Characterization of village chicken production system in Jimma and Ilu Aba Bora zones, South Western Ethiopia

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Abstract: The study was conducted in highland, midland and lowland agro-ecological zones of Jimma and Ilu Aba Bora zones selected districts the objectives were to characterize village chicken production and identify the major constraints. A total of 240 chicken rearing smallholder farmers were interviewed to collect the required information using a semi-structured questionnaire. The chicken production system in the study areas was scavenging with regular supplementation of the little amount of feed. The average flock size of chicken per household was 10.05. About 33%, 55% and 12 % of smallholder farmers were provided feed for their chickens once, twice and three times a day respectively. Most of the farmers 74% of the respondents do not have a separate house but provided night time rest in different places: in the living house 24.6%, kitchen 29.1, veranda 15.4 and animal barn 5%. The average age at first mating for cockerel and pullet were reported 6.02 and 6.15 months respectively. The average age of hen at first egg laying was 6.74 months. The overall average number of clutches was 3.64 times per year per hen. The length of the single clutch was 3.4 weeks. The average numbers of egg production per clutch were 13.19 and number of eggs set to a broody hen for incubation was 11.4%. The average hatchability of eggs and survival rate of chick up to 8 weeks were 79.4% and 47.7% respectively. All of the respondents in the study areas were not identify the specific name of the disease but reported the clinical signs. Most of the farmers (89.5%) were reported a high incidence of diseases occurs the wet season. About (91.7%) of the farmers were treated their sick chickens by using of traditional medicine. Farmers were reported different Predators such as black kite (29.2%), mongoose (28.8%), wild cat (20%), dog (7%), Cat (9.2%), Baboon (3.8%) and Fox (2%) which plays a role for chicken loss. Constraints in village chicken production system were prioritized the disease (35.8%), predators (18.8%), lack of veterinary services (17.9%), feed shortage (11.7%), lack of proper house (8.8%) and unstable prices (7%).Therefore, improvement should be need to design veterinary services, chicken management (feeding and housing) and identification and conservation of the best ecotype in the area. Finally, evaluation, demonstration and promotion of exotic chicken breeds that can fit the local feeding and management condition will be necessary.

Key words: characterization, village chicken, production system, constraints.

Introduction

In Ethiopia chickens are the most widespread and almost every rural family owns chickens (Tadelle *et al.*, 2003). Indigenous chickens contribute to income sources, improved nutritional status and provision of food security for rural households (Islam *et al.*, 2014). The advantages of village chicken production are special meat and egg quality/flavor, hard egg shells and high dressing percentages (Gueye, 1998). Total chicken population in the country is estimated to be 56.87 million. Indigenous chickens accounted 95.9%, hybrid 2.79% and exotic breeds 1.35% (CSA, 2016). The most dominant chicken types reared are local ecotypes, which show a large variation in body position, plumage color, comb type and productivity (Halima *et al*., 2007). The production systems are characterized as including small flocks, with nil or minimal inputs, low outputs and periodic devastation of the flocks by disease. Birds are owned by individual households and maintained under a scavenging system, with little or no inputs for housing, feeding or health care (Tadele, 1997). The production performance of indigenous or local scavenging chickens are low because of their low egg production potential, high chick mortality and longer reproductive cycle or the low genetic potential (slow growth rate, late sexual maturity and broodiness for an extended period (Besbes, 2009). The Major challenges in village chicken production are a high incidence of disease, predation, low

productivity of local chicken ecotypes, poor chicken management(feeding, housing, health) and lack of institutional support and source of information (Fisshea *et al*., 2010). In Jimma and Ilu Aba Bora zones little information is available regarding chicken production system. Therefore, the objectives of this study were to characterize the Chicken production system and identify the major Constraints on chicken production.

Description of the study areas

This study was carried out in Jimma and Ilu Aba Bora zones Oromia regional state, south western Ethiopia. Jimma zone is the largest zone in south-western Ethiopia. It is bordered on the south by the Southern Nation nationalities and Peoples; the northwest by Illu aba bora, on the north by Misraq Welega, on the northeast by Mirab Shewa, part of the boundary with Misraq Shewa is defined by the Gibe River. Towns and cities in Jimma include Agaro and Saqqa. Altitude is in the range of 1166-3238 meters above sea level, rain fall condition ranges 887-1107mm and temperature ranges 20-25 ^{0}C. Total populations of the zone are 2,486,155 (CSA, 2007). Jimma zone is one of the three top coffee producers along with Sidama and Gedeo zones. (CSA, 2005) Major crops grown in the zone are coffee, maize, teff (Eragrostis tef), sorghum, barley, pulses (beans and peas), root crops (enset-false banana and potato), and Enset (*Ensete ventricosum*). Honey production is another source of cash after coffee (CSA 2005).

Ilu Aba Bora zone is one of the zones of the Oromia Region of Ethiopia. It is bordered on the south by the Southern Nations, Nationalities and Peoples, on the southwest by the Gambela Region, on the west by Kelem Welega Zone, on the north by Mirab Welega, and Benishangul-Gumuz Region, on the northwest by Misraq Welega Zone, and on the east by Jimma. Towns and cities in Ilu aba bora include Bedele, Gore and Metu. Altitude is in the range of 500-2575 meters above sea level, rain fall condition ranges 1500-2200 mm, and temperature ranges 14-18^{0}C. The total population is 1,271,609 (CSA, 2007). It is mostly known for its vegetation coverage, suitability for coffee, crop, livestock and bee production. The dominant crops being Maize, Teff , Coffee, Sorghum, Barley, Wheat, different pulse crops, finger millet, fruits, vegetables, spices and rice. (LDMA, 2010)

Sampling procedure and Data Collection

The study districts were stratified based an agro-ecological zone (highland, midland and lowland). Three districts were selected from each zone: Jimma (Gera, Omonada and Shebe) and Ilu Aba Bora (Alle, Metu and Bure). Two kebeles and 40 chicken rearing farmers were selected from each district. A total of 240 chicken rearing farmers were interviewed. Semi-structured questionnaire format was used to collect all the required data from chicken rearing farmers mainly focused on household characteristics, livestock holding, feed and feeding, housing, culling practices, productivity, selection criteria, disease, predators and the major constraints in chicken production.

Data analysis

The quantitative and qualitative data were summarized on Microsoft Excel sheet and analyzed by using SPSS (statistical package for social science, version 20) software. The mean separation was made by using Turkey.

Results and Discussion

Household characteristics

The overall mean male and female interviewed farmers were 43.8% and 56.2%, respectively (Table 1). The number of female respondents were higher than male because chicken production mainly managed by women farmers. This result agrees with Embet *et al*.(2013), Addisu *et al*.(2014) and Meseret (2010) reported 79.1% ,83.66% and 70% interviewed farmers were female respectively. Nearly half of the respondents (49.6%) were illiterate whereas 44.6% and 5.8% were attended elementary and secondary education. Most of the smallholder farmers (95%) were married. The remaining farmers were 2.5% (divorced), 2.1% (widow) and 0.4% (widower). The average age of the respondents was 41.3 years. In the highland area the average age of the respondents were slightly older than midland and lowland areas. The average family size of farmers was 5.4. A higher number of family sizes (6.17) recorded in the midland area. The average land holding of smallholder farmers was 1.25 hector (Table1).

Table 1: Sex, age, family size, land holding, educational and marital status of respondents

Variables	Agro- ecological zone			Overall Mean
	Highland (n=80)	Midland (n=80)	Lowland (n=80)	
Sex of Respondents (%)				
Male	38.75	47.5	45	43.8
Female	61.25	52.5	55	56.2
Educational Status (%)				
Illiterate	62.5	36.25	50	49.6
Elementary	32.5	55	46.25	44.6
Secondary	5	8.75	3.75	5.8
Marital Status (%)				
Married	97.5	93.75	93.75	95
Divorced	1.25	3.75	2.5	2.5
Widow	1.25	2.5	2.5	2.1
Widower	-	-	1.25	0.4
Average Age	44.8	38.2	40.91	41.3
Average family size (N)	5.16	6.17	5.19	5.5
Land holding(ha)	1.22	1.31	1.20	1.25

Average flock size of local chicken

The overall mean flock size of chicken per household was 10.05. Out of the total flock Hen accounts (3.32%), Cocks (1.38%), Pullets (1.41%), Cockerels (0.87%) and Chick (3.07%). The average number of Chicken per household, Cock and Cockerels were significantly different (P<0.05). In the lowland areas farmers keep high number (11.5) of chicken per household than midland and highland areas (Table 2). The result obtained in this study was in line with Wondimu *et al.* (2013) reported 10.44 chickens per household in Northern Gonder. Contradict with Fisshea. *et al*. (2010) 13, Malede (2014) 16.43, Mekonnen (2007) 9.22, Embet, *et al.* (2013) 4.85 and Mesert (2010) 6.23 chicken per household.

Table 2 : Average flock size of local chickens (M±S.E)

Variables	Agro- ecological zones			Overall Mean
	Highland (n=80)	Midland (n=80)	Lowland (n=80)	
Hen	3.04±0.18	3.52±0.17	3.39±0.16	3.32±0.10
Cocks	1.04±0.91[a]	1.61±0.15[b]	1.49±0.16[b]	1.38±0.08
Pullets	1.15±0.16	1.42±0.17	1.65±0.23	1.41±0.11
Cockerels	0.54±0.13[a]	0.99±0.17[b]	1.10±0.165[b]	0.87±0.89
Chicks	3.08±0.51	2.25±0.35	3.88±0.56	3.07±0.28
Chicken/HH	8.85±0.51[a]	9.82±0.51[ab]	11.51±0.51[b]	10.05±0.51

Means with the same row with different superscripts letters are significantly different (P<0.05)

Source of chicken

Most of the respondents (87.5%) chicken sources were from local market purchase (Table 3). Fisshea. *et al*. (2010) reported 93.9% of the respondents were parent stock chicken bring from market purchase in Bure district, North West Ethiopia. Other farmers obtained as a gift (1.7%), family (4.6%), market and livestock agency (5.4%) and market and NGO (0.8%).

Table3: Source of chickens in the study areas

Variables	Agro-ecological Zones			Overall Mean
	Highland (n=80)	Midland (n=80)	Lowland (n=80)	
Source of Chicken (%)				
Market	85	91.25	86.25	87.5
Gift	-	-	5	1.7
Family	3.75	2.5	7.5	4.6
Market and livestock agency	10	5	1.25	5.4
market and NGO	1.25	1.25	-	0.8

Feed resource and feeding

Source and type of supplementary feeds

All of the respondents were practice scavenging chicken production system with a supplement of additional feed. Most of the farmers (72.5%) provide supplementary feeds for their chickens from their own farm. While the rest 27.5% were from both household made and market purchased (Table 4). In this study, farmers reported as they supplement different types of cereals grains such as wheat (15.4%), maize (26.7%), barley (9.6%), sorghum (22%), household scraps (25%) and rice (1.3%).

Table 4: Source of feed and type of supplementary feed in the study area

Variables	Agro-ecological zone			Overall mean
	Highland (n=80)	Midland (n=80)	Lowland (n=80)	
Source of feed (%)				
House hold(farm)	71.25	63.75	82.5	72.5
Farm and market	28.75	36.25	17.5	27.5
Type of supplementary feed (%)				
Wheat	20	15	11.25	15.4
Maize	27.5	25	27.5	26.7
Barley	8.75	8.75	11.25	9.6
Sorghum	18.75	25	22.5	22
House hold scrap	25	26.25	23.75	25
Rice	-	-	3.75	1.3

Months of feed availability and shortage

Very few farmers (5.3%) were reported as chicken feed shortage starts from months of September and extends to March. This means, around 94.7% of the respondents agree as chicken feed is available in these months. Months of October, December, and January were the crop harvesting seasons in the area in which surplus grain supplements are available. In April (6%), May (14.7%), June (24.7%), July (26.5%) and August (22.7%) the farmers reported the

existence of chicken feed shortage. Especially in wet season chicken feed scarcity occurrence is common in the study area (Figure 1).

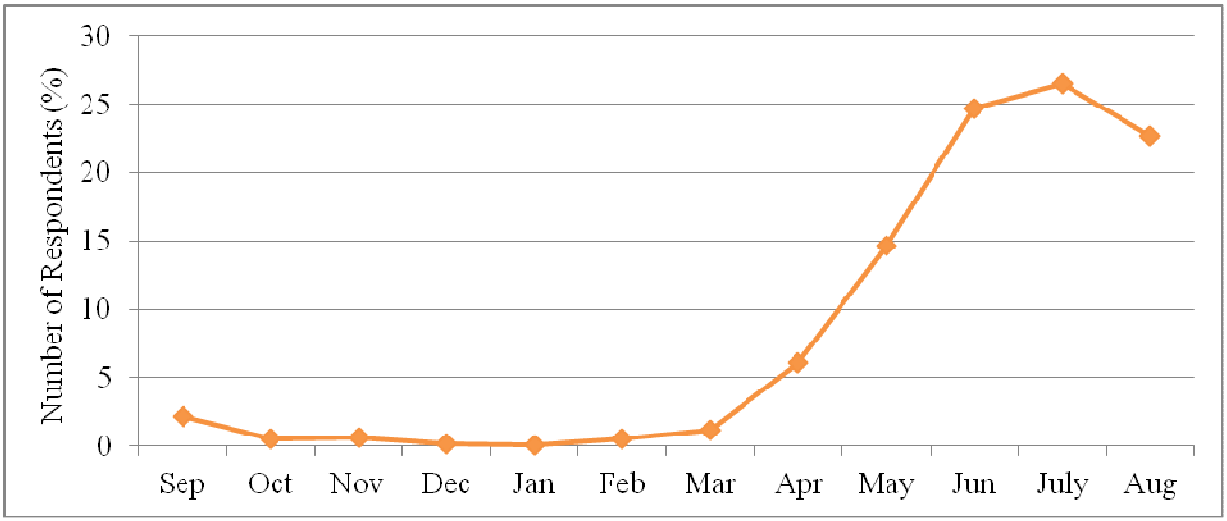

Figure 1: Months of supplementary feed availability and shortage in Jimma and Ilu Aba Bora zones

Frequency of feeding and feeding practices

Most of the respondents (55%) supplement feed twice a day but 33% and 12% supplement once and three times a day respectively (Table 5). Similarly, Messert (2010) reported 48.3% of respondents offer twice a day (morning and afternoon) in Gomma worda, Jimma zone. About 89.2% of the respondents as they provide supplementary feed directly on the floor. The remaining 10.8% of the respondents use both feeding trough and on floor. Wondu *et al.* (2013) reported as more than half (58%) of the respondents in North Gonder supply feed to chickens on the ground and the rest (42%) use different old household utensils.

Table 5 : Frequency of feeding and feeding practices

Variables	Agro-ecological Zone			Overall Mean
	Highland (n=80)	Midland (n=80)	Lowland (n=80)	
Frequency of Feeding (%)				
Once/day	33.8	33.8	31.3	33
Twice/day	52.5	51.2	61.2	55
Three times/day	13.7	15	7.5	12
Feeding practices (%)				
Feed trough	11.2	8.8	12.5	10.8
Feed trough and on floor	88.8	91..2	87.5	89.2

Source of water

Smallholder farmers in the study districts used different water sources for chickens *i,e* tap water (17%), river (56%),Spring(14%) and Hand dug well (13%)(Figure 2). Majority of the respondents (82.5%) were used plastic water troughs. The rest 7.1% and 10.4% clay pot and wood made materials. About 77.8% and 22.2% of the respondents were provided water for chickens ad libtum and once a day (Table 6)

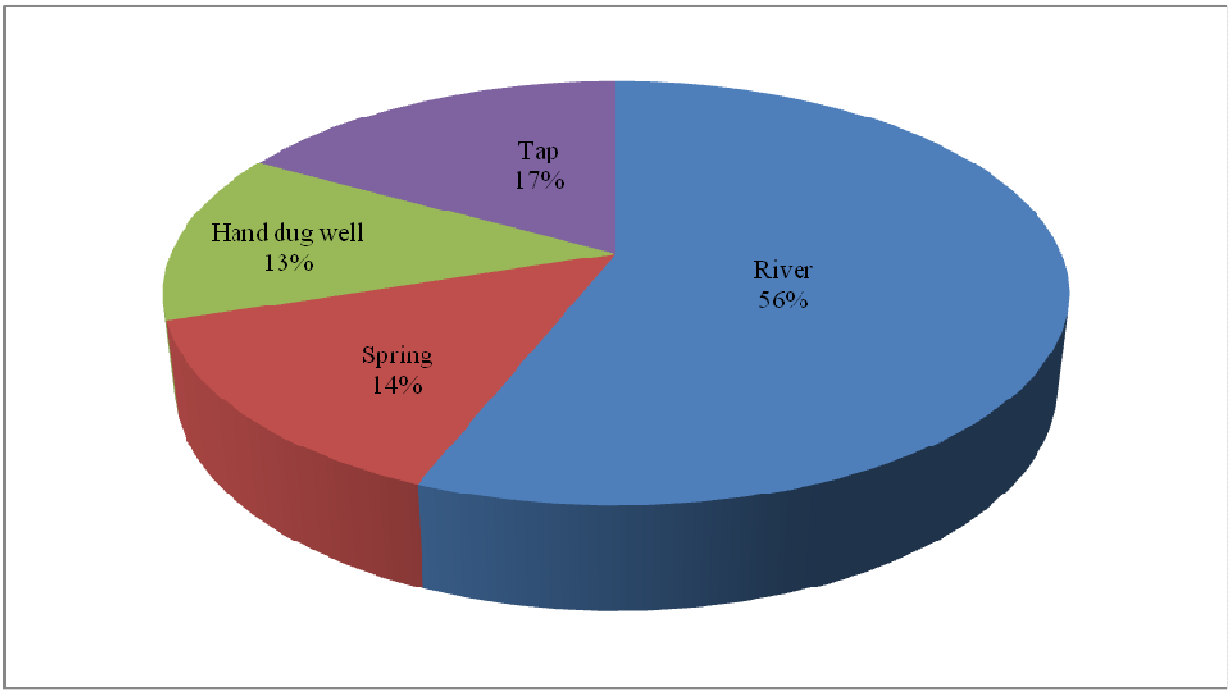

Figure 2: Jimma and Ilu Aba Bora Zones chicken water sources

Table 6 : Type of water trough and frequency of watering

Variables	Agro-ecological Zone			Overall Mean
	Highland (n=80)	Midland (n=80)	Lowland (n=80)	
Type of water trough (%)				
Clay	6.25	3.75	11.25	7.1
Plastic material	87.5	81.25	78.75	82.5
Wood made	6.25	15	10	10.4
Frequency of watering (%)				
Once/day	17.75	26.25	22.5	22.2
Ad libitum	82.25	73.75	77.5	77.8

Housing

About 74 % of the respondents did not have separate house for their chicken but provide overnight shelter in different places like in the living house (24.6%), kitchen (29.1%), veranda (15.4%) and animal barn (5%). About 26% of the respondents were constructed separate shelter from different materials such as wood and grass (19.6%), corrugated iron sheet and wood made house (1.7) and bamboo cage (4.6%). Farmers were not constructed chicken house due to lack of attention (27%), presence of small flocks (26.3%), lack of knowledge (10.4%), risk of predators (11.7%), lack of construction materials (20.8) and Risk of theft (3.8%). Similarly, Fisshea *et al.*(2010) reported the reasons for not contracting a separate house for chickens indicated that small flock size per households (34.6%), lack of construction material(25%), lack of knowledge (19.6%), risk of predators (12.1%) and shortage of labour and time (5.4%) in Bure district in North West Ethiopia.

Table 7 : Chickens housing condition and reasons for not providing separate house

Variables	Agro-ecological Zone			Overall Mean
	Highland (n=80)	Midland (n=80)	Lowland (n=80)	
Chicken night shelter (%)				
Perches in the house	23.75	25	25	24.6
Perch in the kitchen	28.75	28.75	30	29.1
Perches on the veranda	10	20	16.25	15.4
Perches in Cattle yard	10	3.75	1.25	5
Wooden made with grass roof	23.75	20	15	19.6
Wood made with corrugated iron sheet	-	2.5	2.5	1.7
Bamboo cage	3.75	-	10	4.6
Reasons of didn't separate shelter (%)				
Lack of Knowledge (Awareness)	10	7.5	13.75	10.4
Lack of construction Materials(Cost)	20	25	17.5	20.8
Risk of predators	8.75	12.5	13.75	11.7
Risk of theft	2.5	5	3.75	3.8
Lack of attention	32.5	20	28.75	27
Presence of only small flock size	26.25	30	22.5	26.3

Chicken culling practices

About 53% of farmers cull their chickens as a result of low production. The rest 29.6% at old age, 6.6% unwanted plumage color and 10% disease outbreak (Table 8). About 73.7% and 26.3% of the respondents soled culled chickens for income sources and home consumption respectively (Table 8). Embet *et al*. (2013) reported farmers cull their chicken for home consumption and sale (72.3%), sale (16.9%), home consumption (9.1%) and religious sacrifices (1.7%) in south west and southern part of Ethiopia.

Table 8: Chicken culling practices

Variables	Agro-ecological Zone			Overall Mean
	Highland (n=80)	Midland (n=80)	Lowland (n=80)	
Reasons of culling (%)				
Old age	33.75	30	25	29.6
Low production	52.5	48.75	60	53.8
Plumage	3.75	7.5	8.75	6.6
Disease	10	13.75	6.25	10
Purpose of culling (%)				
Sale	75	73.75	72.5	73.7
Consumption	25	26.25	27.5	26.3

Productivity and reproductive performance of local chicken

The overall average age at first mating for cockerel and pullet were reported 6.02 and 6.15 months respectively (Table 9). Average age of hen at first egg laid was 6.74 months. Similarly, different scholars reported the same result Nebiyu *et al* (2013), Kibreab *et al.* (2016) and Melkamu *et al*. (2013) the average age at first egg laying was 6.5 months, Meseret (2010) 6.33 months and Fisshea *et al*. (2010) 6.9 months. The average number of single clutch per hen was 3.4 weeks and observed significantly different (P<0.05) over the agro ecologies. The number of clutches was 3.64 times per hen per year. This result was comparable with Mekonnen (2007) who reported that the average number of clutches per year was 3.7 times per year. The average numbers of egg production per clutch in this study was 13.19 and significantly different (P<0.05). Higher number of egg production produced in the lowland area (13.9). The number of eggs set to a broody hen for incubation was 11.61 and significantly different (P<0.05) among agro-ecologies. The average percent of hatchability was (87.93%) which was higher than Melkamu *et al.* (2013) 76%, Fissha *et al*. (2014) 81.6 %, Nebiyu *et al*.(2013) 83.7 % and Tadel *et al*.(2003) 68.9 % hatchability reported. The average survival rate of chick up to 8 weeks age was 47.7% (Table 9). This result was higher than Mesert (2010) reported 41.5% and lower than Taddle *et al.* (2003) and Fissha (2014) reported 51.6 % and 61.35 % respectively survival of chick up to eight weeks.

Table 9: Production and reproductive performance of local chickens (Mean±S.E)

Variables	Agro-ecological zones			Overall Mean
	Highland (N=80)	Midland (N=80)	Lowland (N=80)	
Age of cockerels at 1st mating (M)	6.09±0.74	6.00±0.07	5.98±0.81	6.02±0.04
Age of pullets at 1st mating (M)	6.19±0.08	6.18±0.66	6.10±0.08	6.15±0.05
Age of hen at 1st lay(month)	6.70±0.09	6.80±0.08	6.10±0.93	6.74±0.05
Number of clutches/ year/hen	3.62±0.09	3.58±0.07	3.70±0.07	3.64±0.05
Length of single clutches (weeks)	3.18±0.90[a]	3.55±0.79[ab]	3.49±0.97[b]	3.40±0.05
Number of egg/clutch	12.58±0.27[a]	13.09±0.33 [a b]	13.90±0.29 [b]	13.19±0.19
Average number of egg incubated	11.02±0.26[a]	11.90±0.29[b]	10.91±0.18[a]	11.61±0.16
Hatchability (%)	79.31±1.53	78.81±1.49	78.68±1.76	78.93±0.92
Survivability (%)	48.92±1.69	47.20±1.89	47.44±1.84	47.85±1.04

Means with the same row with different superscripts letters are significantly different (P<0.05)

Incubation of Egg

Majority of the respondents (97.5%) incubate home laid eggs whereas 2.5% use purchased cross breed/ exotic breed eggs. About 73.8% of the farmers do not select egg for incubation. The remaining 10.8% reported as they select larger and unbroken and 15.4% select clean and unbroken eggs for incubation. More than half (51.7%) of the respondents incubate eggs two times per year, but 11.6%, 30% and 6.7% of respondents reported as they incubate once, three times and four times per year respectively (Table 10).

Preferred season of incubation of eggs

Most of the farmers prefer to incubate eggs from September up to April. During these months chicken feeds are available and reduced disease outbreak. Very few farmers incubate eggs in May, June, July and August (Figure 3). Similarly Mokonnen (2007) reported 89.4 % of the respondents used to incubate and brood their hen during the dry seasons.

Table 10: Source of egg, selection criteria and frequency of egg incubation

Variables	Agro-ecological zones			Overall Mean
	Highland (N=80)	Midland (N=80)	Lowland (N=80)	
Incubated egg sources (%)				
House	98.75	97.5	96.25	97.5
Market and House	1.25	2.5	3.75	2.5
Incubated egg selection (%)				
Larger and unbroken	13.75	7.5	11.25	10.8
Larger, clean and unbroken	8.75	13.75	23.75	15.4
No select	77.5	78.75	65	73.8
Frequency of egg incubated/year				
Once	15	13.75	6.25	11.6
Twice	55	46.25	53.75	51.7
Three	23.75	32.5	33.75	30
Four	6.25	7.5	6.25	6.7

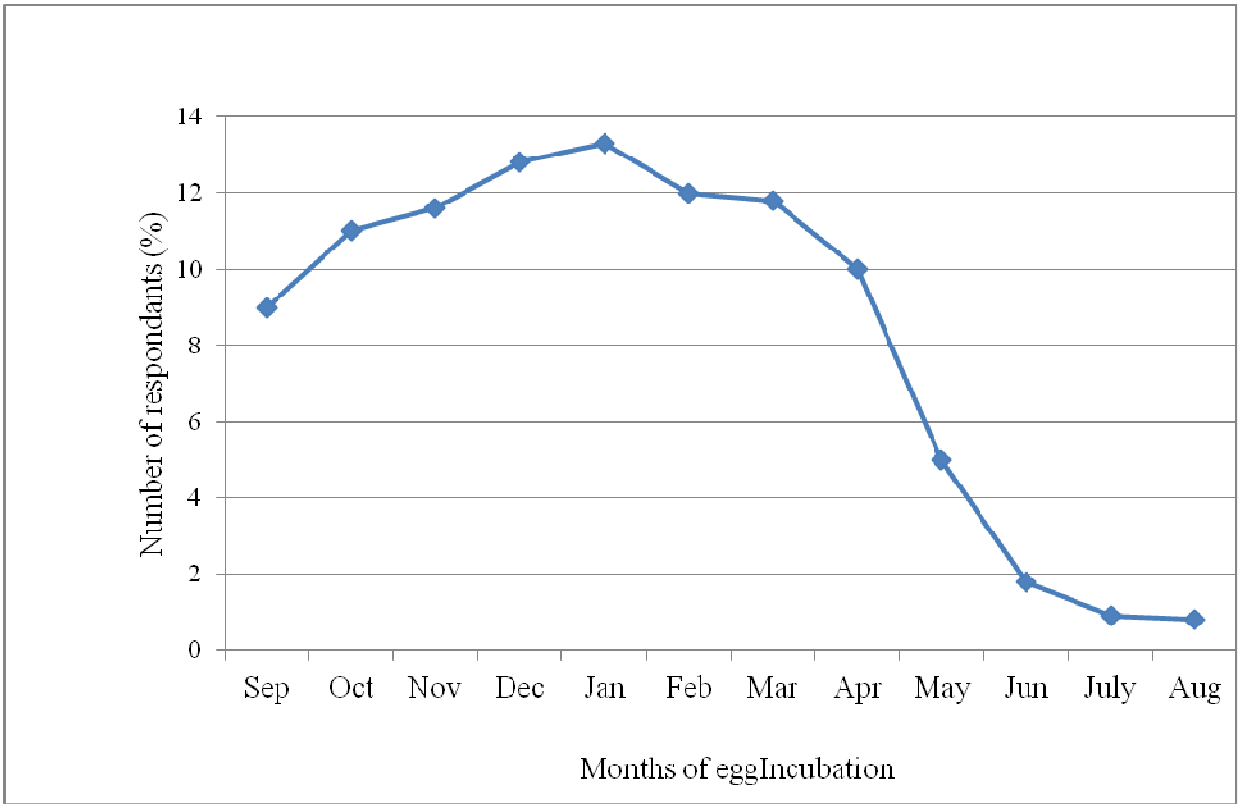

Figure 3: Jimma and Ilu Aba Bora zones preferred months of egg incubation

Broody hen management

All respondents witnessed the use of broody hen for egg hatching. More than half of the respondents (62.9%) used wooden made container for broody hen egg incubation. About 10.8%, 20%, 3.8% and 2.5% farmers reported as they use mud, clay, plastic container and carton for incubation respectively (Table 11). Majority of the respondents (88.7%) used teff straw as bedding material. In this study farmers were practice different methods to avoid the broadness behavior of hen. These includes hanging hen upside-down (16.4%), disturbing (6.5%), taking to another place (33.2%), taking away brooding nest (23.9%) and tying separately (20%).

Table 11: Broody hen management, egg incubation and bedding materials

Variables	Agro-ecological zones			Overall Mean
	Highland (N=80)	Midland (N=80)	Lowland (N=80)	
Material used to Incubate (%)				
Wooden container	57.5	61.25	70	62.9
Mud	16.25	10	6.25	10.8
Clay	21.25	26.25	12.5	20
Plastic	1.25	2.5	7.5	3.8
Carton	3.75	-	3.75	2.5
Bedding materials (%)				
Teff straw	96.25	92.5	77.5	88.7
Grass	3.75	7.5	18.75	10
Rice straw	-	-	3.75	1.3
Avoided broodiness (%)	-			
Hanging hen upside-down	17.9	15.3	16	16.4
disturbing	2.5	6.2	10.6	6.5
Taking to another place	39	31.6	29	33.2
Taking away brooding nest	21.3	25.4	25.1	23.9
Tying separately	19.3	21.5	19.3	20

Brooding hen selection criteria

Most of the respondents (63.3%) farmers were selected larger body size egg laying hens while 18.8% and 17.9% of the respondents were previous egg lying performance and attractive plumages colors (Table 12). Broody hen selection more than half of the farmers (64.6%) select larger body size, others select based on previous hatching ability (19.6%), defensive behavior (8.8) and attractive plumage colors (7) of the broody hen. Mokonnen (2007) reported broody hen selected based on previous performance of the hen (50.7%), body size (32.2%) and ample plumage (17.1%). Fisshea *et al.* (2010) also reported, the hen's past egg incubation performance (73.9%), large body size (7.9%), presence of thick feathers (2.1%), and size of eggs laid (2.5%) in Bure district.Farmers also select best breeding cock based on larger body size (40.4%), double comb (24.1%), attractive colors (28.9) and young age cocks (6.6%). Fesshea *et al*. (2010) reported farmers selected cock based on Plumage color (45.4%), physical stand and shank length (37.1%), type of comb (8.6%) and parent's performance or pedigree (1.1%).

Table 12: Selection of laying hen, broody hen and cock in the study area

Variables	Agro-ecological zones			Overall Mean
	Highland (n=80)	Midland (n=80)	Lowland (n=80)	
Laying Hen (%)				
Larger body size	61.2	62.5	66.2	63.3
Previous performance	21.3	16.3	18.8	18.8
Attractive color	17.5	21.2	15	17.9
Cock (%)				
Large body size	38.8	40	42.5	40.4
Double comb	25	27.5	20	24.1
Attractive color	26.2	30	30	28.9
Young Age	10	2.5	7.5	6.6
Broody hen (%)				
Larger body size	51.2	67.5	75	64.6
Hatching ability	27.5	16.3	15	19.6
Defensive Behavior	11.3	11.2	3.8	8.8
Attractive color	10	5	6.2	7

Plumage color preferences

Farmers in the study areas preferred different plumage color, comb and shank types. Farmer's first preferences were red (key) Cocks, and mixed color hens followed by Gebsma Cock and red color Hen (Figure 4). Very few farmers were selected black color cock and hens protected from predators.

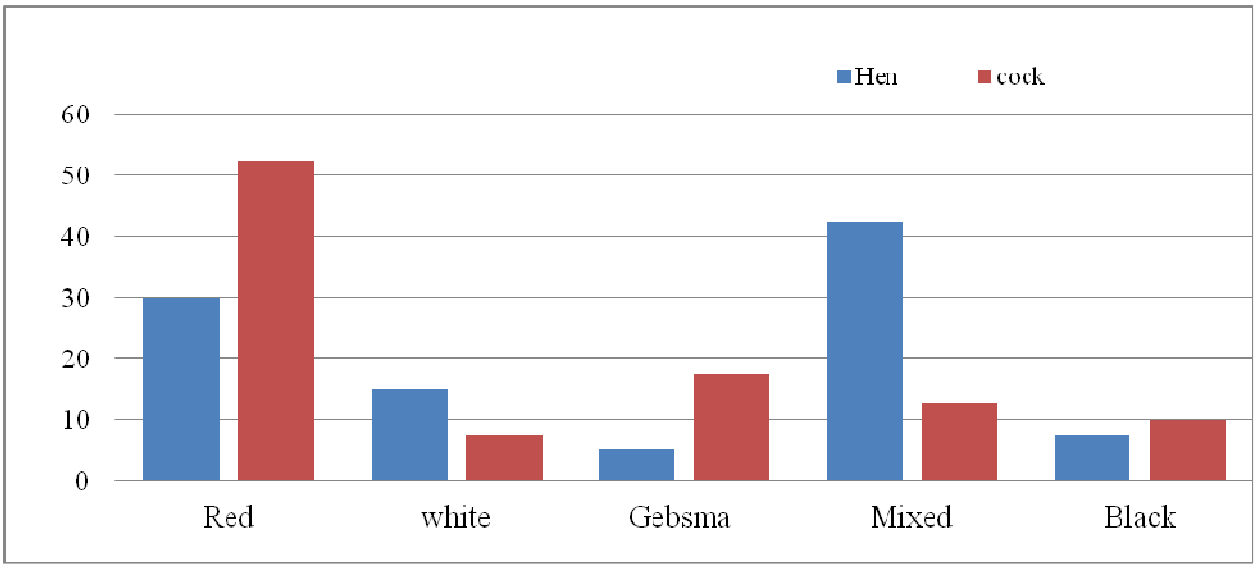

Figure 4: Jimma and Ilu Aba Bora zones Farmers Plumage Color preferences

Comb type and Shank color preference

Almost all of the farmers (96.2%) were selected double comp type Cocks. About 42.5%, 11.7% and 13.3% were preferred yellow, white and black/grey shank color respectively .The remaining 32.5% of the respondents do not prefer shank color (Figure 5).

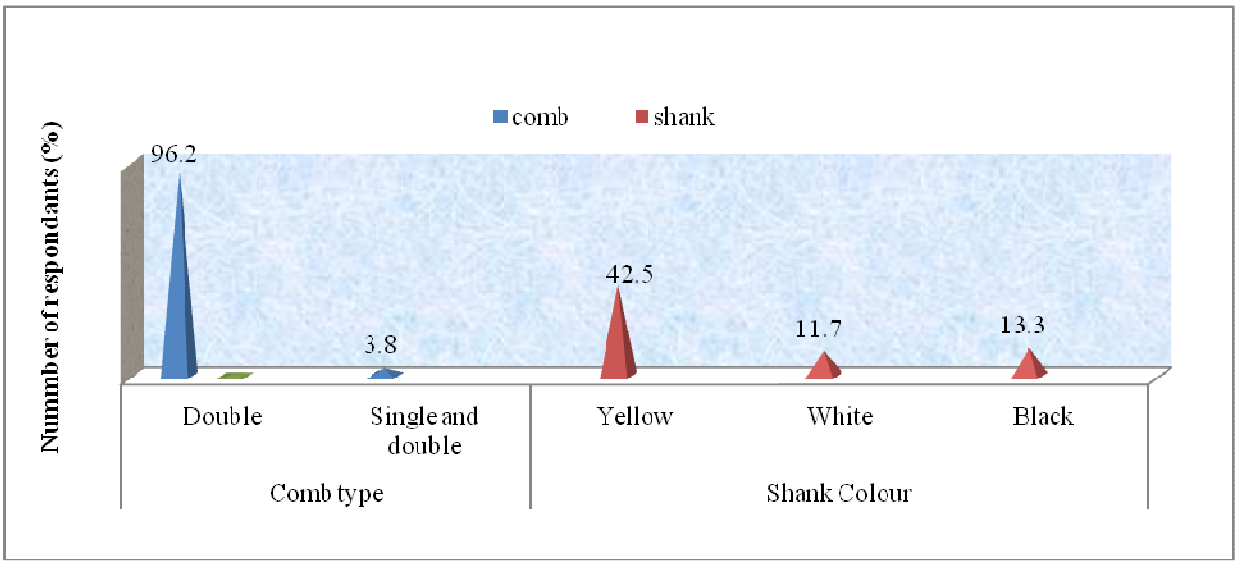

Figure 5: Jimma and Ilu Aba Bora zones Comb Type and Shank Color Preference

Reasons of comb type and plumage color preferences

Majority of the farmers 76.2% and 72.9% preferences of plumage colors and comb types were based on both aesthetic and high market value (Figure6). While 8.8% and 12.5 % of farmers were selected plumage color and comb type related to high market prices. Only 15 % and 14.6% of the farmers were prefers plumage color and Comb type attractiveness (Aesthetic Value).

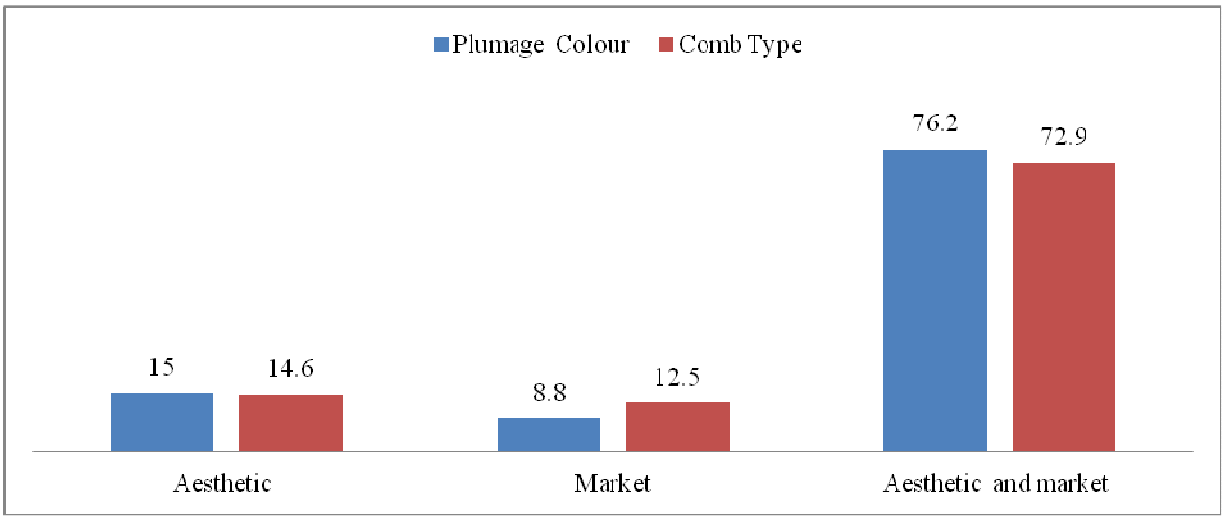

Figure 6: Reasons of comb type and plumage color preferences.

Disease

All of the respondents in the study areas did not identify the specific name of the disease but reported clinical signs of the diseases such as sneezing, diarrhea(watery, yellow and green), discharge from mouth and nose, raffled feather, depressed, closing of eyes, twisting of head and neck, paralysis, sudden death, decrease in egg production and loss of appetite. About 89.5% of the farmers reported high incidence of diseases in wet season (May, June, July and August).This result agree with Hunduma *et al*. (2010) the occurrence of diseases is seasonal where the highest chicken death rate was observed during the rainy season (June to August) (80%) in Rift Vally of Oromia, Ethiopia. Majority 91.7% of the farmers reported as they treat their sick chickens by traditional home made medicine. These local treatments were mainly the combinations two or more of the locally available materials such as pepper, garlic, onion, lemon, oil, ginger, papaya, ash, boiled coffee residue, endode (*Phytolaca dodecaudra*), grawa (*vernonea omygdalan*), feto (*lepidium sativum*), Bsana (*Croton macrostachyus*). Only 1.3% of the respondent use modern medicine brought from the market. The rest of respondents (7%) do not treat sick chickens.

Table 13: Season of disease occurrence, affected age group and treatments

Variables	Agro-ecological zone			Overall mean
	Highland (n=80)	Midland (n=80)	Lowland (n=80)	
Occurrence /season of disease (%)				
Wet	91.25	88.75	86.15	88.7
Dry	1.25	10	8.8	6.7
Wet and dry	7.5	1.25	5.05	4.6
Age of birds mostly affected (%)				
adult, grower and chick	76.45	68.75	67.5	70.9
Chicks	6.7	12.5	12.5	10.6
Layer	16.85	18.75	20	18.5
Treatments (%)				
local	83.75	97.5	93.75	91.7
modern	1.25	-	2.5	1.3
No treatments	15	2.5	3.75	7

Predators

Predators also causes chicken loses in the study areas. Farmers were reported different predators: black kite (29.2%). mongoose (28.8%), wild cat (20%), dog (7%), Cat (9.2%), Baboon (3.8%) and Fox(2%) (Table 14).Black kits (locally known as Chilfit) were eaten chicks and mostly existed at dry season. Mongoose, wild cat, dog and baboon were attack all chicken age group throughout the year. Similarly, Fisshea *et al*. (2010) who reported Wild birds (*chilfit)* were the most dangerous type of predators (59.3%) affecting village birds and attack young chicks, Mongoose (36.8%) and wild cats (3.9%). Hunduma *et al* (2010) reported Predators such as birds of prey (locally known as "Culullee") (34%), cats and dogs (16.3%) and wild animals (15%) were the major causes of village poultry in rift valley of Oromia, Ethiopia.

Table 14 : Chicken predators in the study areas

Variables	Agro-ecological zone			Overall Mean
	Highland (N=80)	Midland (N=80)	Lowland (N=80)	
Black kite	31.25	27.5	28.75	29.2
Mongoose	26.25	30	30	28.8
Wildcat	17.5	25	17.5	20
Dog	7.5	7.5	6.25	7
Cat	12.5	5	10	9.2
Baboon	2.5	3.75	5	3.8
Fox	2.5	1.25	2.5	2

Major Constraints in chicken production

Farmers in the study areas reported different constraints that affect the village chicken production. These were disease (35.8%), lack of veterinary services (17.9%), predators (18.8%), feed shortage (11.7%), lack of proper house (8.8%) and unstable prices (7%). Fisshea *et al.* (2010) reported the major challenges in village chicken production and marketing are disease problem mainly new castle disease and lack of proper health care (46.2%), predation (25.7%), poor production of local chicken (3.5%), poor management practices (feeding, housing, diseases control) (12.7%) and lack of capital, lack of technical support, marketing and theft problems (1.7%) in Bure district. Bonsenu and Takelel (2014) reported disease (52.67%), Predators (25.83%), Economic problem (11.67%) and marketing (9.835%) in Haramya district.

Conclusions and Recommendations

Chicken reared by smallholder farmers under scavenging system with supplemented cereal crops (grain) and kitchen leftovers. Feeding and housing system were under poor management conditions. Disease and Predators were found the major causes for chicken flocks loss in this study area. Therefore, improvement should be need to design veterinary services, chicken management (feeding and housing) and identification and conservation of the best ecotype in the area. Finally, evaluation, demonstration and promotion of exotic chicken breeds that can fit the local feeding and management condition will be necessary.

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