chickens diseases and predators. The study revealed that majority of the respondents practice traditional scavenging system of chicken production. The major diseases of chicken in the study areas were New castle disease, Fowl typhoid, Infectious bronchitis, Gumboro and Marek's diseases in order of their importance. Thus, the major constraints related to poultry production should be alleviated to scale out through improve overall management chicken with the distribution of improved chicken breeds for producers to better the productivity of chickens in the study areas.
Keywords: Local chickens, Chicken production, chicken productivity
DOI: 10.7176/FSQM/121-03
Publication date: January 31st 2023

1. INTRODUCTION

In Ethiopia chickens are the most widespread and almost every rural family owns chickens, which provide a valuable source of family protein and income (Tadelle *et al.,* 2003). According to estimates of CSA (2015), Ethiopia has 60.51 million chickens, among which indigenous chicken constitute 94.33% and the remaining 2.47% is exotic and 3.21% hybrid chicken. The majorities (99%) of these birds are maintained under a traditional system with little or no inputs for housing, feeding or health care. The most dominant chicken types reared in this system are local ecotypes, which show a large variation in body position, plumage color, comb type and productivity (Halima *et al*., 2007).

Rural poultry in Ethiopia represents a significant part of the national economy in general and the rural economy in particular and contributes 98.5% and 99.2% of the national egg and chicken meat production, respectively (Aberra, 2000). However, the economic contribution of the sector is not still proportional to the huge chicken numbers, attributed to the presence of many production, reproduction and infrastructural constraints. About 99% of chicken owners of North- eastern Ethiopia provided supplementary feed to village birds once per day, mainly during feed shortage seasons (Halima, 2007). The greater part of the feed for village birds is obtained through scavenging, which includes; the household cooking waste, cereal and cereal by-products, roots and tubers, oilseeds, trees, shrubs, fruits and animal proteins (Tadelle *et al*., 1996).The amount & availability of scavenging feed resource base (SFRB) per bird are significantly dependent on season, household grain availability, the time of grain sowing and harvesting and household flock size (Tadelle, 2004).

According to the data obtained from BGRS-ANRD office (2017), there were around 1.62 million chicken populations in BGRS, accounting to 2.9 % of the national chicken population. Metekel administrative zone, where the study district is found, accounts to409, 863 (25.3 %) of the regional chicken population (BGRS-ANRD 2017).

According to Pedersen (2002); it is difficult to design and implement chicken-based development programs that benefit rural people without understanding village chicken production and marketing systems. Hellin *et al*. (2005) also reported that understanding of village chicken functioning and marketing structure are a prerequisite for developing market opportunities for rural households and could be used to inform policymakers and development workers in considering the commercial and institutional environment in which village chicken keepers have to operate.

1.1. Statement of the Problem and Research Gaps

Pawe district of Metekel zone is one of the top producers of chickens. It is believed that the nutritional status and income levels of rural and town populations could be enhanced through productivity of chicken populations. However, the current production and productivity of chickens in the pawe district have not well investigated and documented even in Beneshangul Gumuz in general. Therefore, it is a high time and urgent need to investigate the current production and productivity performance of chickens in pawe district. Based on the above mentioned facts and research gaps, this research is initiated with the following general and specific objectives.

1.2.1. General objective

❖ To assess chicken production system and productivity performance in Pawe District, Beneshangul Gumuz Regional State, Ethiopia

1.2.2. Specific objectives

- To study the current on-farm production of chickens under village production system in the study area
- To study the current productivity performance of chickens in the study area

2. MATERIALS AND METHODS

2.1. Description of the study areas

The study was conducted at Pawe district found in Metekel administrative zone of Beneshangul Gumuz Regional state (BGRS), located at 11^0 09'N latitude and 36^0 03′ E longitudes in the North-Western part of the country. The study district shared boarders with Dangur district in North, Mandura district in South, Dangur and Mandura district in west and Amhara Region in the East. According to BGRS-BoANRD (2017), the study district has an agricultural human population size of 41,162 (21,186 male and 19,976 female) and the total human population was estimated to be 59,127 (30,041 males and 29,113 females). The population density is estimated to be 87.68 people per square kilometer. The study district has a total of 20 rural kebeles, from which 3 are urban (Felege, Selam and Mender 7) and 18 are rural kebeles. From the total human population, 85 % were rural community and15% were urban dwellers (BGRS-BoANRD, 2017). Almu, the administrative and commercial center of the district, is found at about 340 and 548 km from Assosa, the capitals of Beneshangul-Gumuz Regional State and Addis Ababa, respectively.

The study district has a total land area of 5184.2 km square. The average altitude of the study district is estimated to be 1120 meters above sea level. The total average annual rainfall is estimated to be 1578 mm and the rainfall has a mono-modal pattern which extends from late May to early November. It has an average temperature 24.4^0 C with minimum and maximum annual temperature of 16.3^0 C and 32.6^0 C, respectively (BGRS-BoANRD, 2017). Livestock is considered as an important component of the prevailing crop-livestock mixed farming systems of the study district. Small holder farmers of the study area owned various livestock species such as; cattle, sheep, goat, chicken and equines. According to BGRS-BoANRD (2017), the study district is reported to have a total population of 67,171 for cattle, 316,890 for sheep, 15,362 for goats, 491 for donkeys, 568 for mules and 23,017 for chicken. The study district was categorized as one of the administrative district of Metekel administrative zone of Beneshangul Gumuz Regional state (BGRS) known to have highest potential for crop and livestock production. Crop production is highly related to village chicken production of the study district with high seasonal fluctuation of feeds availability, high prevalence of disease and other production and marketing constraints (BGRS-BoANRD, 2017).

Sorghum, soy bean, maize, Finger millet, sesame, groundnut, Mango, pepper and vegetables were the common crops grown. Most households produced two or more of the mentioned crops. Cattle, goats, sheep, and donkeys are the types of livestock raised. About 57 percent of the total households in the study sites keep chicken.

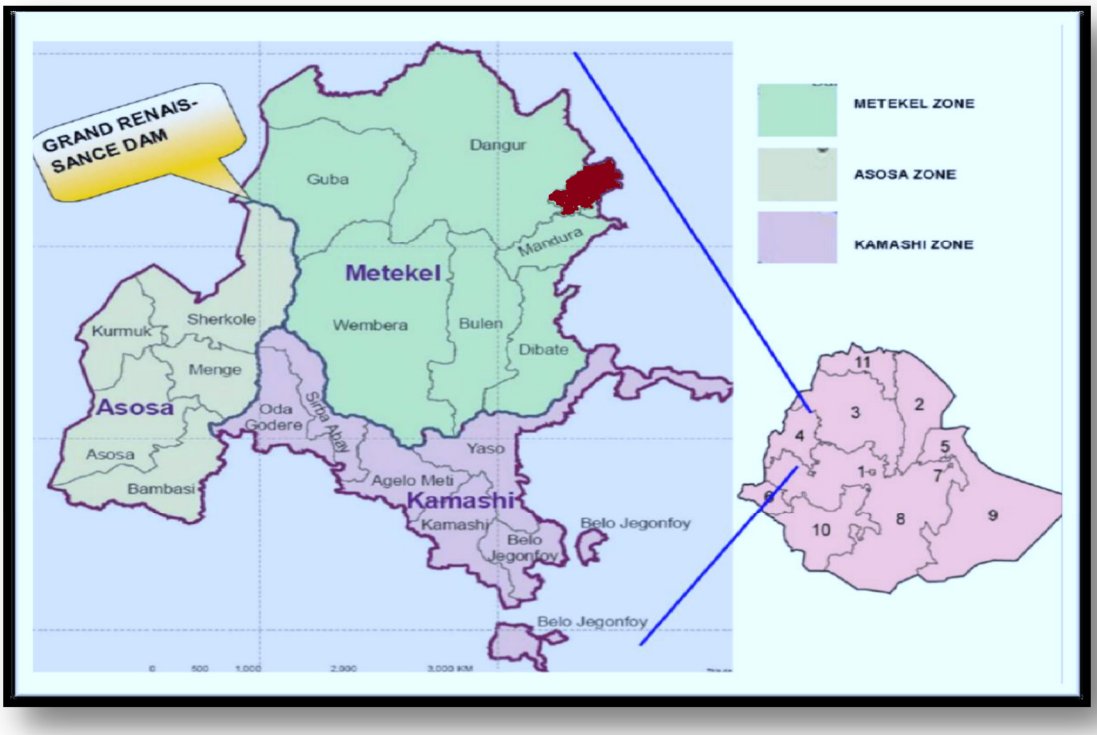

Figure 1: Location of the study district **Source: BGRS, BoANRD, 2017**

2.2. Study methodology

2.2.1. Sample size determination

The total household included in the study areas was determined according to the formula given by Yemane (1967) for homogenous experimental material, with 95 percent confidence level.

$$n = \frac{N}{1+N(e)^2} = \frac{1oo}{1+100(0.05)^2} = 80$$

Where, n=designates the sample size

N=designates total number of households

e= designates maximum variability or margin of error =5% (0.05)

1=designates the probability of the event occurring

Accordingly, the sampled household in the study area were unequal proportion of sample size household in each kebeles (a total of 80 households), was selected.

Table 1: Sample size determination

Name of selected kebeles	Total number of households having local chicken	Sampled households
Mender 17	25	20
Mender 23/45	27	22
Mender 49	25	20
Mender 134	23	18
Total sample households	-	**80**

2.2.2. Household selection and sampling techniques

Four kebeles (Mender 17, Mender 23/45, Mender 49 and Mender 134) were purposively selected based on the potential for population of chickens and accessibility of the area. A total of 80 households were purposively selected in the pawe district.

2.2.3. Data sources and collection methods

Both primary and secondary data was used for this study. Secondary data (like total number of chicken, mortality rate, health care, etc.) were obtained from the Pawe of Livestock and Fishery Development office annual and quarterly reports. Primary data were collected by formal interview methods using semi structured questionnaires.

2.2.4. Data analysis

Qualitative data was collected and all the data collected were entered in to Microsoft excel spreadsheet and analyzed using Statistical package for social science (SPSS) version 20. Then descriptive statistical tools such as percentage, mean and standard error were used to present the data.

3. RESULTS AND DISCUSSION

3.1. Socio-economic Characteristics

The household characteristics of interviewed village chicken owner households were presented in Table 2. Among the overall households, the majority of the households (80.0%) were male-headed while (20.0%) female-headed households. The most dominant age group within the household heads was younger age between 15- 30 years (72.5%), followed by mid age 31-60year (16.25%), elderly (23.75%) and above 60 years (3.75%). This indicated that about 96.25% of the respondents were within the productive age category (15-60 years), which has significant contribution in chicken production where the demand for labour is high. The overall average family size in sampled households was 5.21 $\pm$ 0.08. These values were comparable to the national average 5.20 persons (CSA, 2003).

The majority (72.5%) of the respondents were found to be literate while 27.5% of them were illiterate. This is revealed that the higher proportion of educational levels of the household heads in the study area have a vital role in adopting and promoting new technologies and to examine the available information in the production of chicken.

Table 2: Demographic characteristics of the sampled house hold heads.

Parameters	Pawe district				Overall mean
	Mender 17(N=20)	Mender 23/45(N=22)	Mender 49(N=20)	Mender 134(N=18)	(N=80)
Household heads (%)					
Male	85.00	72.70	75.00	88.90	80.00
Female	15.00	27.30	25.00	11.10	20.00
Age group (%)					
15-30	80.00	77.30	60.00	72.22	72.50
31-60 years	15.00	18.15	35.00	27.78	23.75
> 60 years	5.00	4.55	5.00	00.00	3.75
Education level (%)					
Illiterate	23.70	23.70	30.00	33.30	27.68
Literate	76.3	76.3	70	66.7	72.32
Family size	5.18 + 0.08	5.34 + 0.08	5.57+0.08	4.74+ 0.08	5.21 $\pm$ 0.08

3.2. Purposes of Chicken Rearing and Chicken Ownership in Household in the Study Areas

Farmers raise chickens for the purposes of income generation, home consumption, Cultural value, to entertain guests and for breeding. The results of the study revealed that 45.1%, 18.7% , 13.6 %, 12.6% and 10.1% of the respondents keep chicken for income generation, home consumption, Cultural value, to entertain guests and for breeding, respectively (Table 3).

The survey result as well as the discussion made with key informant groups of the study sites indicates that, either slaughtering or holding certain birds for sacrifice or healing ceremony is not practiced. This indicates that the main objective of poultry keeping is to sell the birds and egg and utilize the eggs for home consumption. Thus the poultry make considerable contribution to improve the family income and protein needs of the rural farmers as reported by many authors in different countries (Tadelle, 2003).

Among eggs produced, about 68.75, 20.0 and 11.25% were used for sale, hatching, and home consumption, respectively. The demand for egg in study area might have made the farmers to sell the largest proportion (68.7%) of eggs produced.

The study also indicated that 48.75% of surveyed household's chicken production was practiced by women and in 27.50% of surveyed households, it is practiced by whole family members (women, men and children) (Table 4). But in the remaining 8.75, 5.00 and 10.00% of surveyed households chickens was run by children, men and both women and children, respectively. This result indicates that higher proportion of women participated on chicken production as compared to men. This result is concurred with the report of Bikila (2013) who reported 51.7, 32.5 and 15.8% of the village chicken production owned by women, children and men, respectively, in Chelliya district, but disagreement with the finding of Samson and Endalew (2010) who reported 92.4% of the village chicken production practiced by both women and children followed by men (husband) 7.6% in mid Rift Valley of Oromia.

Table 3: The Purpose of chicken and eggs rearing in household in the study areas

Variables	Pawe district				Overall mean
	Mender17 (N=20)	Mender 23/45 (N=22)	Mender 49 (N=20)	Mender134 (N=18)	(N=80)
Purpose of keeping chicken (%)					
Generate income	45.0	45.4	40.0	50.0	45.1
Consumption	20.0	18.2	20.0	16.7	18.7
Hatching/Breeding	10.0	9.1	10.0	11.1	10.1
Cultural/religious	10.0	18.2	15.0	11.1	13.6
To entertain guests	15.0	9.1	15.0	11.1	12.6
Purpose of keeping eggs (%)					
Hatching	25.00	18.20	20.00	16.67	20.00
Sale for income	60.00	68.20	75.00	72.22	68.70
Home consumption	15.00	13.64	5.00	11.11	11.30

Table 4: Chicken ownership in household in the study areas

Chickens Ownership in HH (%)		
Woman	39	48.75
Men	4	5.00
Children	7	8.75
All family members	22	27.50
women and children	8	10.00

3.3. Flock Size and Flock Structure of Chicken

The average flock size of local chickens per household in the study was (13.8± 0.20) (Table 5). The large number of chickens per household might be due to high population growth and shortage of grazing land for other livestock production. The respondents also reported that they engaged in chicken rearing or having more number to get more income from selling of chicken and chicken product for buying grain for the family consumption, cover school fee, paying land tax, purchasing cloth for their family and other expense. The flock size of chicken reported in present study is similar to the report of Addis and Malede (2014) and Tadelle *et al*. (2003) who reported 16.43 and 16 birds per household in North Gondar zone and in central high land of Ethiopia for local chickens, respectively. The present report on chicken flock size is by far higher than the flock size of 8.53 chickens per household reported at Halaba district of southern Ethiopia, but it is lower than the report of Khalafalla *et al*. (2001) who reported 19 birds per household in Sudan.

Table 5: Chicken flock size and structure of the study areas

Kebeles	Chicken flock size and structure (Mean ± SE)					Over all mean
	Hens	Cocks	Pullets	Cockerel	Chicks	
Mender 17	3.4± 0.40	0.8±0.20	1.6±0.15	0.7±.02	6.4±0.42	12.9± 0.24
Mender23/45	3.7±0.30	1.4±0.11	2.0±0.18	0.9±0.03	6.7±0.45	14.7± 0.43
Mender 49	3.2±0.01	1.0± 0.22	2.9±0.23	1.0±0.01	4.6±0.4	12.7± 0.18
Mender 134	4.3± 0.07	1.6±0.02	2.3±0.21	1.0± 0.01	5.8±0.43	15.0± 0 .15
Total	**3.6± 0.20**	**1.2±0.14**	**2.2±0.19**	**0.9± 0.02**	**5.9±0.43**	**13.8± 0.20**

3.4. Management Systems of Chicken in the Study Areas

3.4.1. Chicken production systems of the study areas

In the study areas, majority of the farmers (92.6%) practice the traditional scavenging system of chicken production. The results of the study (Fig.2) showed that the dominant chicken production system was a free range scavenging or extensive type, utilizing various feed sources searching by their own in the field, with conditional feed supplementation. During the rainy season, mostly the chickens feed different types of insect, worms and leaves of different vegetables and grasses sown at the garden because there is shortage of grain yet for human being. The input offered for the chickens and the output harvested is low. The quality and quantity of the products obtained from scavenging system of production is also poor compared to the semi-intensive chicken production systems.

From total sample size, about 92.6 and 7.4% of the respondents kept chickens in extensive and semi-intensive in study area, respectively. This implies that farmers in the study areas are going to change and improve chicken production system and management practices like provision of improved health care, commercially formulated feed and separate poultry house. This proportion is almost nearest to the report of

Melese and Melkamu (2014) who reported 83.3% and 16.7% of the respondents reared chickens in extensive and semi-intensive systems, respectively. Melkamu and Andargie (2013) also reported that the type of management system is commonly extensive (71.66%), semi-intensive (23 to 33%) and intensive (5%) in Enebsie Sar Midir Woreda, Eastern Gojjam. Similarly, Moreda *et al*. (2013) reported that in South west and South part of Ethiopia, the management system provided for chickens was extensive (71.6%) and semi-intensive (28.4%)

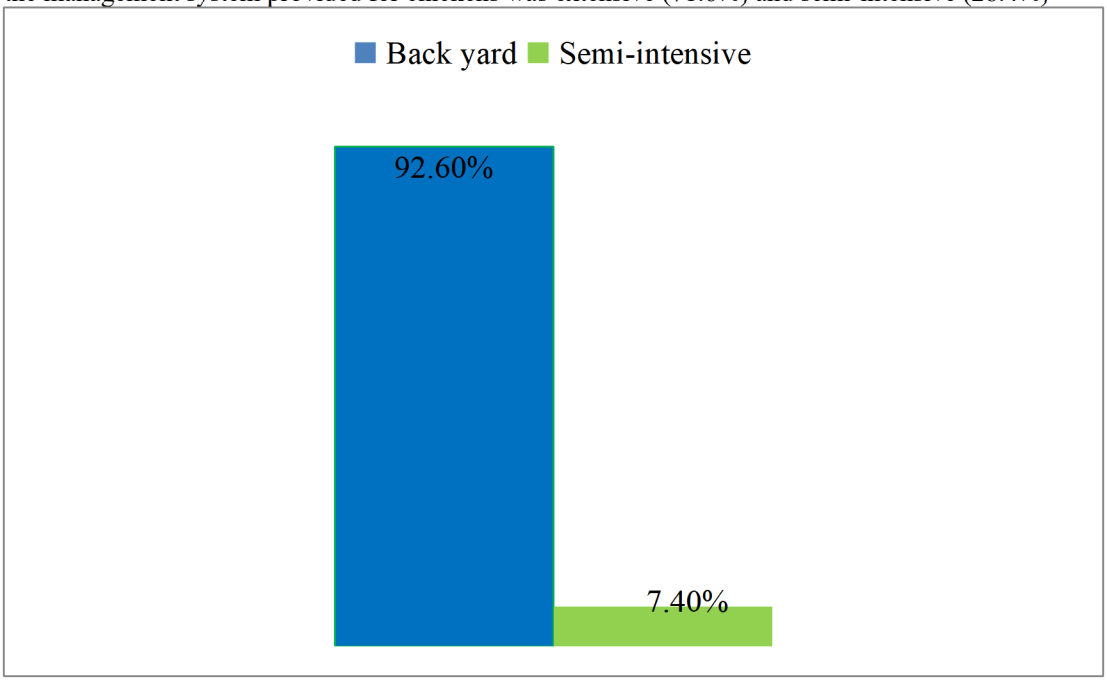

Figure 2: Chickens production systems of the study area

3.4.2. Feed resources and feeding practices of chickens

The major feeds and feeding practices of chickens and the methods of provision of supplementary feeds in the study areas are summarized in Table 6 and 7.Result of the study revealed that about 82.5% of the respondents practiced scavenging with additional supplements and 10.0% use only scavenging with no additional feed supplements. From the total sample size, only 7.5% of the respondents provide homemade feeds for their chickens. This finding is in line with the report of Desalew (2012) who reported that 97.8% of the respondents were using scavenging with additional supplements, 2.8% using purchased feed and 2.2% using only scavenging. Nigussie *et al.* (2010) also reported that 83% of the farmers use scavenging and supplement, and 17% use only scavenging in Ethiopia. But the present finding is at par with that of Wondu *et al*. (2013) who reported about 55, 33 and 12% households involved scavenging only, scavenging and grain supplementation and provided refusals as supplementary feeds, respectively. In the study districts, about 92.6% (Sorghum and maize) and 7.4 %(Maize and wheat) of the farmers reported that they provided locally available cereal grains as supplementary feed for chickens. But the amount of supplement varies depending on seasons of the year and the quantity and availability of the resources at the household level. Similarly Desalew (2012) reported that 95% of the farmers in east Shewa offer wheat and maize as supplement. Regarding feeding frequency, 62.5, 27.5 and 10.0% of the respondents offered supplements for chickens twice a day (morning and afternoon/evening), three times per day (morning, afternoon and evening) and once per day (morning only), respectively. This result is in line with the report of Meseret (2010) who reported about 48.3, 22.2 and 18.3% of surveyed household in Gomma offer supplement twice a day (morning and afternoon), three times per day (morning, afternoon and evening) and once per day, respectively. Addis and Malede (2014) also reported that 27.78, 18.89, 34.44 and 7.78 % of the farmers provided supplement three times per day (morning, afternoon and evening), twice per day (morning and evening), once per day (morning only and afternoon only) and no feeding, respectively. About 70% of the surveyed households offer each ingredient of grain supplement alone and 30% of them provided a mixture of different grain supplement in the study area (Table 6).

Table 6: Feed resources and feeding systems of chicken

Variables	Study Area	
	Pawe district	
	Number	Percent
Feeding practices of chickens		
Scavenging only	8	10.0
Scavenging with supplement	66	82.5
Homemade feed	6	7.5
Time of feed supplements		
Morning only	8	10.0
Morning and evening	13	16.25
Morning and afternoon	37	46.25
Morning, afternoon and evening	22	27.5
Types of grain used for supplement		
Maize	26	32.50
Maize and wheat	17	21.25
Sorghum and maize	37	46.25
Frequency of supplementing per day		
Once	8	10.0
Twice	50	62.5
Three times	22	27.5
Form of grain supplemented		
Mixture of different ingredient/cereals	24	30.0
Each ingredient/cereals alone	56	70.0

As indicated in table 7, majority (76.2%) of the households in the study district provide supplementary feeds by throwing on the ground. Group feeding is practiced by most (85.0%) of the surveyed households. Only 5 and 10% of the surveyed households separate chicken by sex and age, respectively during supplementary provision. Group feeding has its own effect on the growth and productivity performance of very young chickens and weak layers. System of feeding for the present study area resembles the report of Melese and Melkamu (2014) who reported 91.1% of the respondents provided supplementary feeds by throwing on the ground to feed in groups without age separation; Bikila (2013) also reported 94.2% of the farmers provide supplementary feeds by spreading on the floor and Addis and Malede (2014) also reported 96.67% of the respondents offer supplementary feeds by throwing on the ground for the whole chickens together (100%). However, some of the farmers 23.8%, use locally available feeding trough to provide supplementary feed.

Table 7: Methods of provision of supplementary feeds for chickens in the study district

Variables	Study Area	
	Pawe district	
	Number	Percent
Method of provision of supplementary feeds		
Using locally prepared feeding trough	19	23.8
Throwing on land to feed in groups	61	76.2
Ways of feeding chickens		
Group feeding	68	85.0
Feeding by separate in age	8	10.0
Feeding by separate in sex	4	5.0
Feeding by separate in breed	-	-
Mixing salt or limestone during grain supplements		
Yes	-	-
No	80	100

In study areas, all in all about 100% of the interviewed farmers were not adding salt or limestone when they offer grain supplement for chickens. This has its own effect on egg quality. Chickens which fed grains that have mineral deficiency might be produce eggs with thin egg shell or eggs without shell coverage. This is in agreement with the report of Desalew (2012) who reported provision of mineral supplement was practiced only by few households (2.2%) in Ada'a and Lume districts.

3.4.3. Frequency of watering chickens

In the families of 63.8% surveyed households water is provided with free access for chickens in the study area

(Table 8). On the other hand, about 27.5 and 8.7% of the respondents provide water for chickens twice a day (morning and evening time); and once per day (morning time only) in and around Assosa town. This result is at par with that of Bikila (2013) who reported 65.8, 19.2 and 15% of the respondents provided water for chickens twice/day, once/day and every other day, respectively without free access.

The main sources of water identified in the present study areas were rivers water, holes water and hand pump water. The majority (73.75%) of the households in the study area obtained water from river, while 13.75% from holes and the rest 12.50% from hand pump water. This result is agreement with the finding of Bikila (2013) also reported that 90, 5.8 and 4.2% of the respondents obtained water for their chickens from river, rain and well water in Chelliya district, respectively.

As can be evident from the table, majority (72.5%) of the respondents use part of plastic equipment as watering trough for their chicken, while 27.5% of the respondent used broken part of clay for watering trough. This result is in line with the result of Melese and Melkamu (2014) who reported that 42.2% of the respondents use part of plastic equipments to provide water for chickens.

Table 8: Frequency and source of water used for chickens in the study areas

Variables	Study Area	
	Pawe district	
	Number	Percent
Frequency of watering chickens		
Free access	51	63.8
Only morning	7	8.7
Morning and evening	22	27.5
Source of water for chickens		
Hole water	11	13.75
River	59	73.75
Hand pump	10	12.50
Water trough used for water provision of chickens		
Broken part of clay	22	27.5
Part of plastic equipments	58	72.5
Purchased watering trough	-	-

3.4.4. Chicken housing systems and cleaning in the study area

Type of housing has its own effect on chicken production and productivity. Can be noticed from the present study that about 55.0, 30.0, 10.0 and 5.0% of respondents share the same house with chickens, constructed separate house for chicken, kept in kitchen and kept on perch under the roof, respectively. Respondents didn't keep chickens in cage system in study area. This reflects adoption of modern chicken housing is weak in the study area. Similar proportions of housing methods was reported by Bikila (2013) who reported that 53.3% of the respondents shared the same room with chickens, 33.3% constructed separate house for chicken and 13.3% of the respondents have different shelter during night in the same room for chickens while different proportions of housing methods reported by Samson and Endalew (2010) who reported that 58% of the surveyed households of mid-rift valley of Ethiopia keep chickens in main house, 26.6% on perch and 14 % in separate sheds made for chickens.

As the farmers replied, majority of the chickens were kept in different types of house with people and utensils during the night and scavenge freely during the day, about 72.5% of the households clean the chickens' house daily, whereas 16.25%, 8.75% and 2.5% of the owners clean it weekly, once in two days and monthly, respectively (Table 9). Lack of frequent cleaning of chicken shelter might cause disease and increase morbidity and mortality rates of chicken. Thus, raising awareness of farmers on the need for cleaning shelters is important. In addition to diseases prevalence, the quality of the product obtained from dirty house is poor. Similarly Melese and Melkamu (2014) have reported that 65.6 % of surveyed households of East Gojjam clean chicken house daily. Matiwos *et al. (*2015) also reported that majority of the respondent's clean chicken house/shelter daily (85.7%), while the remaining (14.3%) clean weekly in Amaro district of Ethiopia.

Table 9: Chicken housing system and frequency of cleaning in study areas

Variables	Study Area	
	Pawe district	
	Number	Percent
Chicken housing system		
Share the same house with people	44	55.0
Separate house entirely constructed for chicken	24	30.0
Kept in kitchen	8	10.0
Kept on perch under the roof	4	5.0
Frequency of cleaning		
Daily	58	72.5
Weekly	13	16.25
Monthly	2	2.5
Once in two days	7	8.75

3.4.5. Chicken health management

3.4.5.1. Major diseases of chicken in the study areas

The major diseases of chicken in the study areas are shown in Table 10. Accordingly, the study showed that the major chicken diseases are Newcastle disease (NCD), fowl typhoid, infectious bronchitis, Gumboro and Marek's disease in their order of importance. This result clearly showed that there were many chicken diseases existing in the study district. It is obvious that disease impacts chicken production in many ways such as reduced body weight, reduced growth rate, low egg and meat production, low reproductive performance, high mortality and treatment cost. Poor housing, climatic condition, poor nutritional status and low level of management contributed to a high incidence of chicken diseases in the areas. On top of that the insufficient veterinary service and absence of scheduled vaccination seemed the major bottlenecks that need to be solved by concerned body to utilize the potential of the study areas. The problem chicken diseases raised in the study areas is in agreement with the report of Matiwos *et al.* (2015) who reported Newcastle (Wararshe/Fengel), fowl cholera (cholera) and salmonella (kisen) were the major diseases affecting chickens in Amaro district, SNNPRS of Ethiopia and Bikila (2013) also reported that the major diseases in order of their importance were 85% Newcastle disease (NCD) and 15% other diseases (Coccidiosis, Fowl pox and Fowl typhoid) in Chelliya district.

Table 10: Major poultry diseases in the study district

Variables	Study Area	
	Pawe district	
	Number	Percent
Diseases that mainly affect chickens		
Newcastle diseases	35	43.75
Marek's disease	4	5.0
Fowl typhoid	24	30.0
Gumboro	7	8.75
Infectious bronchitis	10	12.5

3.4.5.2. Sick chicken treatment and places of treatment in the study areas

It was noticed from the present study that, majority of the sample household respondents had different treatment methods when sick birds observed in the flock. Accordingly, majority (86.25%) of the respondents reported that they medicate sick chickens in pawe district. However, about 5.00% and 8.75% of the surveyed household reported that selling and isolation of sick chickens in the study area. Similarly, Nebiyu *et al.* (2013) reported that the measures taken by farmers when sick chickens observed in the flock were medication (90%), selling (6.8%) and isolation of chicken (3.2%).

The majority of farmers reported that they have treatment places when their chicken is sick in the flock. Thus, of the total households 42.50% of the respondents were treated sick chickens at home by traditional treatment methods. The respondents used traditional treatment due to lack of enough knowledge about the advantage of modern drug, accessibility and low prices of traditional treatment and unavailability of veterinary services at their locality.

But those farmers who know the negative effect of traditional treatment on the health of chickens treated at animal health posts and veterinary clinics. Therefore, about 32.50% of the respondents reported that they treat sick chicken at animal health post (health institution organized at kebele level) and 11.25% of the respondents treat at veterinary clinics (health institution organized at woreda level).

The traditional materials used for treatment of sick chickens reported by household respondents were garlic (nech shunkurt), lemon juices (lome chemek), local beverage (araqee/Katikala), Juice of Eucalyptus leaf and

Juice of Demakese leaf in the study area. Other respondents reported pepper powder as traditional drug to treat their chickens. According to the response of the household respondents, the amount of traditional drug used for sick chicken treatment was not measured and known. This might have impact on the health status of the chickens. In addition to traditional treatment, some respondents used treatments ordered for human being for sick chickens. The current result is in line with the report of Samson and Endalew (2010) who reported farmers in mid rift valley of Oromia, use garlic, different green leaves like "Bala Ganate", lemon, local alcohol, paper powder, butter as drenching, nasal application and smoking to treat sick chickens and Fisseha *et al.* (2010) also reported the provision of a mixture of local alcohol (''Arekie''), lemon and onion to sick birds against NCD was the most widely used type of traditional treatment.

Table 11: Sick chicken treatment and places of chicken treatment

Variables	Study Area	
	Pawe district	
	Number	Percent
Measures against diseases		
Medication	69	86.25
Selling	4	5.00
Isolation	7	8.75
Place of sick chickens treatments		
Animal health post (kebele level)	26	32.50
Veterinary clinic (woreda level)	9	11.25
At home by traditional medicine	34	42.50
Traditional material used for treatment		
Juice of Eucalyptus leaf	4	5.00
Juice of Demakese leaf	3	3.75
Lemon Juice	8	10.00
Katikala	7	8.75
Garlic	12	15.00
Traditional treatment methods		
Orally in liquid form	10	12.50
Mixing with injera	23	28.75
Smoking	1	1.25

Among traditional users of the study area (28.75%) administer traditional treatment for sick chickens by mixing with injera (human food) while 12.50% of respondents of the study area traditional treatment for sick chickens orally in liquid. Only very few farmers (1.25%) from the study area reported provision of traditional treatment through smoking for chickens.

3.5. Reproductive and Production Performance of Chickens in Study Areas

3.5.1. Age at first egg laying

In the study areas, the average age at first egg laying for the local chickens (6.18 $\pm$ 0.024month) (Table 12). The current result is concurred with the report of Melkamu and Wube (2013) who reported 6 months of age at first egg laying for local chicken breeds in Debsan Tikara kebele at Gondar Zuria Woreda, North Gondar and Nebiyu *et al.* (2013) who reported 6.5 months of age at first egg laying for local chickens in Halaba district of southern Ethiopia. But this is similar for local but different for exotic breeds with the results of Alem (2014) who reported 6.8 and 6.4 months of age at first egg laying for local and improved breeds in lowland and midland agro-ecological zones of central Tigray, Northern Ethiopia, respectively. Melkamu and Andargie (2013) also reported higher value (7 months) of age at first egg laying for indigenous chicken breeds at Enebsie Sar Midir woreda of Eastern Gojjam.

3.5.2. Egg production and numbers of eggs per clutch

The result of the present study showed the average egg production of the local chicken breeds (60 $\pm$ 0.123) in the study area (Table 12). The average egg yield (60 eggs per hen /year) for local chicken was almost equal to the result of Melkamu and Andargie (2013) who reported an average of 65 eggs per local hen/year at 33 Enebsie Sar Midir woreda of Eastern Gojjam. But, the average eggs yield in the current study was greater than that of Meseret (2010) who reported an average of 43.84 eggs per local hen/year for Gomma woreda and by far lower than the average egg yield reported by Bikila (2013), 155.2 eggs/local hen/year for Chelliya district of west Shewa zone. The reason for this variation might be the difference in management practices of the farmers in different districts.

In the study districts, the average number of eggs per clutch was 14.28 eggs for local chicken breeds. This

result is almost similar with the findings of Melkamu and Wube (2013) who reported 13 eggs per hen /clutch and Samson and Endalew *(*2010) who reported 14 eggs per hen/ clutch for local chickens. But this result is lower than that of Melese and Melkamu (2014) who reported 18 eggs per clutch for local chickens.

3.5.3. Number of eggs set per hen and hatchability of eggs in the study areas

The respondents revealed that exclusively natural incubation and hatching was practiced by all (100%) chicken producers in the study area. The average number of eggs set for incubation was 10.65 ± 0.03 per hen, from which relatively fair percentage of chicks (81.50 %) was hatched from local chickens. This result is in line with that of Melese and Melkamu (2014) who reported average number of eggs set per local hen was 13.2 eggs with 82.83% hatchability and Nebiyu *et al*. (2013) who reported average number of eggs set per local hen was 12 with 83.7% hatchability for local breeds. But the current hatchability reported was lower than that of Wondu *et al*. (2013) who reported average number of eggs set per hen as 10.95 with 87.29% hatchability in Northern Gondar, this is by far greater than 59.6% and 72% hatchability from 13 and 10 average number of eggs set for incubation under local chickens as reported by Melkamu and Andargie (2013) and Melkamu and Wube (2013), respectively.

3.5.4. Mortality rate of chickens in the study areas

In the study areas, high proportion of chicken mortality up to age of 8 weeks was reported by respondents which might indicate high prevalence of chickens diseases and predators. The mortality for local chickens (35.36%) (Table 12). Even though the mortality rate was too high for the current study, it is lower than that of Meseret (2010) who reported 41% of mortality rate for Gomma district. In general, the result indicates that there is an urgent and great need to intervene and reduce chickens mortality in the study areas.

Table 12: Reproduction and production performance of local chickens in the study areas

Parameters	Study Area Pawe district Local chickens Mean ± SE
Age at first laying eggs (month)	6.18 ± 0.024
Number of eggs per year	60 ± 0.123
Number of eggs per clutch	14.28 + 0.05
Clutch size	4.40 ± 0.019
Numbers of eggs set per hen	10.65 ± 0.03
Chicks hatched from set eggs	8.68 ± 0.06
Hatchability (%)	81.50
Chicks survived up to age of 8 weeks	5.63 ± 0.06
Survival rate up to age of 8 weeks (%)	64.86
Mortality rate up to age of 8 weeks (%)	35.36
Age of cockerels for breeding (month)	5.32 ± 0.02

4. CONCLUSIONS

The study was conducted with the overall objective to assess of Chicken production systems and identify the productivity performance related to chicken production under village/traditional production system in pawe district of Beneshangul Gumuz Regional State, Ethiopia. A total of 80 respondents were purposively selected from four purposively selected kebeles in the study areas. All the data collected were analyzed using SPSS version 20.

Results of the study revealed that the average flock size of local chickens was (13.8 ± 0.20) per household in the study area. In the study areas, the average age at first laying egg for the local chickens was (6.18 ± 0.024month). The survey indicated that the average egg production of the local chicken breeds was (60 ± 0.123 eggs per hen per year). The study revealed that the average number of eggs set for brooding/incubation was 10.65 ± 0.03 per hen, from which relatively fair percentage of chicks (81.50%) was hatched from local chickens. In the study areas, high proportion of chicken mortality up to age of 8 weeks was revealed by respondents which might indicate high prevalence of chickens diseases and predators.

The study also revealed that the main feed of chicken in the study areas are scavenging with additional supplements. But only few of the respondents use homemade feed chicken feed.

The major chicken diseases reported in pawe district in the order of their importance were New Castle Disease, fowl typhoid, Infectious bronchitis; Gumboro and Marek's disease were reported to be the major diseases of chicken.

In general, it can be concluded that the productivity performance of local chicken breeds was better comparatively to the given production system and management in the study areas. More ever the performance of local chickens under village production system could be increased through improved breeding, housing, feeding and health management.

5. REFERENCES

Aberra Melesse. 2000. Comparative studies on performance and physiological responses of Ethiopian indigenous (”*Angete-melata”)* chicken and their F1 crosses to long term heat stress. Ph.D Thesis. Martin-Luther University, Halle-Wittenberg, Berlin. pp: 4-5.

Abubakar, M.B, A.G. Ambali and T. Tamjdo. 2007. Rural Chicken Production: Effects of Gender on Ownership, and Management Responsibilities in Some Parts of Nigeria and Cameroon. International Journal of Poultry Science 6 (6): 413-416.

Addis, G., Malede, B. 2014. Chicken Production Systems, Performance and Associated Constraints in North Gondar Zone, Ethiopia. *J. Fisheries Lives. Prod. 2: 115-118.*

Bikila Negari . 2013. Study of Production Practices, Productivity, and Egg Quality of Village Chicken in Chelliya District Western Shewa, Ethiopia. An Msc thesis, presented to the school of graduate studies of Haramaya University, Ethiopia.81p.

CSA (central statistical Agency). 2015. Agricultural sample survey volume II report on livestock and livestock characteristics Addis Ababa August 2015 573statical bulletin 573.

Dawit A. Tamrat, D., Stotaw, F., Nzietcheung, S. and Roy, D. 2008: Overview and background paperon Ethiopia’s poultry sector. Relevance for HPAI Research in Ethiopia. www.h pai-research net. Accessed 06 April 2011.

Desalew Tadesse . 2012. Management practices, productive performance and egg quality traits of exotic chickens under village production system in east Shewa, Ethiopia. An Msc thesis, presented to the school of graduate studies of Addis Ababa University.70p.

Fisseha Moges, Abera Mellesse and Tadelle Dessie .2010. Assessment of village chicken production system and evaluation of the productive and reproductive performance of local chicken ecotype in Bure district, North West Ethiopia. *African J. Agri. Res., 5(13): 1739-1748.*

Halima Hassen Mogesse. 2007. Phenotypic and genetic characterization of indigenous chicken populations in North-West Ethiopia. Ph.D Thesis. Submitted to the faculty of natural and agricultural sciences department of animal, wildlife and grassland Sciences. University of the Free State, Bloemfontein, South Africa.

Hellin, J., A. Griffith & A. Mike. 2005. Mapping the market: Market-literacy for agricultural research & policy to tackle rural poverty in Africa. In: Proceedings of an International Seminar, 28th February 1st March 2005, Westminster, London, UK, 110–150.

Khalafalla, A.I., S. Awad and W. Hass. 2001. Village poultry production in the Sudan. Department of Microbiology, Faculty of Veterinary Science, University of Khartoum, Khartoum North, Sudan. Department of Microbiology, Faculty of Veterinary Science, University of Khartoum, Khartoum North, Sudan. Accessed on 25th August, 2007.

Matiwos Habte, Selamawit Debele, Birhanu Admassu and Asmamaw Yinnessu . 2015. Village chickens production performance assessment under scavenging management system in Amaro Districts of SNNPRS of Ethiopia. *Wudpecker J. Agri. Res., 4(3): 021 – 034.*

Melese Gashu and Melkamu Bezabih . 2014. Assessment of chicken production under farmer‟s management condition in East Gojjam Zone, Amhara Regional State, Ethiopia. *Greener J. Anim. Breeding and Genetics, 1 (1): 001-010.*

Melkamu Bezabih and Andargie Zewudu . 2013. Performance evaluation of local chicken at Enebsie Sar Midir Woreda, Eastern Gojjam, Ethiopia. *Unique res.J.of Agri. Sci., 1(2): 006-010.*

Melkamu Bezabih and Wube Atalel . 2013. Constraints and Opportunities of Village Chicken Production in Debsan TiKara Keble at Gonder Zuria Woreda, North Gonder, Ethiopia. *International J. of Sci.and res. Publications, 3 (9):8.*

Meseret, M. 2010. Characterization of village chicken production and marketing system in Gomma woreda, Jimma zone, Ethiopia. An Msc Thesis, presented to the school of graduate studies of Jimma University, Ethiopia. 110p.

Moreda, E., S Hareppal, A Johansson, T Sisaye and Z Sahile . 2013. Characteristics of Indigenous Chicken Production System in South West and South Part of Ethiopia. *British J. of Poult. Sci., 2 (3): 25-32.*

Nebiyu Yemane, Berhan Tamir and Kelay Belihu . 2013. Characterization of village chicken production performance under scavenging system in Halaba districts of southern Ethiopia. *Ethiop.Vet.J. 17(1):69-80.*

Nigussie, D., Liesbeth, H., van der Waaij, Tadelle D., Johan A. M. van Arendonk . 2010. Production objectives and trait preferences of village poultry producers of Ethiopia: implications for designing breeding schemes utilizing indigenous chicken genetic resources. *Trop. Anim. Health Prod., 42:1519–1529.*

Pedersen C. 2002. Production of semi-scavenging chickens in Zimbabwe. PhD thesis. Royal Veterinary and Agricultural University, Copenhagen, Denmark.213pp.

Salam Kondombo, R. 2005. Improvement of village chicken production in a mixed (chickenram) arming system in Burkina Faso. Ph.D Thesis. Wageningen Institute of Animal Sciences, Animal Nutrition Group, Wageningen University, the Netherlands.

Samson Leta and Endalew Bekana . 2010. Survey on Village Based Chicken Production and Utilization System in Mid Rift Valley of Oromia, Ethiopia. *Global Vet., 5 (4): 198-203.*

Statistical Packages for Social Sciences (SPSS). 2002. SPSS 12 for Windows. SPSS Inc. Chicago, Illinois.

Tadelle, D. 2004. Effect of scavenging on diet selection and performance of RIR and Fayomi breeds of chicken offered a choice of Energy and Protein Feeds.

Tadelle, D. and B. Ogle, 2001. Village poultry production systems in the central high lands of Ethiopia. Tropical Animal Health and Production, 33 (6): 521 - 537.

Tadelle, D., 1996. Studies on village poultry production systems in the central highlands of Ethiopia. M.Sc. Thesis, Swedish University of Agricultural Sciences. Uppsala, Sweden.

Tadelle, D., 2003. Phenotypic and genetic characterization of local ecotypes in Ethiopia. PhD Thesis, Humboldt University of Berlin, Germany.

Tadelle, D., T. Million, Alemu Yami & K.J. Peters. 2003. Village chicken production systems in Ethiopia: Use patterns & performance valuation and chicken products & socioeconomic functions of chicken. Livestock Research for Rural Development 15 (1).

Wondu Mamo, Mehiret Melaku, and Berhan Tamir . 2013. Characterization of Urban Poultry Production System in Northern Gondar, Amhara Regional State, Ethiopia. *Agri. Biol. J. N. Anim., 4(3): 192- 198.*