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Management Practices and Productivity Performance of Village Chicken in South Ethiopia

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ABSTRACT

In Ethiopia, village chickens play a dominant role in total chicken production, but its productivity performance remains low. The study was conducted in south Ethiopia to characterize the management practices and productivity performance of village chickens. A total of 204 respondents were selected through multi-stage sampling and analyzed using SPSS. The result shows that an average chicken holding capacity per HHs is 12.36 and sourced from the local market/farm (46.70%) and hatching (30.55%). The majority of chicken production in the area is women-owned served as an income source by eggs sale (82.2%) and live chicken sale (66.7%). Less than half (47.2%) of the HHS had no access to extension services. The majority (87.8%) of the HHS practiced scavenging with supplementation and provided water (81.7%), while chicken kept without a separate house (96.11%), matting uncontrolled way (100%) and New Castel Disease (75%) were the leading problems. Crossbred chickens produced a higher number of eggs/year (174.27±1.12) than indigenous chickens (56.57±0.39), though indigenous chicken counted a higher hatchability rate (80.28±0.4) than crossbreds (65.23±0.14), a higher crossbred chick mortality rate (49.15%) was noted. These findings indicated that traditional management practices and low productivity performance of village chicken in general, but a little bit crossbred chickens were performed better in egg productivity performance than indigenous ones, nevertheless, still, they need improvement in health care, feed and feeding, housing, watering, and institutional support as a substantial opportunity. Therefore, training, extension service, improved chicken breeds should be a critical intervention point in the study sites.

Keywords: Management, Production, Productivity, Village chicken

INTRODUCTION

Village chicken keeping in Ethiopia refers to the practice which involves the production of mostly small flocks of chickens largely using scavenging feed resources. Village chicken production is characterized by low input and output which is a minimal investment in housing, feeding, and health care, and hence high mortality rates occurred. The system generally does not involve investments beyond the cost of the foundation stock (USAID, 2010). Currently, the national chicken population of Ethiopia was estimated to be about 65 million, more than 97% of which belonged to village chickens (CSA, 2016). Thus, they play a dominant role in total chicken production which accounts for more than 95% (Mekonnen et al., 2010). The average number of eggs laying period per hen per annum, the length of a single egg-laying period per hen, and the average number of eggs laid per hen per egg-laying period are the parameters required to estimate egg production in Ethiopia (Alem et al., 2014). An attempt has been made to introduce different exotic chicken breeds to the smallholder farming system of Ethiopia because of the low performance of local chicken. Despite their low productivity, the local chickens are known to possess desirable characters such as temperature tolerance, resistance to some disease, good egg, and meat flavor, hard eggshells, high fertility, and hatchability as well as a high dressing percentage (Mekonnen, 2007). Moreover, local chickens particularly pose high genetic diversity for many traits and are therefore serve as genetic reservoirs for present and future genetic improvements of local chickens (Nigussi et al., 2010; Emebet et al., 2014). Also, with all these contributions of village chicken to the smallholder households, little attention has been paid to improve the system. Thus, it plays a vital role for food security and contributes to the country's economy, and fulfills many roles particularly in the livelihood of rural households predominantly resource-poor households who are below the poverty line (Germa et al., 2016). In addition to these, as an animal food source, chicken meat and eggs contain high-quality protein and micronutrients which can increase the nutrient adequacy of traditional diets drawn from staple crops (De Bruyn et al., 2015). Besides, it ensures employment opportunities for rural smallholder households and offers socio-cultural advantages (Fisseha et al., 2010). It demands a small investment compared to other livestock species (Lawal et al., 2016). As a result, it is very well practiced by Ethiopian smallholder households (Fisseha et al., 2010). Similarly, different authors (Mammo, 2012; Tadelle et al., 2013) reported that there were no cultural or religious taboos against the consumption and marketing of chicken and eggs [1]. However, traditionally the output of scavenging chickens is considered to be low because of low input, genetic potential, and poor management. This was also due to their long reproductive cycle (attributed to natural incubation and brooding) and high chick mortality caused by disease condition and the predations (Solomon, 2012). Therefore, successful chicken interventions (drugs, commercial rations, vaccine, housing, and improved chickens) would allow the sub-sector to move to improved village chickens with semi- scavenging crossbreds. Such intervention would contribute considerably to reducing poverty and malnutrition among rural and urban poor, as well as increasing national income (Shapiro et al., 2015). Nevertheless, even where interventions were made, due to the awareness problem some households who are expected to be end-users do not effectively utilize them while expecting better performance (Lyimo, 2013). For that reason, characterization of village chicken

production systems in different agro-ecology might help to identify important problems hindering the success of the chicken sector and know the production potential of local chickens. However, agro-ecological based studies have not been conducted at a wider scale in Ethiopia (Tadesse and Tesfay, 2013). Therefore, households in Ethiopia have not fully benefitted from the potential of village chicken and still not proportional to the chicken numbers as little attention is given to the sub-sector from research and development efforts (Aberra et al., 2012). The little research and development efforts tend to explore improvements largely *via* technical, organizational, and institutional approaches by overlooking the socio-economic and institutional context under which the households operate (Aberra et al., 2012). And finally, the households' local knowledge and management practice on village chicken production have not been extensively exploited (Fisseha et al., 2010). Similarly, characterization of management practice and productivity performance of village chickens in the Gurage zone has been limited [2]. But, the zone is one of the areas which can be used as an indicator that shows the great village chicken potential. However, there have been limited studies undertaken to characterize the prevailing village chicken management practices, productivity performance, and constraints associated with village chicken production activities. Therefore, the study has been a call for a further study and gives a feasible recommendation for more improvement of the practices in a sustainable way to the smallholder farmers in the zone. And also, this study aimed to help the basis for project work, research activities, policymakers, and other development programs to identify critical entry points that need immediate attention and to select the most appropriate innovation aiming to improve village chicken management practices and productivity performance at the grassroots level in the study site. Therefore, the current study focus on characterizing the management practices and productivity performance village chicken under different agro-ecologies of the Gurage zone, south Ethiopia with the specific objectives to evaluate management practices and productivity performance of village chickens under farmer level, to identify production constraints and prospects to village chicken production and to identify the socio-economic features of the households to village chicken production in the study system in different agro-ecologies.

MATERIALS AND METHODS

Description of the study area

The study was conducted in the Gurage zone; Southern Nations, Nationalities and Peoples' Regional State (SNNPRS), of Ethiopia. Cheha district in the zone was purposively selected based on its village chicken production potential (54189 local chickens and 64606 Sasso crossbred chickens) and it has 39 Kebeles (Office of Agriculture and Rural Development of Cheha District, 2017/18). The administrative center and the capital town of Cheha district is Endibir, which is located 188 km south of Addis Ababa, the capital of Ethiopia, and 30 km far from Wolkite town to the South-East, the capital of the Gurage zone. The geographical location of the study area extends from 8° 00' 18.9" to 8° 15' 28.53" North and 37° 35' 46.48" to 38° 03' 59.59" East at an elevation ranging from 1,900 to 3,000 meters above sea level (masl). Thus, the district is classified into high altitude (2401-3000 masl) and mid-altitude (1900-2400 masl) agro-climatic zone based on annual rainfall, temperature, and altitude,

and also the distance between them is 20-45 km. The average annual rainfall of the district is about 1268.04 mm and the average maximum and minimum temperature in the study area is 24.97°C and 10.69°C, respectively. It has a total area of 57,313.85 hectares of which 40,190 is cultivated. The total number of human populations in a Gurage zone is 1,159,824 of these 106,959 human populations are allocated in the Cheha district (CSA, 2015). Livestock production is the main activity of the households of the district. But, still, the management practice is dominated by the traditional production system. Similar to that, although a higher number of village chickens in the district due to awareness problem and lower government attention the households dominated by a scavenging production system. Thus, livestock species keeping in the district are cattle, chickens, sheep, goats, horses, donkeys, and mules. Crop production in the district also the major sources of income like Enset, vegetable, and crop production are predominantly cultivated by smallholder households. Especially, Enset is their main staple crop, and other cash crops are grown, which include Coffee and Khat. Major food crops grown by households are largely field crops that include Wheat, Maize, Teff, Barely, Vegetables, and Sorghum in some mid-latitude and high altitude of the district. Moreover, the Gurage peoples are partially trader and the majority is sedentary agriculturalists (Office of Livestock and Fishery, 2016/17). The study was comprised of a survey and the survey was accomplished through an interview using pre-tested structured questionnaires and was augmented with focus group discussion with key informants and direct field observations. In addition to that, focus group discussions made with key informants (community leaders, elders, district manager, development agents, extension workers, health technicians, and model farmers in chicken rearing) were employed to validate the information gathered and to get in-depth information on village chicken management, production and productivity constraints in the district [3].

Sample size and sampling procedure

Selection of study Kebeles and respondents were assisted by Development Agents (DAs), village leaders, and local administrative bodies in the district. Accordingly, three Kebeles (Ks) were purposively selected from each altitude (Yeferezye, Girar, and Yedebe from High altitude and Gassore, Awan, and Sisenaematye from Mid altitude based on chicken production potential and easy accessibility to the researchers' residence. A total of 204 respondents were selected for the survey study. Thus, 180 households (30 per each Ks) were selected purposively based on their chicken production experiences and those who had both local and crossbreed or exotic chickens and were currently involved in chicken production. Focus group discussions (FGD) (one FGD from each agro-ecology) were made with key informants. A total of 24 participants (16 females and 8 males); eight from smallholder village chicken producers (four from each agro-ecologies), eight livestock experts (four from each agro-ecologies), and eight consumers (four from each agroecology) based on their experience of village chicken management practice and chicken production potential, chicken ownership pattern and decision making [4].

Data collection methods

A rapid field survey was conducted on twelve randomly selected households which were among the selected study respondents (six from each agroecology or two from each Kebeke) to pre-test the prepared semi-structured questionnaire. Additionally, the information regarding chicken distribution, population, and contribution of village chickens was obtained from local governmental administrative bodies like the office of Agriculture and Rural Development (Livestock and Fishery). Before the commencement of data collections, enumerators from the local Agricultural office were selected and trained for two days on the importance of every questionnaire and techniques of data collection. The FGD was made with key informants to collect information on flock size and breed composition, sources of chicken foundation stock, ownership pattern, division of household labor, decision making, limitations to chicken product consumption, management practices, breeding and culling practices, brooding and hatching, flock productive performances, the purpose of keeping chicken, agricultural extension services and intervention made, disease occurrence and severity, constraints and opportunities of village chicken production.

Statistical Analysis

All descriptive data were analyzed by SPSS (Statistical Package for Social Sciences) version 20 for windows (SPSS, 2016), and mean differences were separated using Least Significant Difference (LSD). The mean statistics (Mean, SEM, and percentage) for continuous variables obtained from the survey were subjected to analysis of variance (ANOVA) using the General Linear Model (GLM) procedure of SPSS.

Model for survey data

$Yijk = \mu + Ai + Bj + (AB)\,jig + Єijk$

Where: Yijk= productivity performance as affected by agroecology, breed and their interactions

μ=Overall mean of the respective variables

Ai=the effect of ith agro-ecology (i= high and mid-latitude) on the productivity performance of village chickens

Bj=the effect of the jth chicken breed (j=local and crossbred) on the productivity performance of village chickens

(AB)ij=the interaction effect between agro-ecology and chicken breed on the productivity performance of village chickens

Єijk=the ijkth random error

RESULTS AND DISCUSSION

Socioeconomic features of the households

Peoples of the study district practices a mixed farming system (crop and livestock production) to generate income and basically to meet family demand as reported by Demographic Surveillance and Health Research Center (DSHRC) and Agriculture and Rural Development (ARD). As well as respondents reported: Enset, barley, wheat, potatoes, sweet potatoes, vegetables, Khat, and Coffee as the dominant crops produced in the high altitude whereas, Enset, Khat, maize, teff, sorghum, potatoes, sweet potatoes, and coffee as dominant crops in the mid-latitude. Table 1 indicates the proportion of the respondents from each agroecology and the majority of respondents were females which is in agreement with the study reported. However, this study finding has disagreed with many authors who reported males as a major responsibility in village chicken-keeping. The majority of the households in the study district were attended elementary school (grade 1 up to 8) whereas the remaining households have never been to school. Similarly, reported that more educated households are being attracted to and occupied in chicken keeping perhaps due to their better awareness and knowledge of its value and production efficiency. Also reported a village chicken does not require high levels of skill and education. The majority of the respondents' sources of income to establish chicken foundation stock was from personal income either by selling cereal crops or livestock. This is in line with Tsadk et al. (2015) who reported that the most important source of income for establishing foundation stock in central Oromiya was by sale of crop and livestock from own (Table 1).

Table 1: Demographic characteristics of the households in the study area.

Demographic characteristics	Agro-Ecology				Overall Mean	
	HA (N=90)	(%)	MA (N=90)	(%)	(N=180)	(%)
Gender of household						
Female	71	78.9	75	83.3	146	81.1
Male	19	21.1	15	16.7	34	18.9
Age category						
<20 years	1	1.1	2	2.2	3	1.6
21-30 years	11	12.2	8	8.9	19	10.5
31-40 years	49	54.4	52	57.8	101	56.1
41-50 years	23	25.6	24	26.7	47	26.1
>51 years	6	6.7	4	4.4	10	5.5
Marital status						
Married	71	78.9	72	80	143	79.4
Single	2	2.2	2	2.2	4	2.2
Divorced	7	7.8	9	10	16	8.9
Widow	10	11.1	7	7.8	17	9.5
Educational level						
Illiterate	16	17.8	19	21.1	35	19.5
Basic education	12	13.3	9	10	21	11.7
Elementary school	49	54.4	42	46.7	91	50.5

High school education	11	12.2	17	18.9	28	15.5
Preparatory and above	2	2.2	3	3.3	5	2.8
Source of income to purchase chicken foundation stock						
Personal income	59	65.6	61	67.8	120	66.7
Government employee	9	10	9	10	18	10
Small trade	15	16.7	16	17.8	31	17.2
Family	3	3.3	2	2.2	5	2.8
Microfinance	2	2.2	1	1.1	3	1.7
Private lender	2	2.2	1	1.1	3	1.7
Private lender	2	2.2	1	1.1	3	1.7
Type of HH						
Male-headed	80	89	83	92.2	163	90.5
Female-headed	10	11	7	7.8	17	9.5

The overall mean family size in the district was in agreement with the study reported by Zemelak *et al.* (2016) and Getu *et al.* (2014) who reported 6 and 6.2 in Ethiopia, respectively. Dislike to the present finding higher (6.8±2.4) average family size reported in Kambata Tambaro and Wolaita zones, SNNPR, Ethiopia by (Aman *et al*., 2015). In the study district, the average family size is relatively higher than the national average family size of rural areas 4.9 persons/HH (CSA, 2011), and this might be mainly due to more landholding and high population numbers. Thus, labor demanding for agricultural activities (especially for garden keeping like *Khat, Enset*, and Coffee) that requires more labor than other activities contributed to such a higher family size. Overall mean farm landholding per household used for different activities in the district is indicated in Table 2, which was significantly higher in high altitude than mid-altitude. This was attributed to the structure or the geographical arrangement and/or location of the cultivating land at the high altitudinal climatic zone is mountainous which may result in difficulty to cultivation. According to (Zemelak *et al*., 2016) reported lesser land holding for mid (0.46ha) and high (0.2ha) and on average 1.7ha/HH in other parts of Ethiopia. Similarly, Fesseha *et al.* (2010a, 2014) reported lower average landholding of 0.97 and 1.23 ha, respectively in the Bure district, North-West Ethiopia. However, higher landholding per household was reported by Getu *et al.* (2014) in North Gonder. Livestock keeping is a vital part of the livelihood of smallholders in the study of agro-ecologies. The results indicate in table 2 reported that the households in the district particularly rears cattle indicates the availability of animal fed and favorable climate for cattle production. There was a significant difference ($P<0.001$) between the two agro-ecological zones in terms of horse holding per household. Respondents in high altitude use horse for transportation of goods and elders and they use for drafting purpose than mid-altitude. This is due to the landscape that is difficult for humans in the high altitudinal agro-climatic zone. The results obtained from the current finding indicated high cattle and donkey per household which was higher than the results of Mekonen (2007) and Fisseha (2009) who reported 3.12 for cattle and 0.07 for donkey in Bure district of North-West Amhara and Dale, Wonsho, and Loka Abaya districts of

Southern Ethiopia, respectively. This difference might be attributed to the variations in the relative importance and climatic condition favorable for animal production and small traders and household uses donkey and mule always for transportation during the market time, agricultural activity and ridding purposes(Table 2).

Table 2: Household characteristics and livestock holding in study district (N=180).

Agro-Ecology				
Categories	**HA**	**MA**	**Overall Mean**	**P-value**
	(Mean±SEM)	**(Mean±SEM)**	**(Mean±SEM)**	
Family size	6.03±0.17	5.99±0.25	6.01±0.21	0.882
Farmland size (ha)	2.55±0.09[b]	3.42±0.10[a]	2.98±0.09	0.045
Cattle	4.37±0.19	4.44±0.17	4.40±0.13	0.762
Sheep	1.23±0.14	1.14±0.10	1.18±0.09	0.458
Goat	0.63±0.10	0.61±0.10	0.62±0.07	0.88
Donkey	0.82±0.08	0.91±0.07	0.86±0.06	0.428
Horse	0.43±0.07[a]	0.17±0.45[b]	0.30±0.04	0.005
Mule	0.06±0.03	0.04±0.02	0.05±0.02	0.734

Chicken breed composition and flock size

The overall mean value of chicken breed composition and flock size in the district is presented in Table 3. The dominant class of chicken maintained by respondents was hens this implied that egg production is the priority of respondents. There was a significant difference ($P<0.05$) between the high and mid-altitude in young chick rearing. The higher chick ownership in mid-altitude was due to cold stress which causes high mortality in high altitude. The source of exotic young chicks, pullet, and cockerels was from their hatching by broody hens, from the private farm, and sometimes from local markets, respectively. Therefore, in the current study, the overall mean value of village chicken holding per household was 12.36 which is similar to Samson and Endalew (2010)and Fsseha *et al*, (2010) who reported 12 chickens/HH in Mid Rift Valley of Oromia and 13.10 and 12.38 chickens/HH in Bure and Fogera districts, respectively. On the other hand the current result higher than the study observed by Aman *et al*. (2015) and Meseret (2010) who reported 8.6±1.7 and 6.23 average chicken population per HH in Kambata Tambaro and Wolaita zones, SNNPR and Gomma Woreda, Jimma zone, respectively. However, Addis and Malede (2014) and Aklilu *et al.* (2017) relatively reported a higher average flock size of village chicken in Ethiopia and North Gondar zone which was 14.2 and 16.43chickens/HH, respectively. In this finding, the average means value of exotic (Sasso) chicken breeds flock size was extremely less than the study result reported by Aman *et al.* (2017) which was 6±1.22 per household in SNNPR [5]. Like other livestock species, chicken flocks were higher in number in the study area. This could be related to the production potential of the study area in *Enset* and *Enset* products, and grains (maize, sorghum, barley, and wheat) that is a dominant supplemental feed resource for the chickens. Almost all households kept all classes of chicken together without age and breed separation which is similar to the study reported (Table 3).

Table 3: Flock size and breed composition of village chickens (Mean ± SEM).

Agro-Ecology					
Parameters	**HA (N=90)**	**MA (N=90)**	**Overall Mean (N=180)**	**(%)**	**P-value**
	(Mean±SEM)	**(Mean±SEM)**			
Local chicken classes					
Hens	4.32±0.12	4.23±0.22	4.27±0.12	40.34	0.731 ^{NS}
Cocks	0.85±0.06	0.88±0.07	0.87±0.46	8.22	0.811^{NS}
Pullets	0.90±0.08	0.94±0.08	0.92±0.05	8.69	0.708 ^{NS}
Cockerels	0.90±0.08	0.93±0.08	0.91±0.05	8.6	0.778 ^{NS}
Young chicks	3.20±0.14^{b}	4.02±0.12^{a}	3.61±0.10	34.12	**
Total	10.17	11	10.58	100	-
Sasso Crossbred chicken classes (Hybrid)					
Hens	0.37±0.04^{b}	0.58±0.05^{a}	0.47±0.04	27.45	*
Cocks	0.40±0.05	0.40±0.04	0.40±0.04	23.31	0.77 ^{NS}
Pullets	0.42±0.04	0.34±0.05	0.38±0.04	19.68	0.29 ^{NS}
Cockerels	0.36±0.05	0.32±0.05	0.34±0.03	17.62	0.64 ^{NS}
Young chicks	0.14±0.04^{b}	0.24±0.03^{a}	0.19±0.03	12.47	**
Total	1.69	1.88	1.78	100	-
Total	11.86	12.88	12.36	-	-

Sources of foundation chicken

The sources of chicken foundation stocks of the households' are indicated in Table 4. Most of the respondents purchased foundation stock of Sasso crossbred chicken at 42 days age from a private farm (Ethio-Chicken Private Farm) which is located in the study district and seldom purchases from the local market. However; there was not any significant difference between the two agro-ecologies. Parents also practiced transferring at least one pullet for their children, which ensured them to rear chickens for their needs like purchase books, pens, and other educational materials. Similarly, Aman *et al*. (2017) reported that the main sources of foundation stock were purchased from private farms and local cooperatives (58.20%) and given by the government through livestock development extension system in the form of pullets and cockerels (24.7%). (2017) reported that hatching (37%) is the major contributor to the chickens entering the flock, next to hatching (30%) (Table 4).

Table 4: Sources of the foundation stock for local and Sasso crossbred chickens.

Agro-Ecology						
Parameters	**HA**		**MA**		**Overall Mean**	
	N	**%**	**N**	**%**	**N**	**%**
Purchase from the market and private farm	43	47.8	41	45.6	84	46.7

Gift	1	1.1	3	3.3	4	2.2
Family/parents	14	15.6	17	18.9	31	17.2
Hatched (from own farm)	29	32.2	26	28.9	55	30.5
Custody	3	3.3	3	3.3	6	3.4
Total	90	100	90	100	180	100
P-value 0.958 ^{NS}						

Ownership, Labor Division and Decision Making of the Households

There is no significant difference between the two agro-ecologies in the ownership of chicken and income from the sale of chicken and eggs (Table 5). In the study area, the pattern of chicken ownership was women which is in agreement with FAO (2008a) reported village chicken production in the home is mainly the business of the women (wife) followed by young girls. This might be attributed as a side business to support the family income. Similar to the current finding, Samson and Endalew (2010) revealed that a higher percentage (92.4%) of village chicken production was owned by women and girls in the Mid Rift Valley of Oromia, Ethiopia. Similar results to the current finding several scholars and organizations revealed that a higher percentage of village chicken production was owned by women and girls (FAO, 2008a; Samson and Endalew, 2010; Justus et al., 2013; Wanjugu, 2015). This is probably due to the rural women raise chicken for income generation to purchase basic commodities such as salt, cooking oil, spices, and sugar or other home inputs. The minimum role of men in the ownership of village chicken in the district is ascribed mainly due to small trade, field agricultural activities, and traditional belief in the community that chickens are considered to be the only possession by women and sometimes men considered as taboo. The current result indicating that the responsibilities of taking care of the village chickens like chicken feeding, chicken watering, shelter cleaning, and chicken treatment are likely to be done by women and girls, whereas, shelter construction is mostly done by men and sometimes a partial role to be played by boys. Similar ideas were reported by Alem et al. (2014) who revealed that the higher responsibilities in chicken shelter construction were by fathers-headed household (100%) in central Tigray. Tadelle et al. (2013) and Alem et al. (2014) also reported that women and girls have greater responsibilities for many activities compared to men and boys, been involved in house cleaning, feeding, watering, and selling of chickens and eggs. Although there was no significant difference between study agro-ecologies ($P< 0.05$), women were highly decision-maker regarding buying and selling chickens and eggs. This is in line with Justrs et al. (2013) who reported that women are the main decision-maker (60%) regarding the sale of chickens. Similarly, many authors confirmed the greatest decision of women in buying and selling chickens and eggs (Tables 5-7).

Table 5: Ownership pattern of the HH for village chicken production.

Ownership pattern	**Family members**	**Agro-Ecology**		**Total N (%)**	**X^2 test**	**P-value**
		HA	**MA**			
		N (%)	**N (%)**			
Ownership of chickens	Men (husband)	7(7.8)	10(11.1)	17(9.4)	1.45	0.53^{NS}
	Women (wife)	69(76.7)	66(73.3)	135(75)		
	Boys	10(11.1)	12(13.3)	22(12.2)		
	Girls	4(4.4)	2(2.2)	6(3.3)		
Ownership of income from the sale of chicken	Men (husband)	7(7.8)	3(3.3)	10(5.6)	6.75	0.24 ^{NS}
	Women (wife)	52(57.8)	68(75.6)	120(66.7)		

	Boys	18(20)	10(11.1)	28(15.6)		
	Girls	13(14.4)	9(10)	22(12.2)		
Ownership of income from the sale of eggs	Men (husband)	6(6.7)	4(4.4)	10(5.6)	1.31	0.37 ^{NS}
	Women (wife)	74(82.2)	74(82.2)	148(82.2)		
	Boys	6(6.7)	5(5.6)	11(6.1)		
	Girls	4(4.4)	7(7.8)	11(6.1)		

Table 6: Division of HH labor for village chicken management.

A division of Labor	**Family members**	**Agro-Ecology**		**Total N (%)**	**X^2**	**P-value**
		HA	**MA**			
		N (%)	**N (%)**			
Chicken perch/shelter construction	Men (husband)	46(51.1)	45(50)	91(50.6)	1.83	0.64 ^{NS}
	Women (wife)	31(34.3)	37(41.1)	68(37.8)		
	Boys	9(10)	5(5.6)	14(7.8)		
	Girls	4(4.4)	3(3.3)	7(3.9)		
Chicken feeding	Men (husband)	9(10)	13(14.4)	22(12.2)	4.57	0.31 ^{NS}
	Women (wife)	59(65.6)	62(68.9)	121(67.2)		
	Boys	10(11.1)	3(3.3)	13(7.2)		
	Girls	12(13.3)	12(13.3)	24(13.3)		
Chicken watering	Men (husband)	3(3.3)	9(10.0)	12(6.7)	4.07	0.40 ^{NS}
	Women (wife)	68(75.6)	65(72.2)	133(73.9)		
	Boys	6(6.7)	3(3.3)	9(5)		
	Girls	13(14.4)	13(14.4)	26(14.4)		
House/shelter cleaning	Men (husband)	4(4.4)	7(7.8)	11(6.1)	1.53	0.29 ^{NS}
	Women (wife)	78(86.7)	72(80)	150(83.3)		
	Boys	4(4.5)	5(5.6)	9(10)		
	Girls	4(4.4)	6(6.7)	10(11.1)		
Chicken treatment	Men (husband)	26(28.9)	19(21.1)	45(25.0)	1.69	0.60 ^{NS}
	Women (wife)	52(57.8)	59(65.6)	111(61.7)		
	Boys	5(5.6)	6(6.7)	11(6.1)		
	Girls	7(7.8)	6(6.7)	13(7.2)		

Table 7: Decision making for village chicken production.

Decision making	**Family members**	**Agro-Ecology**		**Total N (%)**	**X^2**	**P-value**
		HA	**MA**			
		N (%)	**N (%)**			
Selling chicken	Men(husband)	7(7.8)	6(6.7)	13(7.2)	3.83	0.35 ^{NS}
	Women(wife)	62(68.9)	70(77.8)	132(73.3)		
	Girls	14(15.6)	6(6.7)	20(11.1)		

	Boys	7(7.8)	8(8.9)	15(8.3)		
Buying chicken	Men(husband)	37(41.1)	36. (40)	73(40.6)	5.02	0.13 ^{NS}
	Women(wife)	45(50)	52(57.8)	97(53.9)		
	Girls	7(7.8)	1(1.1)	8(4.4)		
	Boys	1(1.1)	1(1.1)	2(1.1)		
Selling/buying eggs	Men(husband)	2(2.2)	4(4.4)	6(3.3)	0.93	0.93 ^{NS}
	Women(wife)	70(77.8)	67(74.4)	137(76.1)		
	Boys	2(2.2)	3(3.3)	5 (2.8)		
	Girls	16(17.8)	16(17.8)	32(17.8)		

Limitations to chicken product consumption

Limiting factors for chicken and chicken product consumption across the study agro-ecologies was non-significant. Due to respondents gave priority to crop consumption or prohibitive product of chicken, the poor eating habit of egg and meat and expensiveness or unavailability of chicken product (Table 8). The breed preference of the farmer as well as consumers for exotic chicken breeds is lesser than that of local breeds. This is similar to Aklilu (2017) who reported less perception of respondents to exotic breeds in Tigray (Table 8).

Table 8: Limitations against chicken product consumption.

Parameters	Agro-Ecology				Overall	
	HA		MA			
	N=90	%	N=90	%	N=180	%
Prohibitive product of chicken	65	72.1	68	75.6	133	73.9
No availability	7	7.8	8	8.9	15	8.3
The poor eating habit of egg and meat (exotic)	18	20	14	15.6	32	17.8
Total	90	100	90	100	180	100
P-value 0.571^{NS}						

Village chicken husbandry and management practices

Feed resources

Commonly available supplemental feed resources for village chickens in the study agro-ecologies were ranked based on the replies of households and group discussion made with key informants as presented. Accordingly, to study respondents Enset products, household waste, and kitchen waste were the most frequently used.

The market price for available feed in the study area was different based on its availability and production potential. Maize and milling by-products were relatively low as compared with the market price of other cereal grains like wheat and barley due to farmers use wheat and barley for other purposes like local alcohol production. Similarly, Worku et al. (2012) reported that the major types of grain used as supplementary feeds were maize (50.4%), wheat (39.3%), and barley (10.3%) in other parts of the country. Likewise, Aklilu (2017) reported sorghum, maize, and food leftover as supplementary feed for village chickens. June to August was found to be a season of feed shortage whereas mid-December to mid-May was found to be a season of sufficient available supplemental feeds to the chicken. A similar result has been reported by Shishay et al. (2014) rainy season is the critical period of feed supplementation for village chicken production (Table 9).

Table 9: Feed resources used for supplementing village chickens in Cheha district (Ranked).

Feed resources	Ranked	
	HA	**MA**
Enset products (Kocho, Amicho)	1st	1st
Household wastes	2nd	2nd
Kitchen wastes	3rd	3rd
Barley	4th	7th
Maize grain	5th	4th
Milling by-products	6th	5th
Wheat	7th	6th
Sorghum grain	8th	8th

Feeding practices

The feeding practices and feed sources for the village chicken in the study district are presented in Table 10. The majority of respondents depend on scavenging with little supplementation while few respondents practiced the scavenging system only. This is the result was corresponding to a previous study report. Similarly, many authors reported that most of the respondents supplemented their chickens. However, a lower percentage of respondents in western Kenya adopted feed supplementation for village chicken. The majority of respondents simply feeding on the floor whereas few of them use feeding trough which is made from plastic materials called "Mastatebiya lastic", wooden made "Gebete or Wanqema" an earthen pot "Shekla sibari or Gel" (Table10). These poor feeding practices cause disease outbreaks through soil contamination. This result corresponds to Shishay et al. (2014)who revealed that 97.8 of respondents were fed chicken on the ground and 2.2% used local containers like plastic or metallic made. The majority (70.3%) of respondents supplement their chickens only once a day either in the morning, noon, or evening time all age and breed group together (Table 10). However, all respondents do not measure the quality of feed given. In disagreement with this result, Aklilu (2017) reported that the majority (59.1%) of respondents were supplemented their chicken three times a day, and others once and twice a day. Similarly, Emebet (2015) reported that 23.6% of chicken owners supplemented feed three times a day, 44.6% supplemented two times a day, and 31.7% once a day. Moreover, Alemayeh (2017) reported that the majority of respondents (97.8%) provided supplementary feeds once a day while 2.2% not offered. In the study, district farmers provided supplementary feed mainly for hens and chicks which was to boost up egg production and accelerate growth rate (Table 10). However, households had no idea of the quality, quantity, and time of supplementary feed provision. This might be due to the poor activities of developmental agents and extension services of the study district (Figure 1).

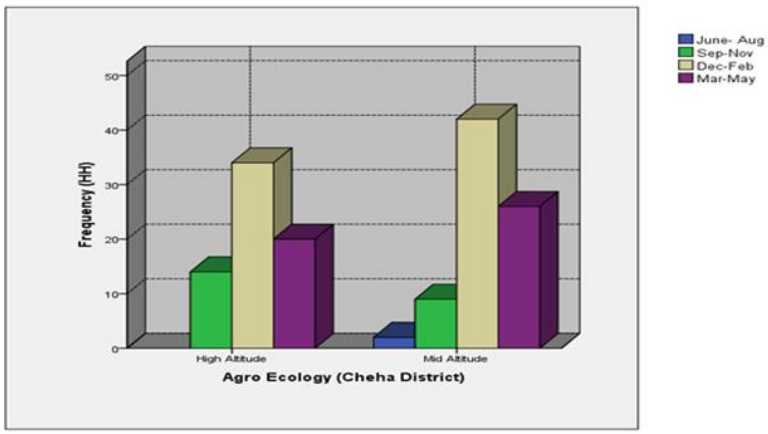

Figure 1. Seasonal availability of supplemental feeds throughout the year.

In the study area, the major sources of supplementary feed were from their crop farm (75.7%) and local market (18.2%) (Table 10). Similarly, Alemayehu (2017) reported that supplementary feed was provided to young chickens (68.9%), laying hen (1.1%), pullet, cockerel, and cock (17.8%), and the together whole group (12.2%). Also, Bikila et al. (2015) reported that 70.8% of the households supplemented to layers and followed by chicks, pullet, and cocks /cockerels in Chelliya district, Ethiopia. However, Wondu et al. (2013) reported as 73% of respondents supplemented different age groups of chickens together and 27% separately. In the study district farmers provided priority of supplementation to layers and chicks. Chicken producers have no access to commercial and formulated ration and this implied poor feeding practices. Thus producers highly recommended to use a well-balanced diet and feed on a separate basis of different age categories, breed, and production levels to increase productivity and reproductively. The major reasons (purposes) of supplementary feed provision to increase egg production, maintain health, increase meat yield, and accelerate growth rate. This report is similar to Addisu et al. (2013) who reported that 34.97% of respondents maintain health issues, 33.99% to increase egg production, and 31.7% to increase meat yield in the North Wollo district. Restricting village chickens free movement is not practiced by the majority. Those respondents practiced restricting free movement were to prevent crop damage and disease transmission (Table 10).

Table 10: Husbandry practices of village chicken in the study area.

Agro-Ecology						
Parameters	**Description**	**HA N (%)**	**MA N (%)**	**Overall N (%)**	**X^2**	**P Value**
Feeding system	Scavenging only	15(16.7)	7(7.8)	22(12.2)	3.314	0.07^{NS}
	Scavenging with supplementation	75(83.3)	83(92.2)	158(87.8)		
Feeding trough	Yes	6(8.7)	8(10.1)	14(9.5)	0.093	0.77^{NS}
	No	63(91.3)	71(89.9)	134(90.5)		
Types of the feeding trough	Plastic made	4(66.7)	5(62.5)	9(64.3)	0.165	1.00^{NS}
	Wooden material	1(16.7)	1(12.5)	2(14.3)		
	Earthen pot	1(16.7)	2(25)	3(21.4)		
Frequency of supplementing	Once	48(69.6)	56(70.9)	104(70.3)	0.67	0.63^{NS}
	Twice	5(7.2)	8(10.1)	13(8.8)		
	Thrice	2(2.9)	2(2.5)	4(2.7)		
	Any time	14(20.3)	13(16.5)	27(18.2)		
Source of supplements	Home produced	55(79.7)	57(72.2)	112(75.7)	1.29	0.36^{NS}
	Purchased	3(4.3)	6(7.6)	9(6.1)		
	Home produced and purchased	11(15.9)	16(20.3)	27(18.2)		
Priority of supplementation	Layers/hens	22(32.4)	26(32.5)	48(32.4)	2.793	0.34^{NS}
	Chicks	15(22.1)	22(27.5)	37(25)		
	Pullets	3(4.4)	7(8.8)	10(6.8)		
	Cocks/cockerels	3(4.4)	4(5)	7(4.7)		
	Chicks and layers	25(36.8)	21(26.2)	46(31.1)		
Purposes of supplying supplementary feed	Egg production	39(52)	51(60.70	90(56.6)	1.651	0.21^{NS}
	Health care	21(28)	21(25)	42(26.5)		

	Meat yield	10(13.3)	9(10.7)	19(11.9)		
	Growth rate	5(6.7)	3(3.6)	8(5)		
Restrict free movement	Yes	15(16.7)	17(18.9)	32(17.8)	2.781	0.69^{NS}
	No	75(83.3)	73(81.1)	148(82.2)		
Reason for restricted free movement	Protect crop damage	13(86.7)	14(82.3)	27(84.4)	0.562	0.60^{NS}
	Protect diseases transmission	2(13.3)	3(17.6)	5(15.6)		

Water sources and watering practice

Despite variations in the source of water and watering frequency majority of respondents provided water for chickens while due to lack of awareness only a few did not. This is a promising and good experience and could be considered as one aspect of their concern for their chickens. There was a significant difference between the two agro-ecologies which might be due to the difference in a climatic condition that is the higher temperature at mid-altitude than high altitude. The current finding is similar to Desalew et al. (2013b), Teshome and Tesfaye (2015), and Aklilu (2017) who reported that most of the respondents were provides water for their chicken. Thus, concerning the source of water, households use various sources of water for their chicken based on the availability of water in their vicinity. However, the majority (44.9%) use water from spring water and followed by hand operating pipe water (41.5%). The result is contrary to Teshome and Tesfaye (2015) who reported river (30.4%) as a major source of water for chicken and less from spring (28.5%), locally made underground water (21.4%), and pipe water (19.7%). Dislike to this study result Alemayehu (2017) reported that the majority (68%) of respondents use water from underground. The information recorded for the frequency of watering revealed that the majority (76.9%) of the households provided water once a day at noontime all year round with particular emphasis during the dry season (or when the chickens show sign of thirst) while only a few (10.1%) of the households provided water twice at noon and evening. Comparable to the study finding Aman et al. (2015) reported that respondents provided water once, twice, thrice per day and ad-labrum to the chickens all year round with particular emphasis during the dry season. However, the result of the current finding has disagreed with Alemayehu (2017) who reported that respondents provided water for chicken ad-liptum (90%), three times per day (6%), twice a day (3%), and once a day (1%). Concerning drinking materials, most of the chicken owners (63.3%) using water trough made of plastic locally called “Mastatebya lastic”. Whereas, other respondents were uses materials like broken clay “Shekila sibari”, locally made wood “Yenchet gebete or Wnqema” and metal made container “Senkelo”. Similarly, Alemayehu (2017) reported plastic made material (55%), earthen pot (2%), wooden through (5%), stone made (21%), half of the broken pot (1%), half of "Jerrycan” (4%) and metallic made (2%) water trough. Likewise, Desalew et al. (2013) reported broken clay “Shekila" (37.3%), wooden made (32.7%), and plastic made (28.2%) as the most widely used types of watering troughs. However, Aklilu (2017) and Teshome and Tesfaye (2015) reported that 82.6% and 98.2% of households used separate watering troughs for their chicken. About 40.5% of respondents washed watering trough sometimes (Table 11).

Table 11: Water source and watering practices for village chickens.

Agro-Ecology						
Parameter	Description	HA N (%)	MA N (%)	Total N (%)	X^2	SL
Provision of water	Yes	$68(75.6)^b$	$79(87.8)^a$	147(81.7)	4.492	*
	No	22(24.4)	11(12.2)	33(18.3)		
Frequency of watering	Once a day	56(82.4)	57(72.2)	113(76.9)	4.271	NS
	Twice a day	4(5.9)	11(13.9)	15(10.1)		

	Ad-libtum	1(1.5)	4(5.1)	5(3.5)		
Source of water	Any time	7(10.3)	7(8.9)	14(9.5)		
	Rainwater	0(0)	1(1.3)	1(0.7)	1.534	NS
	River	3(4.4)	5(6.3)	8(5.4)		
Types of a water trough	Pipe (hand-operated)	28(41.2)	33(41.8)	61(41.5)		
	Well water	3(4.4)	2(2.5)	5(3.4)		
	Pond water	3(4.4)	3(3.8)	6(4.1)		
	Springwater	31(45.6)	35(44.3)	66(44.9)		
	Plastic material	45(66.2)	48(60.8)	93(63.3)	1.73	NS
	Brocken clay	9(13.2)	9(11.4)	18(12.2)		
	Locally made wood	5(7.4)	11(13.9)	16(10.9)		
	Metal made	9(13.2)	11(13.9)	20(13.6)		
The frequency for cleaning water trough	Once a day	15(21.7)	16(20.3)	31(20.9)	0.071	NS
	Sometimes	28(40.6)	32(40.5)	60(40.5)		
	No cleaning	13(18.8)	16(22.3)	29(19.6)		
	Once a week	13(18.8)	15(19)	28(18.9)		

Chicken housing and management

The majority of the surveyed respondents did not have a separate chicken house and they shared their house with chickens during the night time. This implies chickens spent most of their day time scavenging around the family house. However, only a few respondents were uses separate shelter built from available local materials such as wooden and mud, maize or sorghum stover, and thatched . This result is similar to the report of Mahios *et al*. (2015) who indicated that respondents used separate shelter constructed from wood and mud (42.9%, bamboo (39.9%), and timber(17.9%). This was due to lack of awareness, lack of attention to village chickens, and risk of predators. Sharing shelter with humans and other domestic animals exposed birds to a high risk of disease transmission. This has disagreed with Aklilu (2017) who reported that 57.2% of respondents used a separate house, 38.25% only prepared a shelter for night enclosure within their living room and 4.55% let their chicken just perch at a tree logs around their homes. However, the result of the current finding is in agreement with Fisseha *et al.* (2010) who reported 92.55%, and Addisu *et al.* (2013) who reported 97.6% of respondents not separate chicken shelter. In their study, they mentioned lack of attention for chickens (34.6%), lack of construction materials (25%), lack of knowledge and awareness (19.6%), risk of predators (12.1%), and shortage of labor and time (5.4%) as major reasons for not preparing a separate shelter. During the night majority of respondents were used perch in their home (69.35%) which is locally called "*Kott*" and others shelter on the ceiling of the animal pen "*Beret*" (21.95%). This can hinder the adoption, survivability, and productivity of village chickens. The majority of respondents were cleaned chicken shelter once a week and others not at all. This agreed with the study result of Alemayehu (2017) who reported as 54.4% of respondents clean and others not clean. However, this result disagrees with Shishay *et al*. (2014) who reported as the majority (66%) clean chicken shelters every day and others three times a week. In the study area, chicken producers' were poor in bio-

security. Therefore, increasing producers' awareness to improve biosecurity practices should be given to attention (Table 12).

Table 12: Housing and management practices of village chicken.

Agro-Ecology					
Parameter	**Description**	**HA**	**MA**	**Total**	**SL**
		N (%)	**N (%)**	**N (%)**	
Separate	Yes	4(4.45)	3(3.34)	7(3.89)	NS
House	No	86(95.55)	87(96.66)	173(96.11)	
Reason for the absence of separate house	Lack of attention	26(30.20)	28(32.18)	54(31.22)	NS
	Lack of awareness	39(45.35)	36(41.38)	75(43.35)	
	Risk of predators	13(15.10)	15(17.25)	28(16.18)	
	Risk of theft	8(9.35)	6(6.89)	14(8.10)	
	Lack of construction material	0(0)	2(2.30)	2(1.15)	
Sheltering at night	Night perches in the family	59(68.60)	61(70.11)	120(69.35)	NS
	Under veranda	3(3.50)	4(4.60)	7(4.05)	
	On the ceiling of the animal pen	19(22.10)	19(21.80)	38(21.95)	
	The floor covered by containers	3(3.50)	2(2.30)	5(2.90)	
	Under sitting place	2(2.33)	1(1.15)	3(1.75)	
Frequency of cleaning shelter	Every day	4(4.44)	6(6.66)	10(5.55)	NS
	Every two days	10(11.10)	8(8.89)	18(10)	
	Every three days	6(6.67)	7(7.78)	13(7.23)	
	Once a week	40(44.44)	32(35.56)	72(40)	
	Twice a week	10(11.10)	12(13.33)	22(12.22)	
	No cleaning	20(22.22)	25(27.78)	45(25)	
Construction materials	Maize/Sorghum stover	1(25)	1(33.33)	2(28.57)	NS
	Wood and mud	2(50)	2(66.67)	4(57.15)	
	Thatched	1(25)	0(0)	1(14.28)	

Village chicken health and care

Chicken Diseases and control measures

The occurrence of chicken disease in the study district is recognized by the majority of respondents it was specifically different between high and mid-latitude (Table 13). This might be due to moderate environmental conditions at mid-altitude. The prevailing chicken disease in the study district was NCD (Fengil), coccidiosis, external parasite, and another undefined disease, however, NCD was the most. In line with this study result, many authors indicated NCD as the most prevailing disease of village chicken in Ethiopia. However, Adedeji *et al*. (2014) reported less prevalence of NCD (47.37%) and coccidiosis (26.32%) in the Osun state of Nigeria. Respondents were identified disease by its symptom when birds get sick. The most commonly reported symptoms of chickens when infected with NCD were the occurrence of white/yellow color diarrhea, nasal discharge, sneezing, and dullness locally termed as "*Kufef mallet*", poor appetite, and deaths within a few days. During the disease

outbreak, only a few respondents got veterinary services and assistance. However, livestock health forced in the study district reported as treatment and vaccination services were given to other animals except for exotic breeds which were immunized against NCD before distribution. Similarly, animal health technicians of the district as most chicken producers were blamed for negligence and non-reporting of a disease outbreak. The main source of occurrence of disease outbreak was from newly introduced chickens either from market or neighbor, own infected flocks, and other unknown sources. This result is in line with Bogale (2008) who reported incoming flocks (51.4%), own flocks (3.5%), and flock from neighbors (20.8%) as major sources of village chicken disease in Fogera district. Likewise, an earlier finding has been reported by Shishay *et al.* (2014) revealed that the source of infections was either of chicken from the market (26.2%), chicken from neighbors (2.9%), both chicken from market and neighbor (2.3%), contaminated feed (1%) and dirty chicken house, while the remaining 64.7% of the households replied that chickens infections arose unknowingly. Alemayehu (2017) reported fluctuation of the season (35.6%), neighbors (25.6%), and unknown sources (12.2%) were major sources of village chicken disease outbreak. Respondents reported that the prevalence of NCD and chicken mortality were higher during the early rainy season especially from March to June. This was might be due to the critical time for virus outbreak or reproduction at the time of the early rainy season. This result corresponds to the finding of Fisseha *et al*. (2014) who reported high mortality of village chicken during the start of the rainy season, mainly in April (66.8%) and May (31.4%) in the North-West Amahara region, Ethiopia. Likewise, at the same study site Fisseha *et al*. (2010b) reported more prevalence of NCD and chicken mortality at the start of the rainy season, mainly April to June. In this study, respondents reported that NCD affects different chicken breeds and every age group though exotic breeds and layers are more susceptible. This result is agreed with the finding of Fisseha *et al*. (2010a) who identified NCD as it affected every chicken breed and age group. However, Alemayehu (2017) reported that adult birds were mostly affected (80%). For control of NCD majority of respondents were rely on traditional prediction (plant materials). This was due to limited coverage of conventional drugs and veterinary services. Among the traditional medicines reported by the respondent were the uses of the concoction of local alcohol ("Areke"), hot pepper ("*Mitmita"), Feto* (*Brassica spp*)*,* lemon juice, or "*Komtate"*, ginger and garlic "*Niche shinkurt*"). Also other reported use of any plant materials (herbs) like "Endod" and "Semiza", the concoction of salt Gesho, water, and ash to treat mites or sick birds [5].

This result is corresponding to the finding of Aklilu (2017) who revealed that the commonly used traditional treatment methods mentioned by the sample households were; '*Nim*' (*Melia azedarach*) (10.61%), lemon (6.06%), tetracycline (11.36%), garlic (1.89%), hot pepper (6.06%), hot pepper + lemon + garlic (13.64%), lemon + garlic + tetracycline (42.04%) and Moringa leaf (3.79%). Also, similar results reported by Getu and Birhan (2014) who reported about 53.33% in Alefa, 66.67% in Quora, and 73.33% of Tach Armachiho district traditionally experienced to treat their sick chickens However, the current result is in disagreement with Desalew (2012) who reported that 50.6% (21.2% in Adaa and 80% in Lume districts) of the households in East Shewa used vaccines to control chicken diseases (Table 13).

Table 13: Most common chicken diseases and controlling methods.

Parameter	Description	Agro-Ecology		Total N (%)	SL
		HA N (%)	MA N (%)		
Occurrence of disease	Yes	90(100)	86(95.60)	176(97.80)	*
	No	0(0)	4(4.49)	4(2.20)	
Most prevalent diseases	Coccidiosis	14(15.55)	11(12.79)	25(14.20)	NS
	NCD	66(73.33)	66(76.75)	132(75)	
	External parasites	7(7.78)	5(5.82)	12(6.83)	
	Un identified	3(3.33)	4(4.65)	7(3.97)	
Breeds affected by NCD	Exotic breed only	49(54.41)	61(70.92)	110(62.50)	NS
	Local only	13(14.43)	11(12.81)	24(13.60)	
	All affected	28(31.12)	14(16.311)	42(23.90)	
Production and groups affected by NCD	Laying hens	48(53.30)	42(48.85)	90(51.15)	NS
	Brooding hens	30(33.32)	29(33.70)	59(33.52)	
	Adult chickens	3(3.33)	6(7)	9(5.13)	
	Chicks	9(10)	9(10.5)	18(10.2)	
NCD prevalence period	Dry season	15(16.65)	13(15.15)	28(15.90)	NS
	Early rainy	61(67.80)	61(70.90)	122(69.30)	
	Main rainy	14(15.56)	12(13.95)	26 (14.80)	
Main sources of disease infection	Incoming chickens	45(50)	40(46.50)	85(48.30)	NS
	From own flocks	38(42.20)	37(43)	75(42.60)	
	Unknown sources	7(7.80)	9(10.50)	16(9.20)	
Control measures	Traditional way	64(71.12)	60(69.84)	124(70.45)	NS
of NCD	Treatment	3(3.30)	4(4.70)	7(4)	
	Hygiene	15(16.70)	15(17.40)	30(17.05)	
	No, any control	8(6.91)	7(8.22)	15(8.50)	

The traditional control method of NCD	Concoction	53(58.90)	53(61.64)	106(60.30)	NS
	Any plant materials	12(13.30)	12(14)	24(13.50)	
	Cutting vein under the wing to drown blood	25(27.78)	21(24.48)	46(26.20)	

Predators and control measures

The most common predators reported by the respondent were wild cats, flying birds locally called "*Chillfit"*, wild animals (*Shelemitmat*, fox, monkey, and ape), dogs, and rats (Table 14). However, most predators affected seriously young chicks with a significant difference between high and mid-altitude. This is might be due to crop or plant coverage during rainy and before crop harvesting. Moreover, the effects of predation were more serious to chickens owned by households located at foot of mountains. A similar result was reported by Samson and Endalew (2010) as the main causes of chick mortality were flying birds (eagles) (34%), wild cats and dogs (16.3%), wild animals (15%), diseases (34%) and accident (0.7%). Also, Fisseha *et al.,* (2010a) reported that predations were the major constraints in village chicken production. Respondents of the study district were reported as they use various predator protection measures such as restricting free movement, trap or use of poisons and fences also tied broody hens (Table 14).

Table 14: Major predators, insect pests, and protection measures.

Types of predators	**Most affected age groups**	**Agro-Ecology**		**Overall mean**	**SL**
		HA	**MA**	**N (%)**	
		N (%)	**N (%)**		
Wild cats	Chicks only	36 (40) [b]	54 (60) [a]	90(50)	***
	Chicks and adults	35(38.90)	25(27.80)	60(33.30)	
	Adults only	19(21.10)	11(12.20)	30(16.70)	
Flying birds (eagle)	Chicks only	71(78.90)	74(82.20)	145(80.60)	NS
	Chicks and adults	19(21.14)	16(17.86)	35(19.40)	
Wild animals	Chicks and adults	47(52.20)[a]	30(33.30)[b]	77(42.80)	*
	Adults only	43(47.80)	60(66.70)	103(57.20)	
Dogs	Chicks only	47(52.20)	36(40)	83(46.10)	NS
	Chicks and adults	19(21)	24(26.70)	43(23.50)	
	No problem with dogs	24(26.70)	30(33.30)	54(30.40)	
Rats	Chicks only	63(70.01)	65(72.22)	128(71.13)	NS

	Chicks and adults	10(11.11)	7(7.82)	17(9.43)	
	No problems	17(18.92)	18(20)	35(19.44)	
Protection measures					
Restricting free movement of chicken in the house		58(64.40)	58(64.40)	116(64.40)	NS
Traps (poisons)		21(23.30)	22(24.40)	43(23.90)	
Growing of hedge plants (or erect fence)		11(12.21)	10(11.10)	21(11.70)	

Mating system and culling practices

All respondents (100%) in the district reported that they practiced uncontrolled or natural mating systems only; because of their dependence on the free scavenging production system (Table 15). This result was in agreement with Assefa *et al*. (2016) who reported that the majority (96.4%) practiced an uncontrolled mating system. Similarly, Nigussie (2010) reported non-systematic breeding in any region of Ethiopia. Another study by Addisu *et al.* (2013) revealed that (89.2%) of village chicken owners had practiced the natural mating systems while 10.79% of them practiced control mating [2].

The majority of the respondents did not practice chicken culling. However, those practiced cullings were due to health problems, poor production potential, and broodiness. Besides, respondents used different means of culling (home consumption, selling, or either of the two ways). This result is in line with Assefa *et al*. (2016) who reported that the majority of village chicken households practiced culling chickens based on poor productivity (47.3%), poor productivity and sickness (22.9%) or poor productivity, old age and sickness (17.7%) for home consumption (64.9%), home consumption and selling (24.7%) and selling (10.4%). Additionally, the current study agreed with the findings of Addisu *et al*. (2013) reported that respondents culled chicken utilizing slaughtering (53.27%), selling (41.18%), and sell eggs of unwanted hens (5.56%). Likewise, Emebet (2015) reported that respondents were cull birds for selling purposes (72.3%), for home consumption and income (16.9%), for only home consumption (9.1%), and religious ceremonies or scarifies (Table 15).

Table 15: Mating system and culling practices of chickens.

Breeding practice	Agro-Ecology		Overall Mean (N =180)%
	HA (N=90)	MA (N=90)	
Control mating system			
Yes	0(0%)	0(0%)	0(0)
No	90(100%)	90(100%)	180(100)
Culling practices			
Yes	21(23.32%)	25(27.80%)	46(25.60)
No	69(76.70%)	65(72.20%)	134(74.40)
Households practiced culling	(N=21)	(N=25)	(N=46)%
If yes, what was the reason/factors determined to cull chickens from the flock			
Health problem	8(38.10%)	9(36%)	17(36.95)
Age	7(33.33%)	8(32%)	15(32.60)
Broodiness	1(4.76%)	0(0%)	1(2.20)
Productivity	4(19.05%)	6(24%)	10(21.73)
Frequent broodiness	1(4.76%)	2(8%)	3(6.52)
Means/ways of culling the chicken from the flock			
Sell	5(23.80%)	8(32%)	13(28.30)
Slaughtered/consumption	12(57.12%)	15(60%)	27(58.70)
Sell and/or consume	4(19%)	2(8%)	6(13.00)

Brooding and hatching practice

Table 16 showed that the brooding and hatching practices of village chicken in the study district. The majority (81.70%) of households practiced hatching activity in their home. However, a higher proportion (89.4 and 96.7%) of respondents reported as they incubate and brood during the dry season which is a consistent study reported by Mekonnin (2007) and Alemayehu (2017). This might be due to good supplemental feed resources and a beneficial environment for growing chicks during the dry seasons (excess in grain) and might also reduce mortality due to disease outbreaks. According to the discussion made with key informants, the seasonality of incubation depends mainly upon the type of climate in the area and the availability of feed. The main sources of eggs for hatching were laid at home (67%). These eggs for incubation stored for two weeks (77.60%) to three weeks (22.40%) either in a cold place (on the ground) (59.20%), inside the grain container, or mix with grains such as Teff and sorghum or spice (20.40%) and in small pots or plastic (20.42%). Similarly, some households practiced egg selection for hatching activity in the district designated that; 57.15% and 36.72% of chicken owners preferred larger and medium-sized eggs, respectively. Most respondents were isolated quality hatching eggs by shaking (56.12%), visual (24.76%), exposing to viewing in sunlight (11.70%), and using water (7.42%). The majority of the households stored eggs using cartoon (37.40%), clay pot with straw bedding on the ground (28.60%), and bamboo made brooder basket "Kirchat" with grass, Teff, or barley straw bedding (14.96%) (Table 16). This result is similar to the finding of Mekonnin (2007) who reported that usually, they use bamboo made baskets, cartoons and they put the hen simply on the ground (putting some bedding materials like worn clothes, grass) and in some cases use a clay pot. Likewise, Alemayehu, (2017) reported that households used “Dogogo or dimignit" (made up soil) (66.7%), carton (21.1%), and half of the plastic made "Jerrycan”(6.7%).

Almost all respondents were not placed feed and water in front of hens during incubation. Besides, the majority of the households was practiced the traditional methods of breaking broodiness to restart the laying of eggs. Accordingly, about 53.40% of the households indicated that they disturbed the nest or replaced the laying material with other materials followed by taking broody hens to neighborhoods for a couple of days (26.4%). This result is in agreement with the report of Alemayehu (2017) (Table 16).

Table 16: Hatching and brooding practices of village chicken.

Parameters	Agro-Ecology		Overall Mean (N=180)	P-value
	HA (N=90)	MA (N=90)		
Hatching practice				
Yes	70(77.81%)	77(85.60%)	147(81.70%)	0.179 NS
No	20(22.22%)	13(14.40%)	33(18.30%)	
Season of hatching practices				
Wet season	2(2.92%)	5(6.51%)	7(4.75)	0.288 NS
Dry season	54(77.11%)	60(77.90%)	114(77.55%)	
Any season	14(20%)	12(15.62%)	26(17.70%)	
Sources of incubating eggs				
Purchased from market	11(15.71%)	7(9%)	18(12%)	0.595 NS
Laid at home (from own)	40(57.10%)	59(75.60%)	99(67%)	
Purchased and lay at home	19(27.12%)	12(15.40%)	31(21%)	
Egg storage condition				
Inside cooled place	46(65.70%)	41(53.20%)	87(59.20%)	0.108 NS
Inside grain/spices container	13(18.60%)	17(22.10%)	30(20.40%)	
In small pots/plastics	11(15.70%)	19(24.70%)	30(20.40%)	
Egg storage time (duration) after laying				
One week	53(75.70%)	61(79.20%)	114(77.60%)	0.614 NS
Two weeks	17(24.30%)	16(20.80%)	33(22.40%)	
Eggs selected for hatching and brooding				
Medium	27(38.60%)	27(35.11%)	54(36.72%)	0.686 NS
Large	36(51.04%)	48(62.03%)	84(57.15%)	
Small	7(10%)	2(2.61%)	9(6.12%)	
Method of egg quality evaluation				
By shaking	33(47.11%)	50(64.10%)	83(56.12%)	0.094 NS
Viewing through sunlight	10(14.30%)	7(9%)	17(11.70%)	
Floating with water	7(10%)	4(5.12%)	11(7.42%)	
Visual	20(28.62%)	17(21.80%)	37(24.76%)	
Bedding materials and places for broody hens				
Clay pot with straw bedding	23(32.94%)	27(35.12%)	50(34.04%)	0.660 NS
Cartoon on the roof in the house	29(41.04%)	26(33.08%)	55(37.40%)	
Bamboo made a basket with bedding	12(17.01%)	10(13%)	22(14.96%)	
On the ground and straw bedding	6(8.60%)	14(18.20%)	20(13.60%)	
Method of breaking broodiness				

Disturbing the nest	41(58.60%)	42(53.90%)	83(56.1%)	0.902 NS
Moving to neighbors	19(27.1%)	27(34.60%)	46(31.10%)	
Hanging the bird upside down	10(14.30%)	9(11.50%)	19(12.80%)	

Productivity performance of village chickens

Production and productivity performance of village chickens in Cheha district were presented in (Table 17). The result of this study indicated that there was a statistically significant difference between the two agro-ecologies. This difference might be attributed to differences in climatic conditions. Similarly, breed difference or genetic potential is one of the main problems to produce more or fewer eggs. Due to the availability of grain feeds and favorable environmental conditions slightly better performance of both local and exotic chicken breeds in mid-altitude than in the high altitude of Ethiopia (Matiwos et al., 2013; Alem, 2014). The current result indicated that the average egg production per hen per clutch from village chicken was higher than the national average of 12 eggs reported by CSA (2014). Likewise, a similar finding is also reported by Samson and Endalew (2010) the average number of eggs laid/clutch/hen for village chickens was ranged between 10 and 18 in the Mid Rift Valley of Oromia, Ethiopia. Local chickens laid a significantly lower number of eggs as compared to exotic chicken breeds. Local chickens have a long reproductive cycle and low genetic potential. This might be due to the poor management and feeding practices, sub-optimal husbandry practices, low veterinary services/disease outbreak, and low extension services of the study district. A similar idea was reported by Aklilu et al. (2017) who revealed that the main reasons for the low egg production include poor feed availability, disease, and low genetic potential. Households reported that exotic hens hardly exhibit broodiness. But, most of the respondents reported that local hen goes broody four to five times per year and this might be a cause for low egg production of local chickens. Similarly, (Rose, 1997) have reported that during the period of broodiness, chickens interrupt egg-laying. The result of the current study is partly similar to the report of Bikila et al. (2015) who reported that the average number of eggs/hen/week, eggs/clutch, and eggs/hen/year in Chelliya district for local chickens lay 3.23±0.22, 12.93±0.87 and 52±0.45, respectively, and also reported 4.16±0.22, 16.63±0.87 and 198.80±0.45 for exotic chicken breeds. Likewise, this study is similar to Mammo (2012) who reported an average number of eggs per year per bird between 45 and 96 for local chickens under a scavenging system. On the other hand, the result of the current study is higher than Meseret (2010) who reported the mean egg production per year of Ethiopian local chicken breeds was 43.8 eggs in the Gomma district. Also, Melkamu, (2014) reported lower mean egg production per clutch (17+1.53) and per year (65+7.64) for local chickens in Enebsie Sar Midir Woreda, Eastern Gojjam. The egg production for crossbred chicken in this study was indicated in Table 17, which was lower than the study reported by Aman et al. (2017) for Sasso chicken breed (194.4 eggs/year) under village production system in three agro-ecology of SNNPR, Ethiopia. Higher, egg production per year 187.04±13.49 for Potchefstroom Koekoek (PK) was reported by Dasalew (2012) in East Shewa, Ethiopia. Also, Dasalew (2012) reported higher egg production for Bovans Brown (BB) (266.32±8.7) and Isa Brown (IB) (276.10±11.3) under the village production system. However, Yadav (2017) reported a lower annual average egg production per hen (165.27±3.15) for Narmada Nidhi improved chicken managed under backyard condition in Mandla district of Madhya Pradesh. There was a significant difference between the two agro-ecologies and chicken breeds at ($P<0.05$, $P<0.01$, and $P<0.05$) for hatchability. This might be endorsed to the high cold or moisture load and the partial pressure (decreased) of oxygen at the high altitudinal agro-climatic zone of the district that may reduce the hatchability of the eggs and also breed differences. As a result, eggs would be deteriorated or extended the hatching period during the incubation time. Hence, the result of this study clearly showed that the hatchability of crossbred chicken eggs was significantly lower than that of the local chickens (Table 17) at ($P<0.05$). This might be ascribed to breed difference (exotic chickens have larger-sized eggs which have lesser fertility), egg storage condition, management of hen used for brooding, and the number of cocks maintained in flock or village also the factor that

affects hatchability. A similar idea was reported by Yakubu and Ari (2018) that the size of the egg has a significant effect on the fertility of the egg. Infertility is highest for larger eggs than the smaller ones. So this would affect the hatchability of exotic chicken breed eggs. Therefore, the result of the current study is in line with Abraham and Yayneshet (2010) revealed that the hatchability performance of exotic chickens (RIR) was lower (39%) in the Tigray region of Northern Ethiopia. The current result was in agreement with the result of Fisseha et al. (2010) who reported that the hatchability performance of local chickens in the Bure and Fogera districts of Ethiopia was 82.6% and 78.9%, respectively. The result of the current study was significantly higher than the hatchability (67.78%) that reported for local chickens in Gorogutu district, Eastern Hararge zone of Ethiopia by (Ahmedin and Mangistu, 2016). Contrarily, lower hatchability performance (85.8%) was reported for local chicken in central Tigray, Ethiopia by Alem (2014) [1]. There was also, a significant difference between the two agro-ecologies ($P<0.01$) on chick mortality. Therefore, the result of the current study indicates that high altitude had a higher chick mortality rate than mid-altitude. This might be attributed to cold stress, diseases, and predation. Likewise, due to cold stress and lower disease resistance ability, a significantly ($P<0.01$) higher chick mortality rate was reported for crossbred chickens also there was an interaction effect between the two breeds and agro-ecologies in chick mortality and hatchability. This result is in agreement with the finding of Fisseha et al. (2010) who reported a higher chick mortality rate (24-56%). Also, the higher chick mortality rate (51%) and (55.8%), respectively reported by Aklilu et al. (2017) and Mekonnen (2007) (Table 17).

Table 17: Productivity performance of village chicken (Mean±SEM).

Parameters	A-E (Local and Cross)		Overall Mean	SL	Breed		Overall Mean	SL	AE X CB
	HA	MA			Local	Crossbred			
Eggs/hen/week	4.14±0.86^{b}	4.55±0.22^{a}	4.34±0.54	*	3.52±0.06^{b}	6.17±0.02^{a}	4.84±0.04	*	*
Eggs/hen/clutch	14.11±0.45^{b}	14.58±0.02^{a}	14.35±0.24	*	12.57±0.16^{b}	18.11±0.10^{a}	15.34±0.13	**	*
Eggs /hen/year	114.10±0.11^{b}	116.53±0.12^{a}	115.32±012	*	56.57±0.39^{b}	174.27±1.12^{a}	115.42±0.75	***	*
Hatchability %	70.13±0.22^{b}	75.37±0.46^{a}	72.75±0.34	*	80.28±0.45^{a}	65.23±0.14^{b}	72.75±0.29	**	*
Chick mortality	46.35±0.74^{a}	39.92±0.32^{b}	43.13±0.53	**	37.12±0.23^{b}	49.15±0.49^{a}	43.14±0.36	**	**

Purpose of keeping chicken and egg production

Sale for income, egg production, home consumption/entertaining guests, hatching/breeding, cultural/religious, and employment were the major reasons reported for keeping chicken in the district. However, the majority of respondents were maintained chicken for generating immediate income and produced eggs for brooding/hatching. This result is corresponding to Mekonnen (2007) who reported that respondents maintained village chickens for sale (4%), replacement (34%), and consumption (22%). A similar result was also reported by Matiwos et al. (2013) who indicated a remarkable portion of the total households (50%) kept poultry as a source of family income. Likewise, Fisseha et al. (2010) revealed that respondents keep chickens for sale for income (51%), for hatching (45) for home consumption (44%), ceremony (36.4%), and egg production (40.7%) (Table 18).

Table 18: The purpose of keeping village chicken and egg production (N=180).

Variables	Description	Agro-Ecology		Overall N (%)	P Value
		HA N (%)	MA N (%)		
Purposes of keeping	Sale for income	47(52.22)	40(44.44)	87(48.34)	0.992

chickens	Home consumption	13(14.44)	19(21.11)	32(17.78)	1.012
	Hatching (breeding)	4(4.44)	8(8.89)	12(6.67)	0.086
	Employment	3(3.33)	3(3.33)	6(3.33)	0.092
	Egg production	20(22.22)	17(18.89)	37(20.55)	1.022
	Cultural/religious	3(3.33)	3(3.33)	6(3.33)	0.073
Purpose of eggs production	Hatching	48(53.33)	41(45.6)7	89(49.44)	0.141
	Sale for income	28(31.11)	25(27.78)	53(29.44)	0.085
	Home consumption	14(15.56)	24(26.67)	38(21.12)	0.631

Extension services

Most, of the respondents, received extension services at a different location where others had no access to extension services. Among respondents who received extension services, the majority get it every month which is consistent with Halima (2007) who reported that 52.51% of the households in Northwest Ethiopia received agricultural extension services. Contrary to this study lower percentage of respondents (37.55) received extension services in the Bure district of North Amhara, Ethiopia (Fisseha, 2009) (Table 19).

Table 19: Agricultural extension services are given to village chicken producers.

Agro-Ecology (N=180)						
Parameters	**Description**	**HA**	**MA**	**Total**	**X^2**	**P Value**
		N (%)	**N (%)**	**N (%)**		
Receive extension services	Yes	44(48.9)	51(56.7)	95(52.8)	0.296	0.299
	No	46(54.1)	39(43.3)	85(47.2)		
Households received extension services		(N=44)	(N=51)	(N=95)		
Location of service received	At DAs' office	30(68.2)	31(60.8)	61(64.2)	1.796	0.238
	At households' house	9(20.5)	9(17.6)	18(18.9)		
	On seminar/meeting	3(6.8)	6(11.8)	9(9.5)		
	At demonstration sites	2(4.5)	5(9.8)	7(7.4)		
Frequency of service received	Every week	1(2.3)	1(2)	2(2.1)	0.538	0.489
	Every 15 days	11(25)	11(21.6)	22(23.2)		
	Every month	30(68.2)	35(68.6)	65(68.4)		
	Two times per year	2(4.5)	4(7.8)	6(6.3)		
Households have not received an extension		(N=46)	(N=39)	(N=85)		
Reason for not received services	Lack of awareness	15(34.1)	17(33.3)	32(33.7)	0.192	0.762
	Lack of Das	10(22.7)	10(19.6)	20(21.1)		
	Poor DAs' activity	19(43.2)	24(47.1)	43(45.3)		

Constraints of village chicken production

According to the survey result disease problems particularly (NCD), parasites (mites and lice locally called “Kinkin") and other unknown diseases, predators (wild cats, birds of prey, wild animals, monkey, ape, fox, rats, and ants), poor management or husbandry practices (housing, feeding and disease control) and poor extension services were ranked as the most frequently mentioned as economically important challenges prioritized by the households in the production and marketing of village chickens and eggs. But, diseases were one of the major bottlenecks in village chicken production and productivity in the study district. The current result is in line with Teklemariam (2017) who reported that diseases and predators were the most constraints for the adoption of exotic/hybrid chickens in Tselemti Woreda and Tahtay Koraro Woreda. Aman et al. (2015) also reported that diseases and predators were the most constraints of chicken production in Southern Ethiopia. Moreover; several scholars reported diseases, predators, lack of proper health care, poor feeding, and poor marketing information as major constraints for village chicken production (Fisseha et al., 2010; Hunduma et al., 2010; Mammo et al., 2011). Others such as marketing problems (seasonality or fluctuation of price, lack of market information, market linkages and transportation services), unavailability of improved feeds or chicken rations, improper institutional support (poor health service and vaccination schedules, the supply of medicines and vaccines, and lack of credit), damage of garden (crop, vegetables, and Enset), lack of other exotic chicken breeds, breeding program, and poor husbandry skills to expand exotic chicken production and lack of capital to expand chicken production were also ranked as the most prevailing village chicken production-related problems of the study district. Salo et al. (2016) also reported that diseases (57.8%), predator (21.1%), feed shortage (16.7%), and lack of improved breeds (4.4%) were major constraints of chicken production in Lemo district, Hadiya zone, Southern Ethiopia. Similar constraints have been found elsewhere in Northern Gondar, Amhara regional states were disease (1st), predators (2nd), shortage of supplementary feeds (3rd), poultry housing problem (4th), and lack of veterinary health services (5th)(Table 20).

Table 20: Constraints related to village chicken production (Ranked).

Variables	Agro-Ecology	
	High Altitude	**Mid Altitude**
Disease and parasites problem	1st	1st
Predators	2nd	2nd
Poor management or husbandry practices	3rd	4th
Poor extension services	4th	3rd
Marketing problems (no market linkage and group)	5th	5rd
Unavailability of improved/formulated ration	6th	6th
Improper institutional support	7th	8th
Damage of garden (crop, vegetables, and *Enset)*	8th	7th
Lack of other exotic chicken breeds	9th	9th
Lack of capital	10th	10th

Opportunities for improving village chicken production

Even if many constraints were raised by households there were opportunities to improve village chicken production and productivity for the future in the study district. Thus, a significant increase in chicken productivity and production can be achieved through much less capital, less labor, management, and technical skill in which rural communities have comparative advantages compared to other farm activities. Currently, village chicken production is a major source of chicken meat and egg supply in Ethiopia (Aklilu et al., 2007). Consequently, in the study district, there are many bright

futures to develop village chicken production and productivity. Hence, ideal weather for grain production, good demand for eggs and chickens for disposal, good culture for meat and egg consumption in the area was the major opportunities for the improvement of village chickens. Similarly, the available non-conventional feed resources such as Enset and Enset products, maize, food leftover, kitchen waste, and wheat are major sources of feeds for the village chicken keeping on the study district. Furthermore, the presence of cooperatives (Sokem) and NGO chicken farms in the district also creates an opportunity to distribute improved chickens to the farmer. Prices for village chickens and eggs are becoming increasingly attractive to farmers and traders alike. There are also steady festivals marketing chickens being a popular food in Ethiopia as well as in the study district.

The result of the current finding is in line with Salo et al. (2016) who reported that increasing prices of animal products within the locality, in the country, and across the globe provide a real and sustainable business opportunity for the rural poor and any age and groups involved in chicken production activity. Similar, results reported by Aman et al. (2017) good government attention was the primary opportunities (34.2%) for the sector improvement followed by 10%, 5%, and 2.5% of opportunities for improved chicken production under households management condition breed availability, market access and chicken meat-eating habits and presence of good credit and saving services, respectively. Therefore, all the above-mentioned bright futures were playing great roles for developing village chicken production and productivity and creates employment opportunities for poor women, children, and landless households in the district.

CONCLUSION

The district was conducted in two agro-ecologies of Cheha district. The survey data were collected by using semi-structured questionnaire from 204 respondents.

The chicken keeping in the district is highly undertaken by women (81.1%). The average village chicken holding/HH in the study area was 12.36. Enset products, household wastes, kitchen wastes, maize, milling by-products and wheat are the most frequently used supplemental feed for chicken. The majority (87.8% and 81.7%) of the survey households practiced scavenging with little supplementation. Majority (96.11%) of the households did not have separate chicken house. About 97.80% of the interviewed chicken owners were able to recognize the occurrence of chicken diseases mainly Newcastle disease (75%) which was the most dominant disease. Majority (70.45%) of the households practiced traditional medicines (ethno-veterinary) for disease treatment.

All households (100%) practiced uncontrolled mating system. About 81.70% of households practiced hatching activity in their home at dry season. The annual egg production of village chicken in the district was 115.42/hen. Average hatchability percentage for local and crossbred Sasso chicken under village production system was 80.28% and 65.23%, respectively. The higher chick mortality rate was reported for exotic chicken (49.15%) than local chicken breeds (37.12%). Majority (46.67%) of the households in the study district kept their chicken for income and reproduction (20.55%). Around half of (47.2%) of the households had no access to extension services to improve the existing chicken production.

The major village chicken production related problems were disease and parasites, predators and poor management practices. There are many bright futures to increase village chicken production and productivity such as ideal weather for grain production like maize, sorghum, wheat, barley, always available supplemental feeds such as Enset products, food left over, kitchen waste, milling by products, government attention, good culture for meat and eggs consumption.

Generally, there was significant difference between the two agro ecologies and different breeds in terms of production and productivity performance of village chickens. Finally, village chickens in Cheha district showed relatively low performance in terms of production and productivity due to poor management practices.

RECOMMENDATIONS

Based on the results of the current study the following enhancement alternatives are recommended in any attempt to move away from traditional scavenging family chicken management practices and chicken production. Interventions aimed at improving the productivity of village chickens should focus on successive trainings and education on modern chicken management practices to village chicken producers. Strong extension service delivery is needed to boost up the existing poor management practices and traditional production activities. Special emphases need to be placed on the provision of improved chicken breeds. Furthermore, appropriate intervention is needed to control disease and predators so as to minimize loss of chickens as well as young chick especially exotic chicken breeds. Thus, access to veterinary services would play an essential role in this regard. Provision of credit facilities to village chicken producers will encourage chicken owners and contribute to the improvement of the sector. This study was conducted in six rural Kebeles, therefore; further research should focus on similar study by increasing the study sites in the district.

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