

Husbandry practices of indigenous chicken, in Abobo Woreda, Gambella Regional State, South West, Ethiopia

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Abstract

World's chicken population was estimated about 16.2 billion of which 71.6 % were found in developing countries. Therefore, the objective of the study was aimed to study on husbandry practices of indigenous chicken, in Abobo woreda, Gambella regional state, south west, Ethiopia. The sample size of the study was estimated to be 384 (128 from Abobo) using the formula stated in Thrust field. The quantitative data was organized, summarized and encoded on excel sheet and analyzed with the help of Statistical Analysis System (SAS) 9.2 version 2008. Chicken owners in the study area, (56.25 %) and (43.75 %) were male and females, respectively. Village chickens were kept for meat and egg used for consumption and income generation. The overall mean flock size per household was 7.15 chickens. In the current study 92.1 % of the respondents reported to have no separate poultry house. All the respondents (100 %) reported to practice scavenging system with a supplementary feeding. The respondents in Village 14(75 %), Village 17(67.33 %) and Wankefi 02 kebele (58.23 %) had their own indigenous knowledge of culling chicken for a purpose. Respondents indicated that broodiness characteristics were common in their flock in which 88.11 % in village 14, 77.22 % in village 17 and 68.56 % in wankefi 02 kebele practiced the traditional methods of breaking broodiness. Respondents in the study district practiced selection on breeding hen based on six trait categories productivity, age, and absence of broodiness, maternal performance, plumage colour and large body size. The major diseases and parasites easily recognized by the villagers were Newcastle disease (fingile) and lice (qinqin or susii), respectively. The scavenging feed resource in Abobo district consists of kitchen wastes, any kind of feed that fell on ground unfortunately, insects, grass and harvest leftovers.

Key words: Abobo, Chicken, Husbandry, Production.

Introduction

Poultry is the largest livestock group in the world estimated to be about 23.39 billion consisting mainly of chickens, ducks and turkeys (FAO, 2007, 2011) and has remained to be important in the improvement of food security and livelihood (Halima *et al.*, 2007; Malago *et al.*, 2014; Zemelak *et al.*, 2016;) and contributing about 28-30 % of all animal protein consumed in the world (FAO., 2011; ILRI., 2014). Such poultry species contributed important socio-economic roles for food securities, generating additional cash incomes and religious/cultural reasons (Tadelle, 2003; Aberra, 2014).

Ethiopia, with its wide variations in agro climatic conditions, possesses one of the largest and the most diverse plant and animal genetic resources in the world (Azage *et al.*, 2010). Indigenous chicken (97.3 %) in Ethiopia is found in huge number distributed across different agro-ecological zones (CSA, 2011).

The most dominating poultry production system in rural areas of Africa is extensive system based on the local indigenous types and relying on scavenging feeding systems. Sonaiya (1990), and Sonaiya and Swan, (2004) classified village chicken production into three different systems like the free-range system (poultry are roosted on trees at night), backyard (poultry are confined at night), and small-scale intensive systems (poultry are enclosed during the day in a very limited scavenger resources) depending on factors of resources, housing, feed and health care. Chicken production systems in Ethiopia is classified into traditional, small and large-scale oriented sectors, which is based on the objective of the producer, the type of inputs used, and the number and types of chickens kept (Alemu, 1995).

Adaptation of harsh environment and resistance to disease are the major opportunities of local chicken in Ethiopia and contributed to the national economy in general and the rural economy in particular 99.2 % of meat and 99 % of egg productions are contributed by local chickens with the total chicken egg and meat production in Ethiopia is also estimated to be about 78,000 and 72,300 metric tons, respectively from which more than 90 % of the national chicken meat and egg output is contributed by local chickens (CSA, 2010). The total chicken population in the country is estimated to be 56.71 million with native chicken representing 95.86 %, hybrid chicken 2.79 % and exotic breeds 1.35 % (CSA, 2015).

Poultry production is in a part and parcel of the Gambella agriculture with diversified benefits in food security, for consumption and cash sales, creation of wealth and so on. Hence despite its economic contribution the attention given to the sector, the status of the production, and impact of husbandry practice is not justified. With the above background, the objective of the study was aimed to study husbandry practices of indigenous chicken, in Abobo Woreda, Gambella Regional State, South West, Ethiopia.

Materials and Methods

Description of the Study Area

As presented on the map of the study area (Figure 1), the study was conducted in Abobo district of Agnua Zone of Gambella regional state, Ethiopia. Gambella People's National Regional State (GPNRS) is located South West part of Ethiopia. The mean annual temperature of the Region varies from 17.3°C to 28.3°C and annual monthly temperature varies throughout the year from 27°C to 35°C. The annual rainfall of the Region in the lower altitudes varies from 900-1500 mm. Livestock population of the region is about 253,389 cattle, 39,564 sheep 83, 897 goats and 18355 poultry (CSA, 2013).

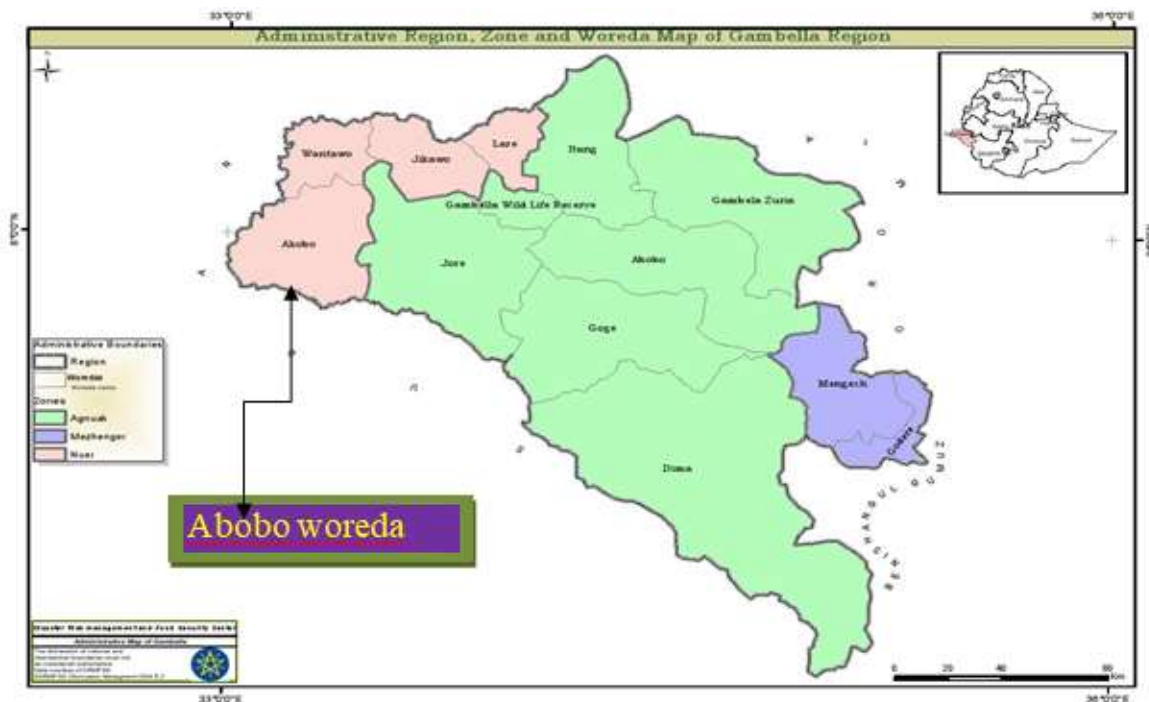


Figure 1: Map of the study area

Sampling Procedure and Determination of Sample Size

A rapid reconnaissance survey was made before the main survey to know the distribution and concentration of local chicken eco-types and the village. Abobo district and three villages; namely village 14, village 17 and wankeki 02 kebele were selected purposively based on the potential for chicken population, road accessibility and indigenous chicken production system. The sample size of the study was estimated to be 384 using the formula stated in Thrust field (2007).

$$N = \frac{Z^2 \alpha 2 P (1-P)}{d^2} = \frac{1.96^2 * 0.5 (1-0.5)}{0.05^2} = 384$$

Where P= Proportion of people who knows about indigenous chicken production system; the researchers took 0.5 as a standard, Z= 1.96 at 95 % confidence interval, d= expected margin of errors, i.e. 0.05, N= required sample size.

Methods of Data collection

Data collecting techniques were applied to collect primary and secondary data which include individual interviews in verbal with the help of semi structured questionnaires to address the all husbandry practices of the indigenous chicken in the study areas. In addition, formal discussions were held with a group of households in each of the villages of indigenous chicken producers.

Method of Data Analysis

All data were coded and recorded in Microsoft excel sheet. Statistical analyses were made separately for male and female chicken on variables that varied on sex; otherwise the data were merged and analyzed together. Descriptive statistics such as mean, frequency and percentage were calculated, and all the surveyed data were analyzed. The descriptive statistics (mean, SE) for numerical survey data was subjected to analysis of variance (ANOVA) using the General Linear Model (GLM) procedure of SAS version 9.2, 2008. Mean comparisons were made by using Tukey`s studentized range test method at p<0.05.

The statistical model used for the study was:

$$Y_{ijk} = m + S_j + k + e_{jk}$$

Where: Y_{jk} = the observed (linear body measurements in the k^{th} village's kebeles)

- m = overall mean
- S_j = the effect of j^{th} sex (j= male and female)
- k = the effect of village's kebele (k=1, 2, 3)
- e_{jk} = random residual error.

Results and Discussions

Characterization of the indigenous chicken husbandry practices System

As shown in Table 1, from the total interviewed village chicken owners in the study area, more than half (56.25 %) less than half (43.75 %) were male and females, respectively. The average age of respondents was 41.35 years in Village 14, 42.13 years in Village 17 and 43.17 years in wankeki 02 kebele. Educational background, the

majority (41.67 %) of the respondents were illiterate. However, this result is lower than 72.34 % for Jarso woreda's of Oromia (Eskinder 2013). From the literate members, 27.60 %, 20.05 % and 10.68 % had gone through reading and writing, primary education and secondary and above secondary education, respectively.

Table.1: Socio-economic characteristics of the respondents in village chicken production system

Parameters	kebeles			Over all
	Village 14	Village 17	wankeki 02 kebele	
Age of the respondents	41.35 ± 0.21 ^b	42.13 ± 0.08 ^{ab}	43.17 ± 0.07 ^a	42.23 ± 0.12
Family size/HH	5.45 ± 0.24 ^{ab}	5.31 ± 0.26 ^b	5.52 ± 0.23 ^a	5.43 ± 0.24
Sex	(Frequency, (%))			
Male	76 (59.37)	73 (57.03)	67 (52.35)	216 (56.25)
Female	52 (40.63)	55 (42.97)	61 (47.65)	168 (43.75)
Educational background	(Frequency, (%))			
Illiterate	57(44.53)	49 (38.28)	54 (42.19)	160 (41.67)
Read & write	31(24.22)	38 (29.69)	37 (28.91)	106 (27.60)
Primary education	25 (19.53)	29 (22.66)	23 (19.97)	77 (20.05)
Secondary education and above	15 (11.72)	12 (9.37)	14 (10.94)	41 (10.68)
Livestock holding/HH	Mean ±SE			
Cattle	4.12±0.31 ^b	5.11±0.13 ^a	4.35±0.25 ^b	4.53±0.23
Sheep	3.22±0.32 ^c	4.59±0.26 ^a	3.83±0.29 ^b	3.88±0.29
Chicken	6.51±0.19 ^b	6.48±0.08 ^{ab}	7.12±0.03 ^a	6.70±0.01
Goat	6.19±0.26 ^b	5.74±0.35 ^c	6.87±0.15 ^a	6.26±0.25

a, b, means with different superscript letters across a row are significantly different at p<0.05; ns= non significance, HH=interviewed households

Purpose of keeping indigenous chickens

The study indicated that village chickens were kept for meat production and egg used for consumption and

income generation respectively (Table 2). This is like Fisseha *et al.* (2010a) and Getachew (2015).

Table 2: Purpose of village chicken rearing and eggs

Kebeles	Purpose of chickens			Purpose of egg		
	Income	Meat	Egg production	Income	Consumption	Hatching
Village 14						
Rank 1	51	22	55	47	38	43
Rank 2	45	20	63	56	42	30
Rank 3	60	33	35	63	52	13
Index	0.33	0.18	0.42	0.41	0.33	0.26
Village 17						
Rank 1	33	21	74	65	43	20
Rank 2	54	29	45	59	29	40
Rank 3	47	35	46	48	59	21
Index	0.34	0.20	0.47	0.47	0.32	0.21
Wankeki 02 kebele						
Rank 1	45	33	50	56	41	31
Rank 2	58	38	32	62	55	11
Rank 3	64	41	23	47	65	16
Index	0.41	0.28	0.31	0.44	0.39	0.17

Index=sum of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for particular trait divide by sum of [3 for rank 1+ 2 for rank 2 + 1 for rank 3] for all traits

Flock composition and characteristics

work is inline of 8.8 chickens per household which was reported by Assefa (2007) in Hawassa Zuria.

As presented in Table 3, the overall mean flock size per household was 7.15 chickens. The value reported in this

Table 3: Chicken flock size per household by different age and sex groups (Mean ± SE)

flock size	Kebeles		
	Village 14	Village 17	wankeki 02 kebele
	Mean ± SE	Mean ± SE	Mean ± SE
Hens	4.23±0.27 ^b	4.27±0.19 ^a	4.12±0.32 ^{ab}
Cocks	1.78±0.19 ^a	1.28±0.25 ^b	1.57±0.21 ^b
Pullets	2.15±0.14 ^a	1.23±0.20 ^b	1.18±0.25 ^b
Cockerels	1.19±0.24 ^b	1.42±0.21 ^b	2.12±0.17 ^a
Chicks	2.23±0.14 ^a	1.97±0.21 ^b	2.15±0.17 ^a
\bar{X}	7.72±0.13	6.15±0.24	7.17±0.04

a, b means in the same row with different superscripts are significantly different ($P < 0.05$); HH= household; SE= Standard error, - x= average number of chickens/HH

Responsible Members of Chicken Production Activities

Most of responsibility of chicken production activities such as natural incubation of egg, feeding, caring for sick poultry and cleaning the house was covered by women in the study area (Table 4). Similarly, Tadelle and Ogle (2001) indicated that in Ethiopia, management of chicken is fully in the domain of women, while decision on control and access to resources varies considerably.

Table 4: Members responsible for chicken production activities

Family Members	Activities (frequency, %)						
	Purchasing	Selling	caring	Feeding	Harvesting of egg	Incubation	Cleaning
Young Male	68(17.7)	87(22.66)	32(8.33)	26(6.77)	43(11.19)	-	17(4.43)
Young Female	65(16.93)	105(27.34)	120(31.25)	124(32.29)	112(29.17)	57(14.84)	187(48.69)
adults Male	120(31.25)	27(7.03)	35(9.11)	33(8.59)	32(8.33)	-	-
adult Female	131(34.11)	165(42.97)	197(51.30)	201(52.34)	197(51.30)	327(85.16)	180(46.88)

Husbandry Practice

Housing

In the current study 92.1 % of the respondents reported to have no separate poultry house (Table 1). This result is

similar with the case reported by Eskindir (2013) and Getachew (2015) who reported 92.06 % in both Horro and Jarso and 93.33 % in bench Maji zone respectively. However, there is Separate poultry house/shelter in the study area (Figure 2).

Table 2: Housing and reasons (%) for not having separate shelter for chickens

Housing conditions	Kebeles			Overall mean
	Village 14	Village 17	wankeki 02 kebele	
Perches in the veranda	97(25.26)	89(23.18)	85(22.14)	90(23.53)
Perches in the main house	175(45.57)	186(48.43)	179(46.61)	180(46.87)
Separate shelter	35(9.11)	25(6.51)	31(8.07)	30(7.89)
Perches in the kitchen	77(20.05)	84(21.88)	89(23.18)	84(21.70)
Reason not having separate shelter				
lack of knowledge(awareness)	83(12.13)	78(20.31)	97(25.26)	86(19.23)
Less attention given to poultry	114(29.69)	123(32.03)	86(22.39)	108(28.04)
Lack of construction material	67(17.44)	59(15.36)	73(19.01)	67(17.27)
Risk of predators	65(16.93)	75(19.53)	57(14.84)	65(17.1)
Risk of theft	27(7.03)	33(8.59)	36(9.38)	32(8.33)
Small flock size	28(7.29)	16(4.17)	35(9.11)	27(6.86)



Figure 2: Separate poultry house/shelter in the study area

Feeding

All the respondents (100 %) reported to practice scavenging system with supplementary feeding (Figure 3).

This is also similar with the findings of Zemene *et al.* (2012) who reported 100 % chicken owners in west Amhara region. Cereal grains (maize, sorghum, wheat and household scraps) are the major supplementary feeds offered (Table 6).

Table 6: Type and provision of supplementary (Percent) feeding for chicken

Provision of Supplementary feeding	Village's kebeles		
	Village 14	Village 17	wankeki 02 kebele
Yes	100	100	100
No	-	-	-
Type of supplementary feeds^a			
Maize	100	100	100
Wheat	21	27	19
Sorghum	86.75	89	79
Household scraps	39	33	45

^a=Percentages do not add up to 100 % since respondent's selected more than one feed type



Figure 3: During scavenging in the study area

Watering

All the respondents (100 %) provided water for their chickens (Table 7). This is concurred the earlier findings in

the northern Gonder as all the respondents in the study area provided water for their chickens (Wondimu *et al.*, 2013) despite variations in source of water 75.5 % provide water from pipe water and 24.2 % from river water.

Table 7: Practice, frequency of watering and type of water trough for chickens

Factors	Villages/kebeles			Overall mean
	Village 14	Village 17	Wankeki 02 kebele	
Provision of water to Chicken (%)				
Yes	100	100	100	100
No	-	-	-	-
Frequency of watering				
Once a day	-	-	-	-
Twice a day	33.24	27.43	38.11	32.93
Three times a day	25.13	29.56	34.24	29.64
Adlibtum (offered freely)	55.34	63.22	59.72	59.43
Type of water Trough				
Brocken clay material	24.56	22.16	25.34	24.02
Plastic made	55.45	60.32	59.33	58.37
Metal made trough	18.33	24.52	19.15	20.67

Culling practice and factors determining culling

As presented in Table 8, most of the respondents in Village 14 (75 %), Village 17(67.33 %) and wankefi 02 kebele

(58.23 %) had their own indigenous knowledge of culling chicken for a purpose. This result agrees with the case reported by Halima (2007) who reported 74.7 % of the respondents in northwest Ethiopia.

Table 8: Culling practice and factors (%) determining culling

Factors	Kebeles			Overall mean
	Village 14	Village 17	wankeki 02 kebele	
Culling practices				
Yes	75	67.33	58.23	66.85
No	25	32.67	41.77	33.15
Factors determining Culling ^a				
Poor productivity	45.33	47.56	52.13	48.34
plumage color	33.23	22.45	21.66	25.79
Old age	17.84	22.55	23.16	21.18
Illness	7.23	9.33	13.45	10.00
Excess in number	4.5	6.2	7.3	6.00

^a= Percentages do not add up to the specific values since respondents selected more than one determinant factor

Traditional methods of breaking broodiness

77.22 % in village 17 and 68.56 % in wankefi 02 kebele practiced the traditional methods of breaking broodiness (Table 9). This agrees with Tadelle (1996,); Dereje (2001,); Tadelle (2003).

The respondents indicated that broodiness characteristics were common in their flock in which 88.11 % in village 14,

Table 9: Traditional methods (%) of breaking broodiness

Factors	Kebeles		
	Village 14	Village 17	wankeki 02 kebele
Yes	88.11	77.22	68.56
No	11.89	32.78	31.44
Traditional methods breaking broodiness ^a			
Hanging upside down	21.33	19.54	21.23
Tying wings	25.12	24.34	24.41
Taking to another place	24.37	22.88	21.65
hidden brooding nest	18.11	19.55	22.93
Put rough materials on brooding nest	13.21	7.22	12.83

^a= Percentages do not add up to the specific values since respondents used more than one determinant factor

Selection criteria for hens

As shown in Table 10, respondents in the study district practiced selection on breeding hen based on six trait categories productivity, age, absence of broodiness, maternal performance, plumage colour and large body size. Egg production appeared to be the most important selection criteria. This result agrees with Nigussie *et al*, (2010a) who reported that egg production as the most important selection criterion in different parts of Ethiopia.

Table 10: Trait categories used by farmers to select female breeding stock

kebeles	Trait					
	Egg production	Mothering ability	Hatchability	Large body size	Color	Large egg size
village 14						
Rank 1	57	65	49	50	17	13
Rank 2	45	56	68	72	34	85
Rank 3	26	7	11	6	77	30
Index	0.18	0.19	0.18	0.18	0.12	0.15
village 13						
Rank 1	67	58	55	51	19	21
Rank 2	43	63	65	68	77	78
Rank 3	18	7	8	9	32	29
Index	0.18	0.18	0.17	0.17	0.15	0.14
Wankeki 02 kebele						
Rank 1	73	66	58	57	47	26
Rank 2	38	41	62	65	71	73
Rank 3	17	21	8	6	10	29
Index	0.17	0.16	0.18	0.17	0.16	0.15

Index=sum of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for particular trait divide by sum of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for all traits

Selection criteria for cocks: Majority of the farmers interviewed in the study district practiced selection on breeding cocks based on five trait categories: plumage color, large body size, conformation/shape, comb type and early maturing (Table 11).

Table 11: Trait categories used by farmers to select a male breeding stock

kebeles	Trait				
	Body plumage Color	Comb type	Large body size	Body conformation	Early maturing
village 14					
Rank 1	65	54	32	25	21
Rank 2	58	59	65	56	49
Rank 3	5	15	31	47	58
Index	0.24	0.23	0.19	0.18	0.16
Kebele 13					
Rank 1	75	63	52	43	27
Rank 2	46	46	48	59	55
Rank 3	7	19	28	26	46
Index	0.23	0.21	0.19	0.19	0.17
Wankeki 02 kebele					
Rank 1	68	71	56	43	23
Rank 2	51	46	48	57	44
Rank 3	9	11	24	28	61
Index	0.22	0.22	0.20	0.19	0.16

Index=sum of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for particular trait divide by sum of [3 for rank + 2 for rank 2 + 1 for rank 3] for all traits

Health management and disease control

The result indicated that 67.97 % in Village 14, 58.59 % in Village 17 and 65.63 % in wankefi 02 kebele village chicken owners experienced chicken disease outbreaks in

the last 12 months (Table 12). The major diseases and parasites easily recognized by the villagers were Newcastle disease (*fingile*) and lice (*qinqin* or *susii*), respectively.

Table 12: Diseases and health (%) management of chickens

Parameters	Villages/kebele Village 14	Village 17	wankeki 02 kebele
Experience of disease outbreak			
Yes	87 (67.97)	75 (58.59)	84 (65.63)
No	41 (32.03)	53 (41.41)	44 (34.37)
Measures taken when chicken sick			
Treat with traditional medicine	103 (80.47)	112 (87.5)	115 (89.84)
service of veterinarian	14 (10.94)	11 (8.59)	9 (7.03)
No action	11 (8.59)	5 (3.91)	4 (3.13)

Accordingly, provision of local alcohol ('*Katikala or areqe*'), 'lemon' (*citrus limon*), garlic (*Allium sativum*), and human antibiotics like tetracycline mixing with feed and/or drinking water of sick birds against Newcastle disease were the most widely used type of traditional treatments.

Conclusion

The study shows that women are responsible for most of the chicken production activities in the study district while men are responsible for crop farming and rearing other livestock. The respondents of the current study also confirmed that the scavenging feed resource in Abobo district consists of kitchen wastes, any kind of feed throw on ground unfortunately, insects, grass and harvest leftovers indicating that the village chicken production system is friendly with the environment. According to the respondent's implication, chickens are interested to drink water at the morning immediately having fasted through the night.

In the study district, respondents have their own criteria and strategies of culling chicken. From the total interviewed village chicken owners in the study area, more than half (56.25 %) and (43.75 %) were male and females, respectively. The average age of respondents was 41.35 years in Village 14, 42.13 years in Village 17 and 43.17 years in wankeki 02 kebele. Educational background, the majority (41.67 %) of the respondents were illiterate. Respondents in the study district practiced selection on breeding hen based on six trait categories productivity, age, absence of broodiness, maternal performance, plumage colour and large body size.

The respondents indicated that broodiness characteristics were common in their flock in which 88.11 % in village 14, 77.22 % in village 17 and 68.56 % in wankefi 02 kebele practiced the traditional methods of breaking broodiness. Most of the respondents in Village 14 (75 %), Village 17(67.33 %) and wankefi 02 kebele (58.23 %) had their own indigenous knowledge of culling chicken for a purpose. All the respondents (100 %) reported to practice scavenging system with supplementary feeding. In the current study 92.1 % of the respondents reported to have no separate poultry house. Most of responsibility of chicken production activities such as natural incubation of egg, feeding, caring for sick poultry and cleaning the house was covered by women in the study area. The study indicated that village chickens were kept for meat

production and egg used for consumption next to that of egg production and income generation respectively.

Recommendations

- ❖ The current study indicated that chicken production is widely practiced in the entire study District. Hence, it is important that research and development initiatives in the future should emphasize on the improvement of indigenous chickens through the adoption of improved feed, health care and management systems.
- ❖ Creation of awareness and training of households should be given on predators and diseases control, construction of improved housing and feeding management.

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