PRODUCTION SYSTEM OF INDIGENOUS CHICKENS IN PASTORAL AND AGRO-PASTORAL DISTRICTS OF SOUTH OMO ZONE, SOUTH ETHIOPIA

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ABSTRACT: In Ethiopia, poultry production offers considerable opportunities in terms of generating employment opportunities, improving family nutrition, empowering women and ultimately ensuring household food security. The objective of this study was to characterize the production system of indigenous chickens in pastoral and agro-pastoral districts of South Omo Zone. A total of three districts and seven kebeles were purposively selected based on chicken population number and production potential of the selected areas. A total of 81 households were randomly selected for characterization of the production system. Data was gathered using semi-structured questionnaire, and field observations. The study showed that most of the household heads were male (70.3%). The average flock size of local chicken was 13.3±0.4 per household and the flock structure includes pullets (30.8%), layers (24.1%), cocks (17.5%), chick (16.6%) and cockerels (11.0%). Traditional chicken management system was the dominant production system (82.7%) practiced in the areas. The major feed sources for indigenous chickens were open scavenging and seasonal feed supplementation. Maize and sorghum grains as well as household leftovers were major supplements used. Newcastle disease was the most common diseases in study districts. The chicken populations have good potential for egg and meat production and the reproductive performances was also reasonable under the existing limiting environmental factors. The major constraints in the districts were disease, predator and feed shortages. Studying the production system of indigenous chickens can be used as first step to design conservation and improvement strategies, and contribute to sustainable utilization of indigenous chickens at scavenging environment.

Keywords: Indigenous chicken, characterization, production system.

INTRODUCTION

Poultry production in Ethiopia offers considerable opportunities in terms of generating employment opportunities, improving family nutrition, empowering women (especially in rural areas) and ultimately ensuring household food security (FAO, 2019). Extensive poultry production is often the domain of poor women as it requires little initial investment and does not usually conflict with other household duties (FAO,

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2019). Poultry production system in Ethiopia is characterized by small flock sizes, low input, low output, and periodic devastation of the flock by disease. There are about 41.35 million chickens; of which 78.04% are local ecotypes (CSA, 2022). This indicates the relevance of indigenous chicken as principal potential farm animal genetic resources of the country.

Indigenous chicken contributes high quality animal protein in the form of eggs and meat for home consumption as well as for sacrifices and are also easily managed by all even the poorest of the poor including women and children. These chicken ecotypes have been reported to adapt very well to the traditional small-scale production system of the rural community (Petrus, 2011). They are known to possess desirable characters such as thermo tolerant, resistant to some disease, good egg and meat flavor, hard eggshells and high dressing percentage (Aberra, 2000). In addition, they have fast generation interval and high reproductive rate as they are prolific, easy to rear and their output can be generally expanded more rapidly and easily than that of other livestock (Dhuguma, 2009).

South Omo Zone is rich in indigenous chicken resources but the production system of indigenous chickens was not well studied and documented in pastoral and agro pastoral areas of the South Omo zone. The objective of this study was to characterize the production system of indigenous chickens in South Omo Zone. Characterization indigenous chicken's production system is imperative to have comprehensive data and information on socioeconomic aspects of owners, flock structure, production system, management and mobility, feeds and feeding management, productive and reproductive performance, health and production constraints.

MATERIALS AND METHODS

Description of Study Area

South Omo zone is located in South-West of Southern Nations, Nationalities and Peoples regional state (SNNPR). According to the South Omo zone agricultural department (2018), the zone roughly lies between 4° 43' N to 6° 46' N latitude and 35° 75' E to 37° 07' E longitude. It is bordered with Keffa zone and Konta

special district in the North, Gamo Gofa zone and Basketo special district in North East, Kenya in South, Segen Zuria People's zone in the East, Oromiya region (Borena zone) in South East, and Bench Maji zone in the West and North West (Figure 1).

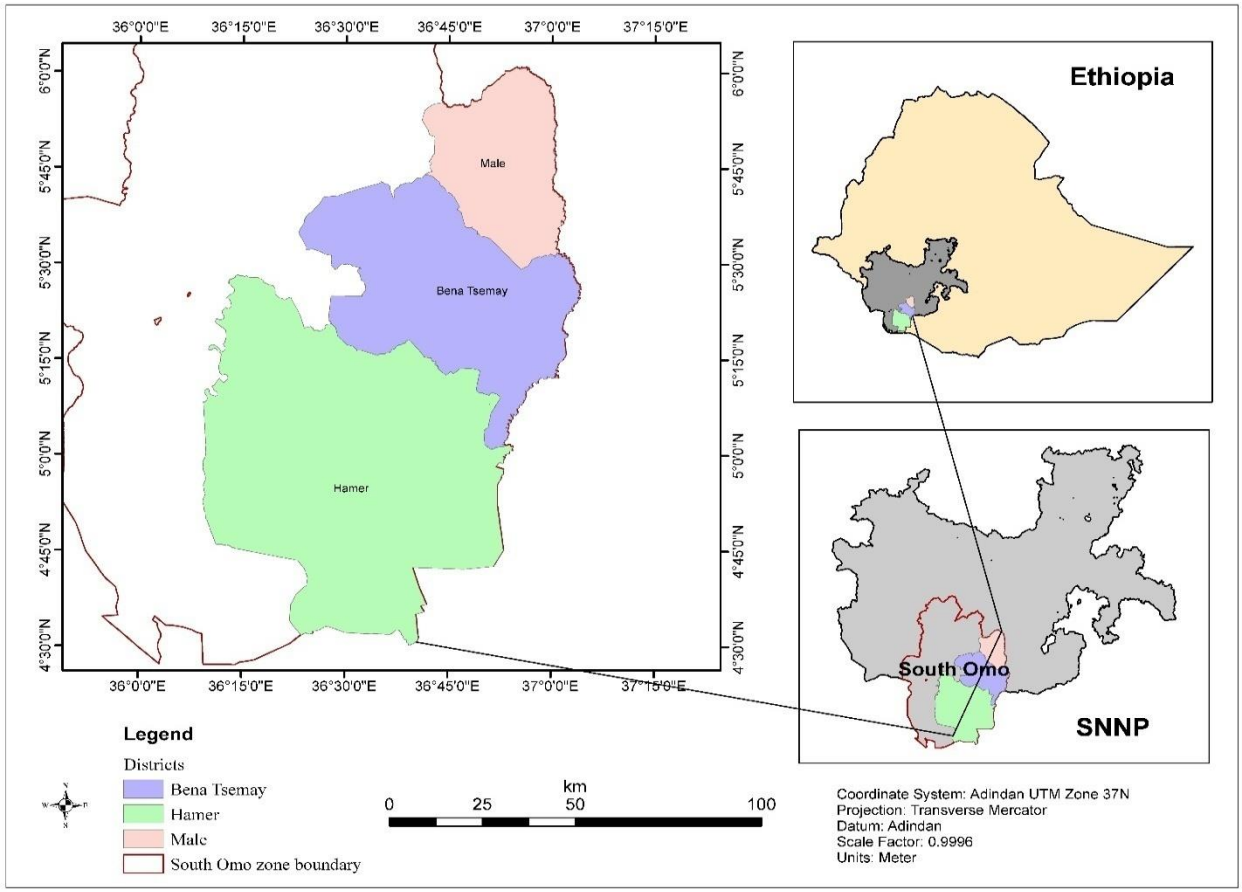

Figure 1. Map of the study area.

The information obtained from Zone agricultural department (2018) indicated that the total area of the zone is estimated to be 22,835.80 sq.km, which shares 20.94% of the total area of SNNP region. The population size of the zone, according to the 1999 E.C population census projection result is estimated to be 790,798 accounting nearly 4% of the total population of the region. The average population density of the zone is 34.6 persons per sq.km. This zone consists of 16 ethnic groups that have their own distinct geographical location, language, culture, and social identities.

Sampling techniques

In collaboration with the zonal livestock office, study districts were selected considering chicken populations, agroecology and potential area for poultry production. Accordingly, two agro-pastoral (Benatsemay and Male) and one pastoral (Hamer) districts were selected. Sampling sites (kebeles) were selected from each sample district based on the chicken population size data obtained from the respective districts of livestock development office. Accordingly, three kebeles from Benatsemay (Aladuba, Luka and Kako), two kebeles in Male (Boshkoro and Gudo) and two kebeles in Hamer (Erayaunbule and Senbele) districts were selected for the study. In totally 81 households (35 in Benatsemay, 30 in Male and 16 in Hamer) districts were selected based on population size of study the districts. Households with minimum number of two chickens and had prior experience in local chicken production were selected.

Data collection

Data were collected by administering a semi-structured questionnaire, focus group discussion, and field observation. A modified questionnaire was prepared by FAO guideline (FAO, 2012). The questionnaire was used to collect information household characteristics, livestock species composition, flock structure, production system, management and mobility, feeds and feeding management, productive and reproductive performance, identification of major diseases and production constraints. Semi-structured questionnaires were also administered to randomly selected pastoralists and agro pastoralists in selected kebeles who were interviewed for the household survey.

Data Managements and Analysis

The collected data was checked, coded and entered to SPSS (2009) software for analysis. Indices were employed to calculate the rank of the production constraints and class of chickens receiving supplementary according to the following formula:

Index = Σ of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] divided by Σ of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for rank.

RESULTS

Socioeconomic status

Household characteristics and socio-economic aspects of the sampled households are presented in (Table 1). The majority (70.3%) of the interviewed households in the study area were male headed. The age of the majority of the respondents (95.7%) falls under 50 years old, which is the active age group to undertake chicken production effectively. The educational status of the respondents was 62.7, 13.3, 16.8 and 7.2% for illiterate, read and write, grade 1 to four and grade five to eight class attendants, respectively. The result revealed that most of the respondents participated in this study were illiterate. The average family size of the households was 5.84±0.48. The results show that there are no significant differences (P<0.05) between the study districts of the family size.

Livestock species composition

The average livestock species composition of the study area is presented in Table 2. Respondents in Hamer district had significantly higher number of cattle, sheep, goat and bee colony holding than respondents in Benatsemay and Male districts. However, they had significantly (P<0.05) lower number of chickens in Hamer district compared to Benatsemay and Male districts.

Table 1. Socioeconomic characteristics of the sampled households in the study areas.

Variables	Districts							
	Benatsemay (n=35)		Male (n=30)		Hamer (n=16)		Overall Total (n=81)	
	N	%	N	%	N	%	N	%
Sex structure								
Male	25	71.4	25	83.3	9	56.2	59	70.3
Female	10	28.6	5	16.7	7	43.8	22	29.7
Age structure								
15-30	16	45.7	11	36.7	3	18.8	30	33.7
31-40	13	37.1	9	30	8	50.0	30	39.0
41-50	5	14.3	7	23.3	5	31.2	17	22.9
51-60	1	2.9	1	3.3	-	-	2	2.1
61-70			2	6.7			2	2.3
Educational status								
Illiterate	12	34.3	18	60	15	93.8	45	62.7
Read and write	7	20.0	6	20	-	-	13	13.3
1-4	13	37.1	4	13.3	-	-	17	16.8
5-8	3	8.6	2	6.7	1	6.2	6	7.2
Family size (Mean±SE)	5.7±.0.4^{b}		5.9±.6^{a}		5.9±.5^{a}		5.8±0.5	

N=Number of households SE=Standard error

Table 2. Species composition and livestock holdings in the study area (Mean ± SE).

Descriptor	Benatsemay	Male	Hamer	Overall
N	35	30	16	81
Cattle	6.7±0.9^{c}	14.1±2.1^{b}	29.6±6.4^{a}	16.8±3.1
Sheep	4.1±1.6^{b}	3.4±0.8^{c}	12.8±3.7^{a}	6.77±2.0
Goat	11.5±1.8^{c}	13±2.0^{b}	62.9±13^{a}	29.14±5.6
Chicken	17.4±2.1^{a}	16.7±1.4^{b}	15.3±1.4^{c}	16.4±1.6
Donkey	0.1±0.4^{bc}	0.7±0.2^{a}	0.2±0.1^{bc}	0.3±0.2
Bee colony	2.6±1.0^{b}	1.63±0.6^{c}	6.7±1.2^{a}	3.6±0.9
Total herd size	11.2±2.2	12.3±1.5	12.3±1.5	11.7±1.9

Chicken flock structure

The average flock size of local chicken in the study area was 13.3±0.07 (Table 3). The highest average flock size was represented by pullets (30.79 %), followed by layers (24.05 %), cocks (17.52 %), chicks (16.64%) and cockerels (11 %). There are no significant differences (P<0.05) of the total flock structure among the study districts.

Table 3. Average local chicken flock structure of the surveyed households in the study area.

Age category	Study districts							
	Benatsemay		Male		Hamer		Overall Mean	
	Mean ± SE	%	Mean ± SE	%	Mean ±SE	%	Mean ± SE	%
Layer	3.6± 0.4^{a}	27.1	3± 0.3^{b}	23.0	3±0.4^{b}	22.0	3.2± 0.3	24.1
Cock	2.4± 0.3^{ab}	18.1	1.9± 0.3^{c}	14.8	2.7± 0.4^{a}	19.7	2.3± 0.3	17.5
Pullet	3.8± 0.5^{c}	28.6	4.1± 0.5^{ab}	31.5	4.4± 0.5^{a}	32.3	4.1± 0.5	30.8
Cockerels	1.5± 0.4^{a}	11.2	1.3± 0.3^{ab}	10.0	1.6±0.3^{a}	11.9	1.5± 0.3	11
Chicks	2± 0.5^{b}	15.1	2.7± 0.7^{a}	20.7	1.9± 0.6^{b}	14.2	2.2± 0.6	16.6
Total flock size	13.3±0.4		13.0±0.4		13.6±0.4		13.3±0.4	

Chicken production system

The study area practiced extensive and semi-extensive chicken production systems. It was more of scavenging type which is supplemented with little feed. About 82.7% of the chickens are managed under a traditional or extensive chicken management system while 17.3% were using semi-extensive management system. Traditional production system was being used by 80, 83.3 and 87.5% of respondents in Benatsemay, Male and Hamer districts, respectively while 20, 16.7 and 12.5% respectively were using semi-extensive system. Most of the study districts community was sedentary.

Role of family members

Women were more responsible (60%) for many activities like selling of chickens, feeding chickens, collecting and selling eggs, natural incubation and cleaning the chicken house in study districts. Men were

responsible for purchasing chickens and caring for sick chickens. Children also participated in various husbandry activities like feeding of chickens, harvesting egg and natural incubation and hatching egg, cleaning of bird's house, provision of supplementary feed and water.

Table 4. Role of family members in poultry production.

Activities	Districts											
	Benatsemay				Male				Hamer			
	Responsible bodies				Responsible bodies				Responsible bodies			
	Male < 18 years	Female < 18 years	Male ≥ 18 years	Female ≥ 18 years	Male < 18 year	Female < 18 years	Male ≥ 18 years	Female ≥ 18 years	Male < 18 years	Female <18 years	Male ≥ 18 years	Female ≥ 18 years
Purchasing	-	-	54.3	45.7	-	-	53.3	46.7	-	-	43.7	56.3
Selling chickens	-	-	40	60	16.7	10	26.7	46.6	-	-	12.5	87.5
Caring for sick chickens	5.7	8.6	20	65.7	10	6.7	53.3	30	-	-	56.3	43.7
Feeding	5.7	11.5	5.7	77.1	23.3	26.7	20	30	12.5	18.7	6.3	62.5
Collecting	8.6	11.4	5.7	74.3	20	13.3	16.7	50	12.5	12.5	-	75
Selling egg	5.7	11.4	5.7	77.2	6.7	26.7	-	66.6	6.3	18.7		75
Natural incubation & hatching egg	11.4	2.9	17.1	68.6	17.1	14.3	28.6	40	12.5	6.3	37.5	43.7
Cleaning the chicken house	-	28.6	-	71.4	-	36.7	-	63.3	-	18.8	-	81.2

Chicken housing

In Benatsemay and Male districts households keep their chickens using different types of housing systems for night sheltering while in Hamer district all households (100%) keep their chicken in the house purposely made for chicken (Table 5). The proportion of households that use a separate housing system was higher

(40%) in Benatsemay than in Male (6.7%) districts. The respondents who have no separate house kept their chicken inside the house, perch on trees (39.5%), and hand-woven basket inside the house (11.6 %). Among the interviewed households about 48.9% kept their chicken in separate house. The poultry shelters were made of corrugated iron sheet, grass/bush and wood. About 75.3% of the respondent's chicks housed with adults in the study area.

Table 5. Type of chicken's shelter, type of housing materials and chicken house.

Variable	Districts							
	Benatsemay		Male		Hamer		Over all total (n=81)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Chicken rest at night (%)								
Inside the house	10	28.	27	90.	-	-	37	39.5
Hand woven basket	11	31.	1	3.3	-	-	12	11.6
Purposely made for chicken	14	40.	2	6.7	16	100	32	48.90
Type of housing material (%)								
Iron sheet	7	20.	-	-	11	68.	18	6.7
Grass/bush	28	80.	30	10	5	31.		60
Wood					16	100		33.3
Chicks housed with adults (%)								
Yes	20	57.	29	96	12	75.	61	75.3
No	15	42.	1	3.	4	25	20	24.7

Feed and water sources

Open scavenging and occasional supplementation were the major feed sources in the study area. About 93.8% of the respondents reared their chickens in an open scavenging with seasonal and regular supplementations (Table 6). The most common supplementary feed resources were maize and sorghum grains. The supplementation frequency was 44.4, 23.5, 23.5% once, twice, and three times per day respectively. Most of the respondents (74.1%) did not use feed trough, they simply pour the grain on the

ground. The results indicated that respondents discriminate classes of chickens giving supplementary feed. Layers and chicks age groups were the first and second ranked chickens receiving supplementary feed respectively.

Water is important for animals including chickens to keep them healthy and increase production. All the respondents (100%) in the study areas provided water to their chickens and tap water and river water were the major water sources.

Disease status

Majority of the respondents (82.7%) in the study areas experienced disease outbreaks (Table 7). Most of the respondents in the study districts treat their sick chickens traditionally due to lack of veterinary health service and limitation of extension service. The major common disease observed in the study areas was Newcastle (53.7%), followed by Influenza (25.8%), Coccidiosis (13.4%) and Infectious coryza (7.2%). Among the identified diseases, Newcastle was economically significant infectious viral disease of chickens in the study area.

Table 6. Feeding practice in study area.

Variable	Districts							
	Benatsemay		Male		Hamer		Overall	
	Frequenc	%	Frequency	%	Frequency	%	Freque	%
Main feed source of chickens (%)								
Own scavenging	21	60	20	66.7	10	62.	51	63
Supplementing	14	40	10	33.3	6	37.5	30	37
Do you give supplementary feed to your chickens (%)								
Yes	33	94.3	27	90	16	100	76	93.8
No	2	5.7	3	10	-	0	5	6.2
Type of supplementary feed resources (%)								
Maize grain	19	54.3	16	53.3	11	68.7	46	56.8
Sorghum grain	11	31.4	8	26.7	2	12.5	21	25.9
Household left over	5	14.3	6	20	3	18.8	14	17.3
How frequently do you feed (%)								
Morning	6	17.2	12	40	1	6.2	19	23.5
Afternoon	3	8.6					3	3.7
Morning & Afternoon	3	8.6			1	6.2	4	4.9
Morning & evening	8	22.9	18	60	10	62.5	36	44.4
Morning, Afternoon & Evening	15	42.9	-	-	4	25	19	23.5
Feeding materials								
Containers	4	11.4	13	43.3	-	-	17	21
Ground	28	80	16	53.3	16	100	60	74.1
Containers & ground	3	8.6	1	3.3	-	-	4	4.9
Class of chickens receiving supplementary feed (index value)								
Layers	0.35		0.35		0.38		0.36	
Cock	0.21		0.10		0.04		0.12	
Pullet	0.02		0.12		0.15		0.1	
Cockerels	0.13		0.07		0.09		0.09	
Chicks	0.29		0.36		0.34		0.33	

Table 7. Health and disease practices in study area.

Variables	Districts							
	Benatsemay		Male		Hamer		Overall total	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Did you experience disease outbreaks in the last 12 months?								
Yes	28	80	25	83.3	14	87.5	67	82.7
No	7	20	5	16.7	2	12.5	14	17.3
What do you do when chickens become sick?								
Treat them myself	20	57.1	29	96.7	12	75.0	61	76.3
Call in the vet.	14	40.0	1	3.3	3	18.8	18	20.7
Doctor								
Kill them immediately	1	2.9	-	-	1	6.2	2	3.0
Name of common diseases (%)								
Newcastle	18	51.4	16	53.3	9	56.3	43	53.7
Influenza	9	25.7	8	26.7	4	25.0	21	25.8
Coccidiosis	5	14.3	4	13.3	2	12.5	11	13.4
Infectious coryza	3	8.6	2	6.7	1	6.3	6	7.2

Productive and reproductive performance

Productive and reproductive variables of indigenous chickens showed a significant difference in the studied districts (Table 8). The average age at sexual maturity of male and female was 5.9 ±0.3 and 6.2 ±0.3 months respectively. The average age at first lay was 6.7 months. The average market age of male and female were 7.4±0.4 and 8.5±0.4 months respectively. The market age was not significantly different (P<0.05) among study districts. The result also indicated that the average number of eggs laid in single clutch was 13.4±0.6 and average number of chicks hatched per incubation was 10.5±0.4. The average number of chicks surviving

was 6.1±0.3 and number of clutches per hen per year was 3.4±0.2. The higher number of clutches per year per hen was in Benatsemay (3.9±0.2) district. The average number of eggs laid per year per hen was 58±2.3.

Table 8. productive and reproductive performance of indigenous chickens.

Reproductive Parameters	District							
	Benatsemay		Male		Hamer		Overall Mean	
	N	Mean ±SE	N	Mean±SE	N	Mean ±SE	N	Mean ±SE
Average age at sexual maturity of (male; month)	35	5.5 ±0.1^{c}	30	6±0.2^{b}	16	6.2±0.5^{a}	81	5.9 ±0.3
Average age at sexual maturity (female; month)	35	5.8±0.2^{b}	30	6.3±0.3^{ab}	16	6.5 ±0.5^{a}	81	6.2 ±0.3
Age at first egg production(month)	35	6.4 ± 0.1^{b}	30	6.7±0.1^{ab}	16	7±0.4^{a}	81	6.7 ±0.2
Average market age (male, month)	35	7.2±0.2^{b}	30	7.4± 0.3^{ab}	16	7.5±0.6^{a}	81	7.4±0.4
Average market age (female, month)	35	8±0.2^{c}	30	8.5±0.3^{b}	16	9±0.6^{a}	81	8.5±0.4
Number of chicks hatched one incubation	35	10±0.4^{b}	30	11±0.3^{a}	16	10.4±0.5^{b}	81	10.5±0.4
Number of chicks surviving	35	6.0±0.3^{b}	30	6.6±0.3^{a}	16	5.8±0.2^{c}	81	6.1±0.3
Number of eggs laid in a single clutch	35	17.7±0.6^{a}	30	14.8±0.6^{b}	16	13.6±0.7^{c}	81	13.4±0.6
Number of times the hen hatches in a year	35	3.9±0.2^{a}	30	3.1±0.1^{b}	16	3.1±0.2^{b}	81	3.4±0.2
Number of eggs produced annually	35	64.6±3.2^{a}	30	55.8±2.3^{b}	16	53.7±1.5^{c}	81	58±2.3

Production constraints

The five major constraints of chicken production, in descending order of importance, were disease outbreak, predator, feed shortage, drought, and market (Table 9). Disease prevalence have been reported by the majority of respondents as common constraint and ranked first.

Table 9. Production constraints of indigenous chickens in study area.

Constraints	Districts												Overall index
	Benatsemay				Male				Hamer				
	Rank			Index	Rank			Index	Rank			Index	
	1	2	3		1	2	3		1	2	3		
Disease	21	4	-	0.34	15	7	-	0.33	11	-	2	0.46	0.38
Predator	10	15	4	0.30	10	13	-	0.31	5	12	-	0.35	0.32
Feed shortage	4	10	21	0.25	5	-	20	0.19	-	4	10	0.17	0.20
Drought	-	6	10	0.10	-	10	-	0.11	-	-	4	0.03	0.08
Market	-	-	-	-	-	-	10	0.06	-	-	-		0.02

DISCUSSION

Compared to earlier studies conducted on poultry production in the country, some differences were observed in the current study area. Most of the households in this study were male headed which is lower than the report by Fitsum et al. (2017) in central zone of Tigray region in northern Ethiopia. There was a difference between districts in educational level. The level of illiterate was highest in Hamer district. In contrast to this finding, better education level was reported from Southern Ethiopia including lower proportions of illiterate and higher number of people with reading and writing ability (Melak et al., 2021). Thus, better educational background obtained in Benatsemay and Male districts might be a good potential for conservation and sustainable utilization of chickens. It is also be useful to consider upgrading the education status in Hamer district for successful chicken breeding strategies and sustainable utilization interventions.

The average family size of the households was closer to the report from Jimma and Illu Aba Bora zones, southwestern Ethiopia (Haile and Biratu, 2017). However, the family size of all districts in this study was higher than the average value of Ethiopia (CACC, 2003).

The average flock size per household was higher than the reported size in Sheka zone (Assefa et al., 2019), Kambata Tambaro and Wolita Zones (Getiso et al., 2015), Northwest Ethiopia (Halima et al., 2007) and South Ethiopia (Mekonen, 2007) and similar with what has been reported from North Gondar Zone, and Ethiopia (Getu and Birhan, 2014). Compared to other countries, the flock size per household was lower than that of Jordan (Abdelqader et al., 2007) and Pakistan (Hunduma et al., 2010).

The flock owner of the chicken determines the flock composition based on economic and management considerations. The number of local chickens in the household in different age categories varies considerably. On average pullets followed by layers were dominant in in the present study area. Which is in contrast to the findings from Northern Gonder, Ethiopia (Wondu et al., 2013). The higher proportion of pullets in the study districts indicated the measures that has been taken to get replacement flocks of layers for egg production and chicken production. This would have direct impact on conservation and sustainable utilization of the resource.

The current result showed that the dominant chicken production system was traditional or extensive type. This agrees with the findings of South west and South part of Ethiopia (Moreda et al, 2013). All members of the family were responsible for poultry activities. This finding was similar with Jamma woreda, south Wollo (Mammo, 2006) and Ganta Afeshum district of Eastern Tigray, Ethiopia (Gebresilassie et al., 2015). Participation of all family members in poultry activities might suggest that poultry keeping is an unbiased practice which allows income generation and sharing of benefits among family members.

About 48.9% of the households kept their chicken in separate house. This finding is higher than what has been reported from GantaAfeshum district of Eastern Tigray (Gebresilassie et al., 2015), North West Ethiopia (Halima, 2007) and Jamma woreda, south Wollo (Mammo, 2006). In Hamer district all respondents

used separate house for chicken. This showed that in Hamer district the owners are aware of the importance of providing separate house for chickens. The differences observed among the study districts might be due to lack of awareness on the importance of chicken house in Benatsemay and Male districts. Locally available materials were used for constructing chicken shelters similar to the reports Gebresilassie et al. (2015) and Halima et al. (2007).

The major feed sources in the study districts were scavenging with occasional supplementation and the major water sources were tap and river water. These results were similar to that of Fitsum et al. (2017). The supplementation frequency of the study area is in line with that reported in Pawe District, Beneshangul Gumuz region, Ethiopia (Dejene, 2021).

Newcastle disease was the most common and economically significant infectious viral disease of chickens in the study area. The result was similar with Serkalem et al. (2005) and Gebremedhin (2007) who reported that this disease was the major infectious diseases affecting productivity and survival of village chicken in the central highlands of Ethiopia. For conservation and sustainable utilization strategies, chicken producers should be encouraged to adopt proper Newcastle and other disease's control measures and the limited animal health services need to be strengthened.

The average age at sexual maturity of male and female was almost similar with those reported in Sheka zone, south western Ethiopia (Assefa et al., 2019) and in Dawro zone and Konta special district, southern Ethiopia (Melak et al., 2021). The average age at first egg laying was higher than the findings of Fitsum et al. (2017). The clutch number of chickens in the study area was similar with the reports of Matawork et al. (2019) in Gena Bossa district of Dawro Zone, Ethiopia and Meseret (2010) in Gomma district, but lower than the clutch numbers reported in Bure and Dale districts, respectively (Fisseha et al., 2010).

The survival rate in the present study was lower than the one reported by Fisseha et al. (2010). The low survival rate might be due to prevalence of diseases, predators and lack of vaccination practice in the study area. The average number of eggs per year per hen was higher compared to the results identified in earlier

studies (Assefa et al., 2019; Markos et al., 2015; Addisu, 2013; Ayalew and Adane, 2013; Meseret, 2010; Halima et al., 2007) but lower than the reports by Fitsum et al. (2017), Fisseha et al. (2010) and Mekonnen (2007).

The Disease prevalence was the most challenging constraints in the study area. This result was similar with report from southern Ethiopia (Melak et al., 2021). This might be due to the lack of healthcare services in the study area.

CONCLUSION AND RECOMMENDATION

The poultry production system in the study area was more of a traditional production system. The major production constraints were disease, predator and feed shortage. Indigenous chicken populations have potential for egg and meat production and the reproductive performances are reasonable under the existing limiting environmental factors. The type, seasonal occurrence and economic loss due to diseases, predator and feed shortage should be documented and pertinent control measure need to be introduced. The constraints of indigenous chicken production can justify for the need of appropriate community-based conservation and sustainable utilization strategies so as to conserve the genetic resource as well as benefitting the community.

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