

Describing the Production Systems of Local Chicken Populations and Their Production Constraints in Hadiya Zone, Southern Ethiopia

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Abstract:- The study was conducted with the objectives to describe the production systems of local chickens and to assess the constraints those hinder the production of local chickens in Hadiya zone. To attain the goals of the study 180 households were randomly selected from two districts. In the study, socio-economic purposes of chickens, responsibilities of the house members towards the chicken management activities, challenges of chicken production and some other parameters were assessed and compared for different sites of the study. For most of the parameters in the study there was no significant difference at selected districts.

Keywords:- Constraint, Hadiya Zone, Local Chicken, Production System.

I. INTRODUCTION

Backyard chicken production system is a subsistence activity providing eggs and meat for home consumption and family income from sale of live birds and eggs. Under the backyard production system, birds are usually reared in the traditional way, based on scavenging (FAO, 2009). Keeping backyard poultry is common among the resource poor households in developing countries. Backyard or village poultry production system is recognized as a strategy for capital build up, food security attainment and malnutrition and poverty reduction among small scale households owing to their short reproduction cycles and low input requirement (Besbes, 2009).

The four major Regional States (Oromiya, Amhara, SNNP, and Tigray) collectively accounts for about 96% of the total national poultry population. The Southern Nation, Nationalities and Peoples Region (SNNPR) accounts 18.8% of the total national chicken population and contributes 18% of the total annual national egg and poultry meat production. The SNNPR rural areas comprise about 97.9% of the total regional chicken population kept under backyard or traditional production system, while the urban areas comprises of 2.1% (CSA, 2012). Sidama, Gurage and Hadiya Zones collectively account for about 43.6% of the total regional indigenous chicken population (FAO, 2007). Village chickens are source of income for women, since the

sale of live birds and eggs is decided by women both of which provide women with an immediate income to meet household expenses such as food (Bush, 2006). Village chicken production and management practice in Ethiopia is characterized by extensive production system and the production and productivity of village chicken is low due to flock mortality by disease, predator and poor management practice (Melkamu and Wube, 2013).

Village poultry is rarely the sole means of livelihood for the household but is one of a number of integrated and complementary farming activities contributing to the overall well-being of the household and Hadiya Zone is not exception to this situation. There is no reliable data indicating the annual contribution of village poultry to household animal protein consumption and family income and productivities, knowing the status of local chicken production, management practices, production constraints, and likes in Hadiya Zone (Berhanu and Temesgen, 2019). These being the case, the major objective of this research project were to assess indigenous village chicken production and marketing system of rural household poultry of Hadiya Zone with the following specific objectives.

- To describe the production systems of local chickens.
- To identify the constraints towards local chicken production.

II. MATERIALS AND METHODS

➤ Description of the Study Area

This study was conducted in two districts of Hadiya Zone (Ana Lemo and Gibe Districts) of the Southern Nation and Nationality People Regional State (SNNPRs). Hadiya Zone is located at about 232 km from Addis Ababa, the capital city of Ethiopia. Hadiya Zone has a total land size of 0.35 million hectare and comprises of three distinctive agro ecological zones with mean average temperature of 22.02° C & the mean annual rainfall of 1260 mm. Hadiya Zone is divided into three major agro-ecological zones. These are high altitude of >2500 masl (23.7%), mid-altitude ranging between 1500 and 2500 m.a.s.l (64.7%) and low altitude of <1500 m.a.s.l (11.6%). The total of Human population of Hadiya Zone is 1.3 million (Berhanu and Temesgen, 2019).

➤ *Sampling Techniques*

Multi-stage sampling method was used for data collection. Hadiya Zone comprises of 10 Woredas, of which two namely Anlemo and Gibe Woredas were purposively selected based on potential in rearing indigenous chickens. and accessibility. Three Kebeles (Peasant Associations) were randomly selected from each of the two Woredas and a total of six (6) Kebeles were considered for the study. A total of 180 households having chickens (90 from each district and 30 per each Kebeles) that had at least one chicken were randomly selected for interview and data collection as shown in Table 2.

➤ *Data Collection and Statistical Analysis*

For selecting the study sites, the concerning experts of the study districts’ Livestock and Fisheries Development Offices were contacted. Primary and secondary data were used during the study to attain the stated goals though interviewing households with the use of pre-tested semi-structured questionnaire and observing on chicken management and husbandry practices like housing, feeding and health status of chicken, marketing system, socio-economic contribution and production and reproductive performance such as egg production, number of clutches, age at first egg and age at first mate of indigenous chickens.

All the data collected were analyzed using Statistical Package for Social Sciences (SPSS) Version, 20 (SPSS, 2007). Descriptive statistics such as mean, range, frequency and percentage were calculated. Moreover, tables and figures were used to present summary statistics such as mean, SD and percentages.

III. RESULT AND DISCUSSION

A. Socio-economic Contribution of local chickens

➤ *Food Consumption & Income*

Among the farmers those involved in the study, 76.7%, 15%, and 8.3% of the respondents reported to consume eggs during religious /cultural holidays, all the times based on availability and during sickness, respectively (Table 1). Moreover, 86.1%, 8.9% and 5%, of the farmers consume chicken meat in times of religious /cultural holidays, on rare cases and during sickness, respectively.

More than 67% and 32% of the farmers keep local chickens for the purpose of family cash income from sale and home consumptions. This report is not in agreement with the report of Tadelle and Peters, (2003) who reported that 52% of the eggs produced under the Ethiopian village chicken production system is incubated in order to replace the new stock and Meseret, (2010) who reported that 50% of the farming community keep poultry for the purpose family income in Gomma Woreda of Jimma Zone.

Parameters	Districts		
	Anlemo(90)	Gibe(90)	Overall (180)
The taboos of poultry consumption, raising and sale	N (%)	N (0%)	N (%)
Yes	0 (0.0)	0 (0.0)	0 (0.0)
No	90 (100)	90 (100)	180 (100)
Egg consuming (eating) times			
Every time (when available)	15 (16.7)	12 (13.3)	27 (15)
During religious /cultural holidays	66 (73.3)	72 (80)	138 (76.7)
When being sick	9 (10)	6 (6.7)	15 (8.3)
P-Value	0.550 ^{ns}		
Chicken consuming times			
Every time (when available)	8 (8.9)	8 (8.9)	16 (8.9)
During religious /cultural holidays	79 (87.8)	76 (84.4)	155 (86.1)
When being sick	3 (3.3)	6 (6.7)	9 (5)
P-Value	0.589 ^{ns}		
Purpose of chickens rearing in HH level			
Cash income from sale	58 (64.4)	63 (70)	121 (67.2)
Home consumptions	32 (35.6)	27 (30)	59 (32.8)
P-Value	0.43 ^{ns}		
Purpose of eggs in HH levels			
Cash income from sale	42 (46.7)	62 (68.9)	104 (57.8)
Home consumptions	24 (26.7)	23 (25.6)	47 (26.1)
For hatching purpose	24 (26)	5 (5.5)	29 (16.1)
P-Value	0.000 ^{***}		

Table 1:- Socio-economic Purpose of Village Chickens
N=number of respondents

➤ *Responsibility in Chicken Keeping*

The result of this study revealed that, 60% of ownership of chicken belongs to women. Unlike wise, Hoyle (1992) reported that elder men and women accounted for about 30% and 47% ownership, respectively in Wolaita Sodo.

From the interviewed farmers, about 77.2% respond as the men construct shelter for chickens (Table 2). The current study reported less responsibility of men while comparing to the report of Fisseha (2009), who reported that 95% of poultry house construction, was done by men in Bure Woreda. According to the results of the current study, about

27.8%, 27.2%, 24.4% and 6.1% of the respondents reported that provision of feed and water was done by women, children and by both children and women and both of men and women, respectively. This result was in contradiction with the study conducted by Meseret (2010), who reported that women are responsible for many activities in chicken rearing.

More than half of the cleaning activities of chicken's partitions were done by women followed by children (19.4%) and women & children together (18.3%). About 26.7% of the respondents indicated that selling activity of chickens and eggs was done by both women and children.

The results of this study indicated that decision making practices are dominated by women accounted for 50%. This is disagreed with the study of Meseret (2010), who reported that 96.7% of decision making on poultry is done by women in Gomma Woreda of Jimma Zone. On the contrary to this study Fisseha (2009) also revealed that the decision making power for women was 30% in Northwest Amhara.

In case of treating the sickness towards the local chickens more than half of farmers reported that as it could be done by men. This is similar to the report of Fisseha (2009) who stated that 67% of treating sick birds was done by men in and Northwest Amhara.

Parameters	Districts		
	Anlemo	Gibe	Overall
	N (%)	N (%)	N (%)
The Owner of chickens			
Men (husband)	20 (22.3)	13 (14.4)	33 (18.3)
Women (wife)	49 (54.4)	59 (65.6)	108 (60)
Children's	21 (23.3)	18 (20)	39 (21.7)
P-Value	0.27^{ns}		
Shelter construction for chickens			
Women	2 (2.2)	2 (2.2)	4 (2.2)
Men	76 (84.4)	63 (70)	139 (77.2)
Children's	3 (3.4)	2 (2.2)	5 (2.8)
Women & Children	3 (3.3)	8 (8.9)	11 (6.1)
Men & Women	6 (6.7)	15 (16.7)	21 (11.7)
P-Value	0.1^{ns}		
Provision of Feeds and Water			
Women	24 (26.7)	2 (2.2)	26 (14.4)

Men	10 (11.1)	34 (37.9)	44 (24.5)
Children's	18 (20)	31 (34.4)	49 (27.2)
Women & Children	30 (33.3)	20 (22.2)	50 (27.8)
Men and women	8 (8.9)	3 (3.3)	11 (6.1)
P-Value	0.000^{***}		
Cleaning of chicken house Partition			
Women	46 (51.1)	45 (50)	91 (50.6)
Men	5 (5.6)	7 (7.8)	12 (6.7)
Children's	24 (26.7)	11 (12.2)	35 (19.4)
Women & Children	14 (15.6)	19 (21.1)	33 (18.3)
Men & Women	1 (1.1)	8 (8.9)	9 (5)
P- value 0.023[*]			
Selling of Chicken and Eggs			
Women	23 (25.6)	5 (5.6)	28 (15.6)
Men	12 (13.3)	34 (37.8)	46 (25.5)
Children's	23 (25.3)	21 (23.3)	44 (24.4)
Women & Children	24 (26.7)	24 (26.7)	48 (26.7)
Men & Women	8 (8.9)	6 (6.7)	14 (7.8)
P-Value	0.000^{***}		
Decision making practices			
Women	54 (60)	36 (40)	90 (50)
Men	15 (16.7)	17 (18.9)	32 (17.8)
Children's	2 (2.2)	5 (5.6)	7 (3.9)
Women & Children	11 (12.2)	15 (16.7)	26 (14.4)
Men & Women	8 (8.9)	17 (18.9)	25 (13.9)
P-Value	0.065^{ns}		

Table 2:- The labor divisions on chicken productions

➤ *Health Care towards Chicken Populations*

For about 44.4%, 25.6%, 22.2%, and 7.8% of interviewed farmers, Newcastle disease locally known as "Fengil", Coccidiosis, Infectious Bursal/Gumboro and parasites were economically important poultry health problem, respectively through highly affecting the rural rearing farmers. This is in line with the report of Aini, 1990 who stated that diseases are the major limiting factor to rural household poultry production system (Figure 1).

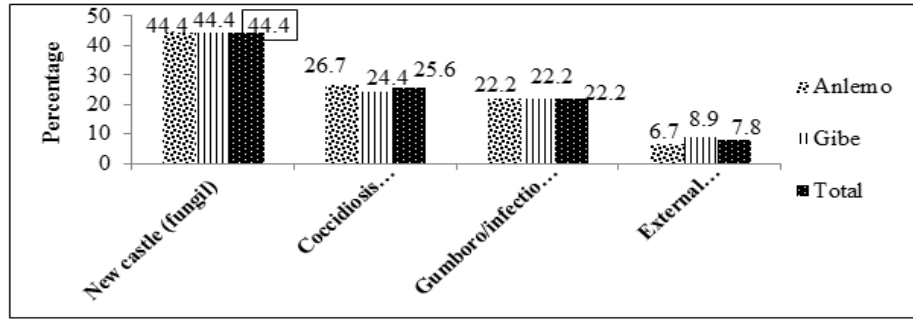


Fig 1:- Major diseases in study areas

Disease prevalence is reported to be about 94.4 and 92.2% in Anlemo and Gibe Woreda, respectively, that causing high losses (Table 3). About 43.3%, 29.4% and 18.93% of the respondents reported as they treat their chickens traditionally at home using local medicine (*feto*, *areke* and some others) and also, they called veterinarians for further treatment. Regarding to this issue, 68.9% of the farmers have provided vaccination before spread of viral disease outbreak.

Predation is an additional economically important constraint of village chicken production system in the study sites. Halima, (2007) stated that as predation could be one of the major constraints in village chickens production in North West Ethiopia. For about 42.2% farmers in Anlemo, Wild cats were the major affecting lives of the chicken. The affection was higher in Anlemo than Gibe district which accounts 13.3% in Gibe. This might be attributed to easily

exposure to predators and the high population of the wild cats in Gibe.

According to the respondents, the common predators attacking scavenging local chickens in the study area included dogs, eagle, cats and wild animals locally known as “*Shelmetmat*”. There was statistically significant difference ($P < 0.05$) between the two Woredas in the prevalence of predators.

In a group discussion made with the key informant’s high prevalence of predator’s attacks, fear of theft and lack of experience were repeatedly mentioned as the reasons for not constructing separate poultry houses. Most of the respondents also pointed out that the risk of diseases, predators and thefts associated with day time scavenging of local chicken and less management practice.

Parameter	Districts		
	Anlemo(N=90)	Gibe (N=90)	Overall(N=180)
Prevalence of disease	N (%)	N (%)	N (%)
Yes	85 (94.4)	83 (92.2)	168 (93.3)
No	5 (5.6)	7 (7.8)	12 (6.7)
Measure taken when chicken sick			
traditional medicine	42 (46.7)	36 (40)	78 (43.3)
Call in veterinarians	31 (34.4)	22 (24.4)	53 (29.4)
Slaughter or sell immediately	10 (11.1)	23 (25.6)	33 (18.4)
Cull/kill all immediately	7 (7.8)	9 (10)	16 (8.9)
P-Value	0.06 ^{ns}		
Provision of Vaccination			
Yes	60 (66.7)	64 (71.1)	124 (68.9)
No	30 (33.3)	26 (28.9)	56 (31.1)
Common predators of chickens			
Dogs	5 (5.6)	10 (11.1)	15 (8.3)
cats	38 (42.2)	12 (13.3)	50 (27.8)
Birds of prey	36 (40)	36 (40)	72 (40)
Wild animals (locally called as “ <i>Shilmitmat</i> ”)	11 (12.2)	32 (35.6)	43 (23.9)
P- Value	0.000 ^{***}		

Table 3:- treatment of Common Poultry Disease and predators attack

➤ *Marketing System of Village Chickens*

Among the farmers participated in the study, 92.2% of respondents indicated that the market flow of live birds situated from producer to consumer (Figure 2).

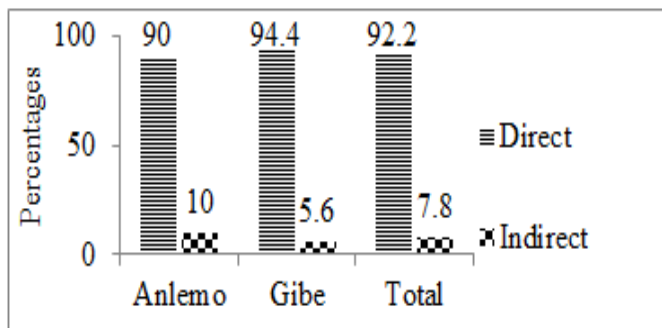


Fig 2:- Market flow of live chicken

The results of the present study showed that marketing practice of poultry and poultry products of the study area is dominated by formal marketing channel (direct market flow). Indigenous chickens are mainly reared for egg and meat production for home consumptions and income generation.

Under to this study, 88.9% of the respondents had market access for live birds and egg sell while the remaining 11.1% of farmers reported to do not have market access for selling their poultry and egg. Live birds and eggs are either directly sold to consumers in small Woreda towns markets or to traders. About 92.2% of the respondents of Anlemo Woredas had good market access to sale their live chickens and eggs, and 81.1% of the respondents of Gibe Woreda had good market access to sale chickens and eggs (Table 4).

About 86.7% of the respondents of this study had a good market access for their poultry and egg. Comparable results have been reported by Desalew, (2012) who reported that 81.7% of the respondents had a good market access for the sale of their birds and eggs in Ada'a and Lume districts of East Shewa Zone of Oromia Region.

Among the respondents in the study sites, 38.9 and 24.4 % of them were sold their eggs and live chicken directly to consumers at small village market places in Anlemo and Gibe Districts, respectively. About 27.2% of respondents of Anlemo and 17.3% of the respondents of Gibe districts were sold their eggs and their chicken to local traders. In this study 32.8% of the respondents reported the usual time of selling their egg and chickens as it has been done during holidays and festivals with maximum price. In contrast, Desalew, (2012), reported that about 73.3% of the respondents were sold their poultry and poultry products according to their personal money requirement in Ada'a and Lume districts of East Shewa Zone of Oromia.

Parameters	Districts		
	Anlemo (90)	Gibe (90)	Overall(18)
Market access of poultry products	N (%)	N (%)	N (%)
Yes	81 (90)	79 (87.8)	160 (88.9)
No	9 (10)	11 (12.2)	20 (11.1)
The access of market for poultry products			
Good access	83 (92.2)	73 (81.1)	156 (86.7)
Poor access	7 (7.8)	17 (18.9)	24 (13.3)
P-Value		0.03*	
The selling times of poultry products			
specific wt.gain/age of birds	13 (14.4)	12 (13.3)	25 (13.9)
personal money requirement	35 (38.9)	34 (37.8)	69 (38.3)
during holidays and festivals	33 (36.7)	26 (28.9)	59 (32.8)
All	9 (10)	18 (20)	27 (15)
P-Value		0.25 ^{ns}	
The ways of Selling poultry products			
village market	35 (38.9)	22 (24.4)	57 (31.7)
local shopkeepers	19 (21.2)	30 (33.3)	49 (27.2)
Selling a town doorstep	13 (14.4)	13 (14.4)	26 (14.4)
Retailer	11 (12.2)	6 (6.7)	17 (9.4)
Whole sellers	12 (13.3)	19 (21.2)	31 (17.3)
P-Value		0.07 ^{ns}	

Table 4:- Poultry Marketing Access and Characteristics of the Study Areas

B. Challenges of Indigenous Chickens Production in Study Areas

➤ *Marketing Problems*

The results of this study indicated that chickens and egg marketing system of the study areas is characterized by lack of clean selling areas, shelters, feed and water. Among the interviewed farmers, about 31.7, 28.9, 25 and 14.4% of them were reported to have attained high market price during certain seasons and occasions such as others festivals (epiphany, *Arefa*, *Mawolid*, Easter and Christmas (Fig. 3)). Eggs and live birds of local chickens had very high consumer preference compared to that of the exotic.

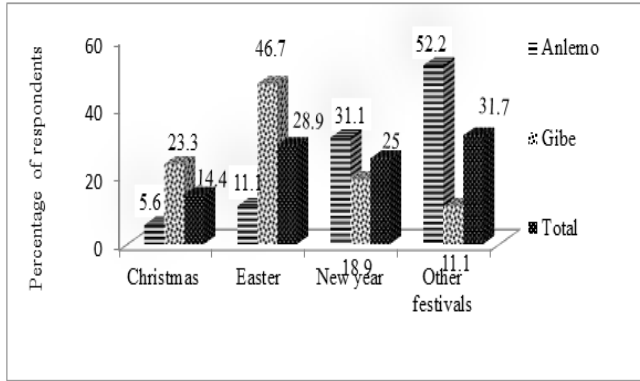


Fig 3:- Production to meet high seasonal demands

The result of the current study revealed that about 39.4, 36.1, 15.6 and 8.9% of the regular clients (buyers) of live birds were direct consumers, collectors in the market, and clients in free market and village collectors/neighbors, respectively (Table 5). From the respondents in the study area, 59.4, 35.6 and 5% of them reported to acquire replacement stock through purchase, hatching and inheritance, respectively. According to most respondents under this study, chickens and chicken products marketing could be affected by instable price, poor sales (demand seasonality), poor infrastructure like (poor roads, poor electric city availability) and/or disease outbreak and also the variation in price of chicken and chicken products palace to place and time to time. This result is in agree with the study conducted by Meseret (2010), who reported that the price of live birds varies based on body weight, feather color, comb type, age and sex and producers get better price both for live birds and eggs during holidays and festivals in Gomma Woreda of Jimma Zone.

Parameters	Districts		
	Anlemo (90)	Gibe (90)	Over all(180)
Sources of replacement stock	N (%)	N (%)	N (%)
Purchase	51 (56.7)	56 (62.2)	107 (59.4)
Inherited	7 (7.8)	2 (2.2)	9 (5)
Hatched at home	32 (35.6)	32 (35.6)	64 (35.6)
P-Value	0.2 ^{ns}		
Problems relating to poultry marketing in study areas			
Instable chicken and eggs price	50 (55.6)	43 (47.8)	93 (51.7)
Poor sales(demand seasonality)	30 (33.3)	26 (28.9)	56 (31.1)
Poor infrastructure	8 (8.9)	10 (11.1)	18 (10)
Availability of substitute	2 (2.2)	10 (11.1)	12 (6.7)

Disease outbreak	0 (0.0)	1 (1.1)	1(0.6)
P-Value	0.12 ^{ns}		
Price variation causes in eggs and chickens			
Season of the year/incubation time	7 (7.8)	4 (4.4)	11 (6.1)
Disease outbreak & Holidays	20 (22.2)	25 (27.8)	45 (25)
Holidays	26 (28.9)	27 (30)	53 (29.4)
Disease outbreak, Incubation time & Holidays	37 (41.1)	34 (37.8)	71 (39.4)
P-value	0.7 ^{ns}		
The regular client(buyer)of live birds			
Village collectors/neighbors	10 (11.1)	6 (6.7)	16 (8.9)
Collectors in the market	32 (35.6)	33 (36.7)	65 (36.1)
Sell to consumers	35 (38.9)	36 (40)	71 (39.4)
All	13 (14.4)	15 (16.7)	28 (15.6)
P-Value	0.76 ^{ns}		

Table 5:- Source of Poultry and Poultry Marketing Problems

Live bodyweight, feather color; comb type, age and sex could be the base for market variation. There were significant difference in two districts (P<0.05) for the market variation parameters. In the study, both live birds and eggs are transported to market places for a long distance which might be the factor affecting the quality of the chicken products. This result is in line with the study conducted by Solomon (2007), who reported that, indigenous birds and eggs could be transported over longer distances to supply urban markets which results in quality deterioration in Ethiopia (table 6).

Parameters	Districts		
	Anlemo (90)	Gibe(90)	Overall(180)
Causes of price variation for chickens	N (%)	N (%)	N (%)
Body weight and Comb type	34 (37.8)	18 (20)	52 (28.9)
Feather color and Body weight	26 (28.9)	21 (23.3)	47 (26.1)
Age and Sex	9 (10)	18 (20)	27 (15)
Feather color and Comb type	9 (10)	12 (13.3)	21 (11.7)
Body weight & Sex	12 (13.3)	21 (23.3)	33 (18.3)
P-Value	0.02*		

Table 6:- Causes of Poultry and Poultry Product Price Variation

N= total number of respondents

➤ *Production Constraints of Chickens in Study Areas*

According to this study; prevalence of diseases (40.6%), predator’s attacks (30.6%), the economic and market problems (10%), lack of modern skill in chickens rearing (9.4%), inadequate veterinary services (5%) and shortage of feed (4.4%) were the major constraints of poultry productions (Table 7). This result is in agreement with that of Desalew (2012) who reported that, disease was the most important problem affecting poultry productivity in Ada’a and Lume districts. The result of this study showed that high prevalence and frequent outbreak of poultry disease is the major limitation to chicken productions and productivity in the study followed by predators.

Variables	Districts		
	Anlemo (90)	Gibe (90)	Overall (180)
Poultry production Constraints in study areas	N (%)	N (%)	N (%)
Presence of disease	41 (45.6)	32 (35.5)	73 (40.6)
Predators attack	26 (28.9)	29 (32.2)	55 (30.6)
Shortage of adequate feed	3 (3.3)	5 (5.6)	8 (4.4)
Inadequate veterinary services	3 (3.3)	6 (6.7)	9 (5)
Lack of modern skill of rearing	6 (6.7)	11 (12.2)	17 (9.4)
Problem of Market access	11 (12.2)	7 (7)	18 (10)
P-Value	0.4^{ns}		

Table 7:- Constraints of Chicken Production in the Study Areas

➤ *Loss and Off Take of Chicken from the Flock*

About 43.3%, 35.6% and 21.1 % of the farmers gave their response as disease, predators, and theft, respectively considered as the factors for the loss and off take of the chickens from the flock with no income generating for the rearing farmers (table 8). Unlike wise, 75% and 19.4% and 5.6% of the off take from the flock was attributed to sales, consumption and gift to relatives, respectively by contributing positive for the rearing farmers either through income generation or social value. This report is not in agreement with that of Mekonnen, (2007), who reported that 71%, 28% and 1% of the chickens are lost due to predators, disease and theft respectively.

Parameters	Districts		Overall
	Anlemo	Gibe	
Off take of chickens from the flock	N (%)	N (%)	N (%)
For consumption	25(27.8)	10(11.1)	35(19.4)
For sell	62(68.9)	73(81.1)	135(75)
Gift to relative/any else	3(3.3)	7(8.8)	10(5.6)
P- value 0.012*			
Losses of chickens from the flock			
Disease	30(33.3)	48(53.3)	78(43.3)
Predators	29(32.3)	35(38.9)	64(35.6)
Theft	31(34.4)	7(7.8)	38(21.1)
P-value	0.000***		

Table 8:- Losses and off take of chickens from the flock in study areas

IV. CONCLUSION

Documenting the production systems of the local chicken is very important in developing the breeding strategy either through genetic improvement or conservation of the adapted chickens in a country. Again it plays the role in identifying the major constraints which hinder the production of the local chicken before taking any decision and measure.

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