

# Characterisation of Village Chicken Production and External Egg Qualities Analysis in Doyogana District, Southern Ethiopia

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## LIST OF ABBREVIATION

CSA	Central Statistical Authority
EARO	Ethiopian Agricultural Research Organization
FAO	Food and Agriculture Organization of the United
GDP	Gross domestic product
ha	Hectare
masal	meter above sea level
PA	Peasant Association
SE	Standard Error
SPSS	Statistical Package for Social Sciences

## ABSTRACT

Poultry production has an important economic, social and cultural benefit and plays a significant role in family nutrition in the developing countries. This study was conducted in Doyogana woreda of Kembata Tambaro Zone, Southern Ethiopia. To conduct this study 4 Kebeles namely Serera, Amecho, Murassa and wagebeta were selected from Doyogana woreda. Three Peasant Associations (PAs) from each kebele which have been participating in poultry production at least in the last one and/or more years were selected purposively based on the extent and intensity of improved chicken distribution and finally interviewed household were randomly selected. A total of 80 eggs (60 eggs from Indigenous chicken and 20 eggs from improved chicken) were purchased from the local markets and transported to Debrezeit Alema poultry laboratory. The age group between 16 and 45 years accounted the largest portion of family (32.4%), followed by the age group between 10 and 15 years (24%). The data revealed that about 13.2% of the farmers had not attended any formal education and were categorized as illiterates. According to the current study the flocks were dominated by young chicks (32.5%). The current data reveal that sale of live chicken for cash income is the first important function of rearing chicken in doyogana (77.8%). The current study revealed that the average age at

first lay for village chicken ranges between (5.6months and 6months). The mean egg weight for the local chicken in the study area was 37.44 g. The major causes of chicken losses in the study area were predation by hawks, fox and wild cats (61.87%), disease (35.63%) and thieves (2.5%). Rural women accomplished 45.67 to 74.83% of farm activities, except chicken shelter construction which was mainly (54.4%) done by rural men. The average mean egg weight measure of local chicken showed significantly ( $p>0.05$ ) lower value than the exotic chicken.

## I. INTRODUCTION

Poultry production has an important economic, social and cultural benefit and plays a significant role in family nutrition in the developing countries. The proportional contribution of poultry to the total animal protein production of the world by the year 2020 is believed to increase to 40%, the major increase being in the developing world (Delgado *et al.*, 1999). It has been estimated that 80% of the poultry population in Africa is found in traditional scavenging systems (Gueye, 2000). In most tropical countries it is based mainly on scavenging production systems, which makes substantial contributions to household food security throughout the developing world (Muchadeyi *et al.*, 2007). Indigenous breeds still contribute meaningfully to poultry meat and egg production and consumption in developing countries, where they make up to 90% of the total poultry population. Village poultry production based mainly on a scavenging system is of enormous socio-economic significance, in terms of contribution to family nutrition and household food security throughout the developing world (Muchadeyi *et al.*, 2007).

The poultry sector in Ethiopia can be characterized into three major production systems, namely the large-scale commercial, the small scale commercial and the village or backyard poultry production system. Each can sustainably coexist and contribute to solve the socio-economic problems of

different target societies (Tadelle *et al.*, 2003). The local chicken sector constitutes a significant contribution to human livelihood by being affordable sources of animal protein and contributes significantly to food security of poor households. Despite its importance, village chicken production system in Ethiopia is generally characterized by poor performance of local chicken in terms of egg production, small egg size, slow growth rate, late maturity, an instinctive inclination to broodiness and high mortality of chicks ( Aberra, 2000). On the other hand, local chickens are known for their ability to resist disease, thermo-tolerance, good egg and meat flavor, hard eggshells, high fertility and hatchability (Aberra, 2000). Alemu *et al.* (2006) suggested that marketing problem is one of the constraints for the adoption of poultry technology and poultry products.

Generally, in order for decision-makers to address the poultry related challenges in production and marketing and to improve the livelihoods and food security of rural households by enhancing the benefits from poultry through appropriate production and marketing extension, it is essential to conduct a research that could generate appropriate technology, which is socially acceptable, environmentally sound and economically feasible. Characterization of the prevailing production and marketing system is thus an obvious prime prerequisite to bring this into an effect. This study will be undertaken to characterize the village poultry production system and egg quality analysis. In the selected area there are different kinds of problem facing regarding poultry production and management, among them feed shortage and feeding system, lack of adequate health, traditional management system (housing, feeding, watering...etc), marketing and a lot of other problem is available. To solve this problem and to give fruitful solution it has to be clearly identifying all problems in a scientific way. So hoping that the findings of this study will be sound enough in addressing the problems of poultry production in Doyogana woreda and it provides a base line data to complement the decision making process ultimately to improve future production system and extension interventions. With this in mind, this research will be conducted with the following objectives.

## II. OBJECTIVE

- ✚ To assess the performance and socio economic characteristics of chicken in the study area
- ✚ To know the external egg quality of chicken in the study area

- ✚ To identify the major constraints and possible opportunities in the system

## III. MATERIAL AND METHOD

### 3.1.1. Description of the Study Area

This study was conducted in Doyogana woreda of Kembata Tambaro Zone, Southern Ethiopia. The woreda is located 171 km in south west of Hawassa, the capital city of the region of SNNP and 258 km south of Addis Ababa.

The altitude study area is 1900-2800 meter above sea level with the agro- ecological condition of mid altitude (30%) and highland (70%). The average temperature ranges from 9 -16<sup>0c</sup>, and the rain fall ranges from 1200 mm to 1600 mm.

### 3.2. Sampling procedure and data collection

To conduct this study 4 Kebeles namely Serera, Amecho, Murassa and wagebeta were selected from Doyogana woreda. The data was collected by using structured questionnaire, field visit and interview from selected kebeles purposively. The kebeles will be chosen based on potential of chicken. Total of 320 household heads (80 from each kebeles) were randomly selected and interview were done by 8 enumerators.

Three Peasant Associations (PAs) from each kebele which have been participating in poultry production at least in the last one and/or more years were selected purposively based on the extent and intensity of improved chicken distribution and finally interviewed house hold were randomly selected.

The questionnaire gathered background information of the farmer which included demographic details such as gender, age and level of education. Data on management practices such as flock structure, feeding, housing, health and breeding management practices was collected. Egg production, handling, incubation and marketing channels were documented.

### 3.2.1. External egg quality

A total of 80 eggs (60 eggs from Indigenous chicken and 20 eggs from improved chicken) were purchased from the local markets and transported to Debrezeit Alema poultry laboratory.

External egg quality characteristics were analyzed according to Tabeekh (2011) included;

- a) Egg weight (g), measured using an analytical balance with 0.01g readability
- b) Egg Length and width (mm), measured using a Vanier caliper to 0.1mm
- c) Shape index, estimated using the equation,  $\text{Shape index \%} = (\text{egg width} / \text{egg length}) \times 100$

- d) Shell weight (g), measured using an analytical balance (0.01g)
- e) Shell thickness (mm), measured at three different points of the broad end, narrow end and in the middle part of the egg using a micrometer screw gauge (0.01mm). The average shell thickness was then recorded in mm
- f) Shell ratio estimated from the expression, Shell ratio (%) = (shell weight/ egg weight) x 100

**3.3. Data management and analysis**

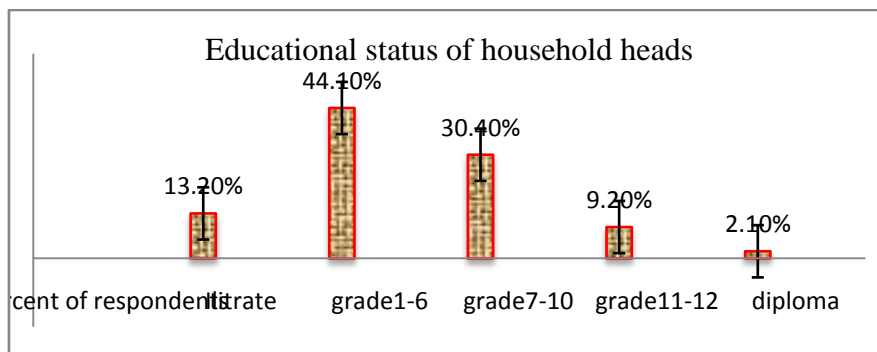
Survey data were coded in Statistical Package for Social Sciences (SPSS, version 16). Descriptive statistics were used to evaluate collected data on the production, marketing practices and external egg qualities of indigenous chicken egg production

system. The mean separation will be made using dunkan test.

**IV. RESULTS**

**4.1. Socio-economic characteristic of the study area households**

Figure 1 shows the educational status of the respondents in the present study. The data revealed that about 13.2% of the farmers in the study area had not attended any formal education, whereas, the other 44%, 30% and 9% of the farmers attended elementary level education (grade 1-6), junior and secondary school education (grade 7-10), and high school education, respectively (Figure 1).



**Figure 1.** Educational status of household heads

**4.2. Flock size and dynamics**

The average chicken flock size per household and flock structure in the studied households is presented in Table 1 (N=320). According to the

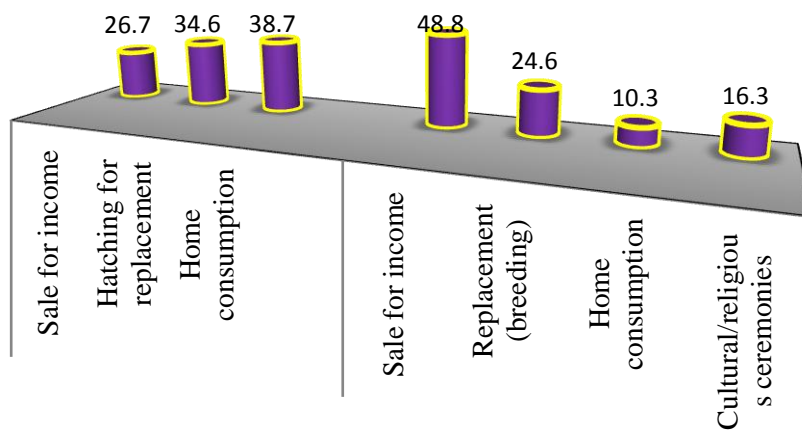
current study the flocks were dominated by young chicks (32.5%), which were followed by hens (28.2%), pullets (15.3%), cocks (13.5%), and cockerels (10.5%), respectively (Table 1).

**Table 1** chicken flock sizes per household and flock structure in the studied

Class of birds	Serera Kebele		Amecho Kebele		Murassa Kebele		Wagebeta Kebele		Overall	
	Mean ±SE	%	Mean ± SE	%	Mean ± SE	%	Mean ± SE	%	Mean	%
Cocks	1.1 ± 0.3	13.3	1.3±0.04	14.6	1.3 ±0.5	15.3	0.9 ±0.0	10.7	1.2	13.5
Hens	2.2±0.8	26.5	2.3±0.05	25.8	2.4±0.3	28.2	2.7±0.7	32.2	2.4	28.2
Pullets	1.4±0.2	16.9	1.2±0.05	13.5	1.2±0.1	14.2	1.4±0.2	16.7	1.3	15.3
Cockerels	0.8±0.1	9.6	0.9±0.05	10.1	1.1±0.2	12.9	0.8±0.5	9.5	0.9	10.5
Chicks	2.8±0.9	33.7	3.2±0.28	36.0	2.5±0.7	29.4	2.6±0.4	30.9	2.8	32.5
<b>Overall</b>	<b>8.3</b>		<b>8.9</b>		<b>8.5</b>		<b>8.4</b>		<b>8.53</b>	

Figure 2 shows the major purposes of chicken rearing and egg production of respondents in the present study. The current data reveal that sale of live chicken for cash income is the first important function of rearing chicken in doyogana (77.8%)

districts while, the main purpose of egg production in doyadana district was for home consumption (38.7%) followed by hatching for replacement (34.6%). However, the function of income generation is rated as low in the current study



**Fig2** Purposes of chicken rearing and egg production in Doyogana district

### 4.3 Egg weight and hatchability age

Productive and reproductive performance of local chicken is indicated in Table 2. The current study revealed that the average age at first lay for village chicken ranges between (170 to 180 days) with average age at first lay of 175.5 days or with average age at first lay of 5.85months (Table 2).

The average weight at first lay in the present study was 0.92 kg and it varied from 0.87kg to 1kg for the

minimum and maximum respectively. The mean egg weight for the local chicken in the study area was 37.44 g. In the current study the average egg weight varied from kebele to kebele (31-46gms). In all the districts studied, hatchability was above 81%, being highest at 83% in kebele A. Most hens produced 2.97 clutches of eggs per year.

**Table 2.** Production performance of local chicken in Doyogena district

In the current study farmers are requested to rank their perception on the causes of chicken loss and severity of

Production parameters	Serera Kebele	Amecho Kebele	Murassa Kebele	Wagebeta Kebele	Average
	Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE	
Age at first laying (days)	180 ±06	174±0.78	170±40	178±27	175.5
Weight at first lay (kg), n=40	0.9±0.02	0.9±0.02	0.87±0.02	1±0.02	0.92
Hatchability performance (%)	83 ±9	79±2	82±5	80±11	81
Number of egg/clutch	10.05 ± 0.15	9.3± 0.15	10.2± 0.15	10.82±0.13	10.09
Number of total clutches/year	3.08 ± 0.07	-	3.10±0.01	2.71±0.29	2.97
Total egg/hen/year	45±0.7	34±0.6	38±0.4	40±0.9	39.25
No of eggs incubated	12±0.7	10±0.7	10±0.7	13±0.7	11.25
No of eggs hatched	10.8±0.9	11.2±0.8	9.75±0.9	10.5±0.7	10.56

disease. And farmers indicated that the major causes of losses in the study area were predation by hawks, fox and wild cats (61.87%), disease (35.63%) and thieves (2.5%) (Table 3). Among the classes of chickens, chicks and growers were severely attacked by predators during both dry and rainy seasons. According to the respondents diseases accounted for about (35.63%) of the death of chickens in which

Newcastle disease played the major cause of death. The data revealed that the severity of the disease was higher during rainy season (75.4%) than during dry season (Table 4). The measures taken by farmers when sick birds were observed in the flock was medication (54.37%), selling (42.5%) and isolation of birds (3.13%). Dead birds were disposed through pet animals (69.06%) and burying (30.94%).

**Table 3.** Poultry health and predation in the research area (N=320)

Variable	Number of household	Percentage	Rank
<b>Causes of loss</b>			
Predation	198	61.87	1 <sup>st</sup>
Disease	114	35.63	2 <sup>nd</sup>
Thieves	8	2.5	3 <sup>rd</sup>
<b>Season of disease severity</b>			
Rainy season	246	76.87	1 <sup>st</sup>
Dry season	74	23.13	2 <sup>nd</sup>
<b>Dead birds disposal</b>			
Given to pet animals	221	69.06	1 <sup>st</sup>
Burying	99	30.94	2 <sup>nd</sup>
<b>Measures against diseases</b>			
Medication	174	54.37	1 <sup>st</sup>
Selling	136	42.5	2 <sup>nd</sup>
Isolation	10	3.13	3 <sup>rd</sup>

All members of the family in a household participate in chicken production and management practice in one way or another. Table 4 shows family labor allocation and utilization in chicken husbandry and marketing. Feeding, watering, cleaning, house construction, treating sick chicken, and buying and selling live chicken are common

activities in poultry farms. This study described that such activities were accomplished by family members including the mother, father and children or jointly with husband, wife and others (Table 4).

Rural women accomplished 45.67 to 74.83% of farm activities, except chicken shelter construction which was mainly (54.4%) done by rural men.

**Table 4.** Family labor allocation for village chicken husbandry in Doyogana district, Ethiopia

Parameter (%)	Serera Kebele	Amecho Kebele	Murassa Kebele	Serera Kebele	Overall
<b>Sample size (N=320)</b>	80	80	80	80	
<b>Feeding the chicken (%)</b>					
Mother	70.3	79.9	76.5	72.6	74.83
Father	13.4	9.5	12.4	9.5	11.20
Children	9.1	6.4	7.2	13.8	9.12
Other	7.2	4.2	3.9	4.1	4.85
<b>Chicken shelter construction (%)</b>					
Mother	20.7	19.6	21.6	20.9	20.6
Father	53.6	48.7	58.5	56.7	54.4
Children	17.9	16.9	14.8	16.2	16.5
Other	7.8	14.8	5.1	6.2	8.5
<b>Buying chicken (%)</b>					
Mother	52.7	41.9	40.8	47.3	45.67
Father	33.5	39.7	37.9	38.2	37.33
Children	9.3	14.8	12.1	3.9	10.03

Other	4.5	3.6	9.2	10.6	6.97
<b>Selling chicken (%)</b>					
Mother	44.4	50.1	50.8	47.9	48.3
Father	25.6	27.2	25.1	30.6	27.12
Children	20.7	13.8	20.2	12.9	16.9
Other	9.3	8.9	3.9	8.6	7.68
<b>Treating sick chicken (%)</b>					
Mother	55.6	52.1	56.9	50.4	53.74
Father	27.3	29.6	20.3	27.1	26.08
Children	7.6	9.8	16.7	18.1	13.05
Other	9.5	8.5	6.1	4.4	7.13

Calculated phenotypic means with standard errors for different external and internal egg quality traits are presented in Table-5. The current study revealed that the average mean egg weight of indigenous chicken were 45.87 whereas, the egg weight for the exotic chicken were 62.5gram. The average mean

egg weight measure of local chicken showed significantly ( $p>0.05$ ) lower value than the exotic chicken. However the average mean egg length measure of local and exotic chicken wasn't statistically significant (Table 5).

Table 5 A comparative analyses of the external egg qualities of Indigenous and Exotic chicken

Traits under study	Indigenous chicken (n=60)	Exotic chicken eggs (n=20)	P-value
Egg weight (g)	45.87±0.013	62.5±0.014	0.001
Egg length (mm)	5.14±0.03	5.62±0.03	0.08
Egg width (mm)	4.15±0.03	4.64±0.02	0.05
Egg shape index (%)	80.74±0.45	82.56	0.07
Shell weight (g)	4.83±0.03	6.75±0.03	0.009
Shell %	10.53±0.20	10.3±0.08	0.09
Shell thickness (mm)	0.79±0.01	1.08±0.01	0.005

Egg shape index (%) = (egg width/ egg length) x 100, Shell ratio (%) = (shell weight/ egg weight) x 100

## V. DISCUSSION

### 5.1 Household characteristics and respondents profile

The current finding noted that more than half of the participants of the study area had junior level education Tadesse, F (2016). Education is one of the major tools to disseminate new technology in the agricultural sector, and the fact that the majority of the households can read and write could make it easier to introduce improved agricultural technologies. Hence, the high level of education in the study area could increase value on agricultural technology scaling up. This observation has consistency with Mulugeta, (2005), Tadesse, F (2016) who reported that low level of education of the households could have an influence on the use of agricultural technologies and their contribution in development.

### 5.2 Flock size and dynamics and Purpose of chicken rearing in the research area

The average flock size in this study was 8.53 chickens HH and this value was higher than the

average flock size of 6.23 chickens per household reported by Meseret Molla (2010). The current work has consistency with work reported by Nebiyu Yemane, et al. 2013.

Village chicken production is a viable and promising alternative source of income for rural households in developing countries (Oh 1990), however, its contribution to the household cash income is generally difficult to assess. Sale of live chicken for cash income is the first important function of rearing chicken in doyogana (77.8%) districts and this observation has similarity with the work of Moges et al. 2010 who reported sale of live chicken for cash income is the first important function of rearing chicken in Fogera (77.8%) and Dale (43.7%) districts.

### 5.3 Hatchability, production and reproduction performance of local chicken

The current study revealed that the average age at first lay for village chicken varies between (170 to 180 days) with average age at first lay of 175.5 days or with average age at first lay of

5.85 months. The current work revealed lower value as compared to value reported by Yemane, et al. 2013 and showed similarity with work reported by Moges et al. 2010.

The average hatchability percentage of eggs from local hens is 83, 79, and 82% in Serera Amecho, Muracha and Wagebeta Kebele respectively. This report has an agreement with the work of Moges et al. 2010 indigenous chicken production and marketing Ethiopia and cited by Aichi et al. (1998), hatchability of 83, 50–100 and 60–90% were reported for local chicken in Guinea (Mourad et al. 1997), United Republic of Tanzania (Minga et al. 1989) and Burkina Faso (Bourzat et al. 1990) respectively. The number of eggs set for natural incubation in Doyogena *woreda*/district is also in agreement with the 12 eggs reported by Yemane, et al. 2013 for village chicken production performance under scavenging system in Halaba district of southern Ethiopia.

#### 5.4 Chicken health and predation in the research area

Farmers are orally asked to answer on preference of chicken breed and the majority of respondents replied that rearing the local chicken is as their interest. This might be due to exotic breeds have no the characteristics of fleeing as well as making alarm sounds when they see predators. Due to this problem, they were easily picked up by predators. On the other hand even though the local breeds have less productivity in terms of egg and body weight; they can resist the diseases and have the ability to flee when they see predators (Yemane, et al. 2013). About 46% of the respondents in Southern Ethiopia reported that wild birds (eagle, hawk, etc.) are the most common predators during the dry season, while wild cat (locally known as Shelemetmat) is the most dangerous predator during the rainy season (Abera 2007). Most farmers ranked predators (hawks, foxes and wild cats) as the main constraint of poultry production in their area. In contrast to the present results, Moreki (2010) reported that mortality due to diseases as the main constraint to village chicken production. Among diseases, Newcastle disease (locally known as “Kimbisha”) was the most prevalent disease of local chicken in the area. Feed shortage, housing, marketing, financial problems and lack of veterinary services played also an important role in village chicken production (Yemane, et al. 2013).

According to Negussie 1999, New castle disease accounted for the largest proportion of overall flock mortality to be 57.3% followed by fowl pox, coccidiosis and predator loss (31.6%, 9.4% and 1.7%). Another study conducted in some

zones found in Southern Ethiopia by Aberra (2007) indicated that the major problems of poultry production in the study areas were Fowl cholera (28.8%), followed by New Castle Disease (26%), Coccidiosis (21.6%), Fowl influenza (Infectious Bronchitis) (15.4%), Fowl pox (3.4%), Fowl typhoid (3.4%) and Salmonella (1.4%).

#### 5.5 Division of household labour

The pattern of ownership differs to some extent according to sex and age of the owner; hence, the ownership of chickens shared among all gender categories. However, some studies showed that women have a more active interest in poultry ownership than men and children do. According to the survey made in Wolaita (Hoyle, 1992), senior men and senior women have the highest flock ownership accounting to 30% and 47%, respectively when compared to the other gender groups boys and girls.

The management of rural chicken in Africa is a family affair with construction of chicken house and major decisions making issues such as sale of chicken and eggs and consumption of poultry products under the control of the men. Whereas looking after chicken, controlling and utilizing the earnings from the sale of eggs and chicken belongs to women (Gueye, 2003). Similarly, Tadelle and Ogle (2001) indicated that in Ethiopia management of chickens was fully in the domain of women whereas decision making regarding control and access to resources varies considerably. Kitalyi (1998) showed that in Gambia, there was gender plurality in decision-making in village chickens production. The same source indicated that in the United Republic of Tanzania men dominated in both selling and buying chickens in village markets.

#### 5.6 Physical egg quality

The average mean egg weight of this study (45.87g) produced by indigenous chicken compares well to results found by Wambui et al. 2018 in Kenya indigenous chicken under free range system of production mean weight of 46.5g and Bobbo et al (2013) in Nigeria frizzle phenotype local chicken whose mean weight of 45.04g. The current results have shown that the egg weight was lower than the one reported by Isidahomen et al, 2013 which was 52.33g for normal and 52.9g for frizzled chicken; this may be due to different production systems.

As cited by Wambui et al. 2018 in west Kenya mean egg length obtained from indigenous chicken in the study was slightly higher (5.47mm) compared to that of frizzled chicken ecotype (5.05) reported in Nigeria (Bobbo et al, 2013). The value

however was lower than that of commercial chicken eggs (5.69mm). The egg width value obtained was higher than that found by (Bobbo et al 2013) (3.95cm). However, this work has an agreement with the work reported by Wambui et al. 2018 in west Kenya mean egg width of indigenous commercial chicken (4.05g and 4.4g) respectively.

## VI. CONCLUSION

The study was conducted in Kembata Tembaro zone Doyogana district located in southern Ethiopia. In the current study the flocks were dominated by young chicks. The major purposes of chicken rearing and egg production of respondents are cash income and home consumption. In the current study the average egg weight varied from kebele to kebele.

The major causes of losses in the study area were predation by hawks, fox and wild cats. Among the classes of chickens, chicks and growers are highly attacked by predators during both dry and rainy seasons. Newcastle disease played the major cause of death in indigenous chicken. The severity of the disease is higher during rainy season than during dry season of the year. The measures taken by farmers when sick birds are observed in the flock is medication selling and isolation of birds. Dead birds are disposed through pet animals and burying.

All members of the family in a household participate in chicken production and management practice in one way or another. Common activities in poultry farms includes feeding, watering, cleaning, house construction, treating sick chicken, and buying and selling live chicken.

The average mean egg weight measure of local chicken showed significantly ( $p > 0.05$ ) lower value than the exotic chicken. However the average mean egg length measure of local and exotic chicken is statistically significant.

## REFERENCES

- [1]. Abera, M. 2000. Comparative studies on performance and physiological responses of Ethiopian indigenous (Angete Melata) chickens and their  $f_1$  crosses to long term heat exposure. PhD dissertation, Martin-Luther University. Halle-Wittenberg Germany. pp127
- [2]. Aberra, M. and Tegene, N. 2007. Study on the characterization of local chicken in Southern Ethiopia. Proceedings held in Awassa, March 16-17
- [3]. Aichi J and Kitalyi Andre. 1998. *Village chicken production systems in rural Africa household food security and gender issues*. FAO Animal Production and Health Paper 142. FAO (Food and Agriculture Organization of the United Nations), Rome, Italy.
- [4]. Alemu, Y., Teklewold, H., Dadi, L. and Dana, N. 2006. Determinants of adoption of poultry technology: a double-hurdle approach Livestock Research for Rural Development 18 (3) 2006 <http://www.cipav.org.co/Irrd18/3.count1803.html>.
- [5]. Asaminew, T. and S. Eyassu, 2009. Smallholder dairy production system and emergence of dairy cooperatives in Bahir Dar Zuria and Mecha Woredas, North western Ethiopia. *World Journal of Dairy and Food Sciences*, 4(2): Pp: 185-192.
- [6]. Bobbo A G, Baba S S and Yahaya M S 2013 Egg quality characteristics of three phenotypes of local chicken in Adamawa state. *Journal of Agriculture and Veterinary Science*, 4 (2):13-21 Available at: <http://www.iostjournals.org/iost-javs/papers/vol4-issue2/C0421321.pdf>.
- [7]. CSA (Central statistical Agency), 2013. Agricultural Sample Survey. Report on livestock and livestock characteristics 2012/13 report. The Federal Republic of Ethiopia, Private peasant Holding, Statistical Bulletin Addis Ababa, Ethiopia, April 2013.
- [8]. CSA (Central Statistical Authority). 2003. Statistical report on livestock and farm implements, part IV. CSA, Addis Ababa, Ethiopia.
- [9]. Dawit A., Ajebu N. and Sandip B., 2013. Assessment of feed resource availability and livestock production constraints in selected Kebeles of Adami Tullu Jiddo Kombolcha District, Ethiopia. *African Journal of Agricultural Research*, 8(29): 4067-4073.
- [10]. Delgado, C., Courbois C. and Rosegrant, M. 1998. Global food demand and the contribution of livestock as we enter the new millennium. International food Policy research institute, markets and structural studies division. Pp 36.
- [11]. Gueye, E.F. 2000. Approaches to family poultry development. Proceeding of the 21st World's poultry congress. Montreal Canada.
- [12]. Gueye, E.F. 2003. Poverty alleviation, food security and the well-being of the human population through family poultry in low income food-deficit countries. Senegalese Institute of Agricultural research (ISRA), B.P.2057, Dakar-hann, Senegal.
- [13]. Hoyle, E. 1992. Small-scale poultry keeping in Welaita, North Omo region.



- Technical pamphlet No. 3 Farmers Research Project (FRP). Farm Africa Addis Ababa.
- [14]. Isidahomen CE, Njidda AA, Olatunji EA. Egg Quality Traits of Indigenous and Exotic Chickens As Influenced By Specific Genes. *Biology Agriculture and Healthcare*. 2013;3(1).
- [15]. Kitalyi, A. J. 1998. Village chicken production systems in rural Africa household food security and gender issues: FAO, Rome.142:<http://www.fao.org/DOCREP/003/W8989E/W8989E00.htm>
- [16]. Moges, F., Tegegne, A., and Dessie, T., 2010. Indigenous Chicken Production and Marketing Systems in Ethiopia: Characteristics and Opportunities for Market-oriented Development. IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project Working Paper 24. Nairobi, Kenya, ILRI.
- [17]. Molla, M., 2010. Characterization of Village Chicken Production and Marketing System in Gomma Wereda, Jimma Zone, Ethiopia. M.Sc Thesis, Jimma University, Ethiopia.
- [18]. Moreki J C, Dikeme R and Poroga B 2010 The role of village poultry in food security and HIV/AIDS mitigation in Chobe District of Botswana. *Livestock Research for Rural Development*. Volume 22, Article #55. Retrieved April 20, 2018, from <http://www.lrrd.org/lrrd22/3/more22055.htm>
- [19]. Mourad MBAS and Gbanamou G. 1997. Evaluation de la productivite et de la mortalite de la poule locale sur le plateau de Sankaran, Faranah, Guinee, en 1993–1994. *Révue d'élevage et de Médecine Vétérinaire des Pays Tropicaux* 50:343–349.
- [20]. Muchadeyi FC, Wollny CBA, Eding H, Weigend S, Makuza SM, Simianer H (2007). Variation in village chicken production systems among agro-climatic zones of Zimbabwe. *Trop. Anim. Health Prod.* 39:453-461.
- [21]. Mulugeta A., 2005. Characterization of Dairy Production Systems of Yerer watershed in Ada Liben Wereda, Oromia Region, Ethiopia. An MSc Thesis Presented to the School of Graduate Studies of Alemaya University, Alemaya University. Pp: 140.
- [22]. Nebiyu Yemane, *Berhan Tamir* and *Kelay Belihu* 2013 characterization of village chicken production performance under scavenging system in Halaba district of southern Ethiopia
- [23]. Negussie, D. 1999. Evaluation of the performance of local Rhode Island Red (RIR) and Fayoumi breeds of chicken under different management regimes in the high lands of Ethiopia. Swedish University of agricultural sciences, Department of animal nutrition and management. Po.Box Tropical Animal health and production, 33:521-537.
- [24]. Oh BT. 1990. Economic importance of indigenous chickens in west Malaysia. In: Proceedings, CTA seminar, 3<sup>rd</sup> international symposium on poultry production in hot climates, Hamelin, Germany.
- [25]. Tabeekh M A S A 2011 Evaluation of some external and internal egg quality traits of quails reared in Basrah city. *Basrah Journal of Veterinary Research*, 10(2):78-84
- [26]. Tadelle, D., Million, T., Alemu, Y., and Peter, K.J. 2003. Village chicken production system in Ethiopia. Use patterns and performance evaluation and chicken products and socio-economic function of chicken. Humboldt University of Berlin, animal breeding for tropics and sub tropics. Philippstr.13, Hause 9, 10115, Berlin.
- [27]. Teketel, F. 1986. Studies on the meat production potential of some local strains of chickens in Ethiopia. PhD Thesis, J.L. University of Giessen, Germany, 210 pp.
- [28]. Wambui, E K Njoroge and C B Wasike 2018 Characterisation of physical egg qualities in indigenous chicken under free range system of production in Western Kenya
- [29]. Wethli, E. 1995. Poultry development study. Family framing rehabilitation program. Maputo. Consultoria E Projectos . Lda.



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