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Original Research

Study of Production Practices, and Productivity of Village Chicken in Chelliya District, Ethiopia

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Abstract

Assessment of production and productivity of village chicken were conducted in two agro-ecology (midland, highland) and eight rural kebeles (RKs), in Chelliya district. A total of 120 households were participated in the survey. The study revealed that the primary aim of chicken rearing is for sale of live chicken (31.81%) followed by for incubation (30.7%). the overall village chicken flock size was 3.81±0.18 per household. The major supplement feed for chicken was wheat grain (59.2 %) followed by food leftover (25.8%). About 70.8% of the respondents give more supplements to layers followed by chicks (10.8%). Hens/layers got the priority highest attention because farmers believe that supplemented hens lay more eggs. About 53.3% of the households shared the same room followed by a separately constructed houses (33.3%) and separate quarter in the same roof for family (13.3%). The Parameters used for selecting breeding village chicken were plumage colors (30%), body weight (27.5%), comp type (23.3%), breed type (12.5%), and comp shape (6.7%), in that order. The major diseases reported in the study area was Newcastle disease (85 %) and 15% other diseases including Coccidosis, Fowl pox and Fowl typhoid. generally exotic breeds seems to perform better than indigenous and there is a need for improvement in production practices and productivity of the cross breeds and indigenous breeds.

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INTRODUCTION

In most African countries, the chicken kept in the villages have no regular health control program, may or may not have shelter and scavenge for most of their nutritional needs. In Ethiopia, almost every rural family owns chickens, indicating that chickens are affordable sources of animal protein and immediate income source (Solomon, 2003; Tadelle *et al.,* 2003). The majorities of these birds are maintained under a traditional system with little inputs for housing, feeding or health care. The amount and availability of scavenging feed resource base (SFRB) per bird are significantly dependent on season, household grain availability, the time of grain sowing and harvesting and household flock size (Dana and Ogle, 2002) having their own nutritional values in terms of protein, amino acids and energy. In Ethiopia chickens are the most widespread and almost every rural family owns chickens, which provide a valuable source of family protein and income (Tadelle *et al*., 2003). The most dominant chicken types reared in Ethiopia are local ecotypes, which show a large variation in body position, plumage color, comb type and productivity (Halima *et al*., 2007).

According to Sonaiya (2005) small farming families, land-less laborers and people with incomes below the poverty line were able to raise village birds with low inputs and harvested the benefits of eggs and meat via scavenging feed resources. However, most rural communities lack the required husbandry skills, training and opportunity to effectively improve their chicken production (Mlozi *et al.,* 2003). Rural household poultry is affordable source of animal protein and sources of family income. Provision of animal protein, generation of extra cash incomes, and religious/cultural importance are amongst the major reasons for keeping village chickens by rural communities (Alders *et al.,* 2009).

Poultry is a source of self-reliance for women since poultry and egg sales are decided by women (Aklilu *et al.,* 2007). It provides women with an immediate income to meet household expenses and sources of food. Hence, study of the existing village chicken production in the district will help to give important and feasible recommendation for further improvement of the practices in a sustainable way. Therefore, the objective of the study was to assess poultry production practices and productivity of indigenous and exotic chicken in the study area.

MATERIALS AND METHODS

Description of the Study Area

The study was conducted at Chelliya District, West Shewa Zone of Oromia National Regional State. The area is located at 175 km Western of Addis Ababa on the main highway to Nekemte. It is situated at an altitudinal range of 1700-3060 m.a.s.l. The study District lies approximately between l9°02` and 9°1' North` latitudes and 37°25` and 37°16` longitudes East of Prime Meridian. The study area having a temperature range of 10-25°C. The farming system was characterized by crop-livestock production systems.

Method of Data Collection

The data was collected from the four RKs purposively selected from each agro-ecology, 15 households who owned flock of indigenous, cross bred and exotic of Isa Brown (pure breed) chicken were selected for the interview (survey part of the study). Accordingly, a total of 120 households were selected from both male and female head. A rapid field survey was conducted before the main survey work to know the distribution and contribution of exotic chicken breeds and existing local strain in the rural households. For the interview, a semi-structured questionnaire were prepared, pretested on two non random sampled households from each study sites during the rapid field survey and the interview was conducted with the household head.

Method of Data Analysis

All data collected were checked for any eggs and corrected and coded. Data from the survey were analyzed using statistical package for social science (SPSS) version 15.0 for windows and Mean differences as applicable was separated using LSD. The mean statistics (mean, SE) for continuous variables obtained from the survey were subjected to analysis of variance (ANOVA) using the general linear model procedure of SPSS. Both internal and external egg quality parameters were analyzed by SAS (2002).

RESULTS AND DISCUSSION

Village Chicken Management Practices

The major feeds and feeding practices of chickens in the study area as indicated by the respondents are summarized in Table 1. According to the results of this study, almost all respondents (98.3%) reported that scavenging is the major feed source for chicken with little supplementary feeding. This was in agreement with that of Asefa (2007) and Mekonnen (2007) who reported that 95-98% of the small-scale household poultry producers in Awassa Zuria and Dale offer supplementary feeding to other chickens on top of scavenging. The respondents of the current study also confirmed that scavenging feed resource in Chelliya district consists of wheat grain, kitchen wastes, and food leftovers. Unfortunately, all the available evidences tend to indicate that scavenging feed resource base for local birds are inadequate and variable depending on season (Hoyle, 1992; and Alemu and Tadelle, 1997). Priority of supplementary feeding to different classes of birds is shown in Table 2. Survey participants were asked to tell to which class of chicken they provided supplementary feeds. Out of the total respondents, 70.8% reported that they give more supplementary feeds to layers followed by chicks, pullet, and cocks /cockerels. Hens/layers got the highest priority and attention because farmers believe that supplemented hens lay more eggs. Chicks are given attention in terms of supplementary feed because they could not scavenge sufficiently.

Table 1: Feed sources for chicken, time of supplement feeding and method of feed provision in Chelliya district (% respondents).

Parameters	Agro Ecologies				Overall	
	Midland		Highland			
	n	%	n	%	n	%
Feed sources:						
Wheat grain	35	58.3	36	60	71	59.2
Foods left over	18	30	13	21.7	31	25.8
Kitchens wastes	7	11.7	7	11.7	14	11.7
Spoiled grains	0	0	4	6.7	4	3.3
***p* -value**	**0.185**					
Time of feeding:						
Morning	41	68.3	39	65	80	66.7
At Noon	0	0	1	1.7	1	0.8
After Noon	17	28.3	19	31.7	36	30
All	2	3.3	1	1.7	3	2.5
***p* -value**	**0.684**					
Method of feed provision:						
In the feeder	3	5	2	3.3	5	4.2
Spreading on floor	55	91.7	58	96.7	113	94.2
Other materials	2	3.3	0	0	2	1.6
Total	60	100	60	100	120	100
***p*-value**	**0.32**					

n= represents numbers of respondents.
There is no significant difference between the rows of two ago-ecologies.

Table 2: Priority of supplementary feed to different classes of birds in Chelliya district

Parameters	Agro Ecologies				Overall	
	Midland		Highland			
	n	%	n	%	n	%
Chicks	6	10	7	11.7	13	10.8
Layeres	44	73.3	41	68.3	85	70.8
Pullet	5	8.3	7	11.7	12	10
Cocks/Cockerels	5	8.3	5	8.3	10	8.3
Total	60	100	60	100	120	100
***p*-value**		**0.92**				

n= represents numbers of respondents; There is no significant difference between the rows of two ago-ecologies.

Housing

The housing systems of village chicken are presented in Table 3. In spite of the fact that village chickens spent most of the daytime in extensive scavenging in and around the house, housing was among the common flock-management practices among the sampled households. The majority of the households keep chicken during the night in the same dwelling for human in both agro-ecology. However, the highland households use either separate area in the house for human dwelling or separate house for poultry than the midland households ($p<0.01$). Sharing the same roof with people might be also associated with the protection from predators, which is very severe in the night than during daytime. This is in agreement with the findings of Kitalyi (1998) and Resource-Center (2005) who found no separate housing for rural chickens in Ethiopia and Kenya, rather chickens are housed in the living room or in the kitchen during the night. More than 66.6 % of the respondent replied that they do not have separate day and night time house and birds spent the whole day elsewhere searching for feed for survival making diseases transmission substantially high and severe.

Table 3: Housing of village chickens by the households in Chelliya district (%)

Parameters	Agro Ecologies				Overall	
	Midland		Highland			
	n	%	n	%	n	%
Share the same room with Family	39	65	25	41.7	64	53.3
Have different shelter during Night in the same room	3	5	13	21.7	16	13.3
Separate House	18	30	22	36.7	40	33.3
Total	60	100	60	100	120	100
p-value		0.008**				

n = represents numbers respondents; ** = there is significant difference between the row of two ago-ecologies (P<0.01).

Breeding and Culling

Criteria used for selecting breeds of village chicken in the study area are depicted in Table 4. The traditional poultry production system is characterized by lack of systematic breeding program. Sonaiya and Swan (2004) noted that the broody hen chosen for natural incubation should be large and this was in line with selection criteria of farmers in the present study area. There was no significant ($p>0.05$) difference in culling criteria between the agro-ecologies, and poor productivity and old age are the two major factors of culling chickens (Table 4). Determinant factors of culling obtained in this study agree with that reported by Tadelle (2003) and Mammo (2006), except that consumption as criteria did not mentioned by the present respondents.

Water source and watering

Water sources and watering frequency used for chickens in the two agro-ecologies was shown in Table 5. Despite variations in source of water and frequency of watering, almost all of the respondents provided water for their chickens. This is a promising and good experience and could be considered as one aspects of their concern to their chickens.

Diseases

Diseases, symptoms and prevention method of disease of village chicken are shown in Table 6. Lack of knowledge among bird keepers about modern drugs availability, inadequate resources to seek for veterinary advice, existence of traditional knowledge on poultry diseases management are the possible bottle necks in chicken disease management. The major diseases reported in the study area in the order of their importance were 85% Newcastle disease (NCD) and 15% other diseases (Coccidosis, Fowl pox and Fowl typhoid). Incidence of NCD is significantly higher (P<0.001) in highlands, but the occurrence of other diseases is more prevalent in midland.

Table 4: Criteria's for selecting breeding and culling village chicken in Chelliya district (% respondents)

Parameters	Agro Ecologies				Overall	
	Midland		Highland			
	n	%	n	%	n	%
Selection:						
Plumage colors (red)	21	35	15	25	36	30
Body weight	17	28.3	16	26.7	33	27.5
Comp type	14	23.3	14	23.3	28	23.3
Comp shape	5	8.3	3	5	8	6.7
Breeds	3	5	12	20	15	12.5
***p* - value**		**0.14**				
culling						
Poor Productivity	31	51.7	40	66.7	71	59.2
Sickness	3	5	0	0	3	2.5
Lack of Broodiness	7	11.7	2	3.3	9	7.5
Old Age	18	30	18	30	36	30
All	1	1.7	0	0	1	0.8
Total	60	100	60	100	120	100
***p* - value**		**0.095**				

n= represents numbers of respondents. There is no significant different between the row of two ago-ecologies.

Hatching and brooding

Hatching and brooding of village chicken is indicated in Table 7. Season of hatching, selection of hatching egg, and hens used for brooding did not significantly differ between the agro-ecologies. However, high number of large eggs and medium eggs ($p<0.05$) are selected for

hatching in highland and midland, respectively. A hen often finds a dark and quite place in the house for laying eggs. Farmers were very conscious and concerned in the preparation of appropriate place for incubation of broody hen. The number of eggs set for natural incubation in this study is in disagreement with previous works by Asefa (2007) for Awassa Zuria who reported 9.8 eggs per brooding per hen.

Table 5: Water sources and frequency used for chickens in two agro-ecologies in Chelliya district

Parameters	Agro Ecologies				Overall	
	Midland		Highland			
	n	%	n	%	n	%
Every Other Day	11	18.3	7	11.7	18	15
Once/Day	8	13.3	15	25	23	19.2
Twice/Day	41	68.3	38	63.3	79	65.8
***p* -value**	**0.209**					
Source of water for chickens (%)						
Rain water	4	6.7	3	5	7	5.8
River water	54	90	54	90	108	90
Well water	2	3.3	3	5	5	4.2
Total	60	100	60	100	120	100
***p*-value**	**0.842**					

n=represents the number of respondents. There is no significant difference between the rows of two ago-ecologies.

Table 6: Disease, symptoms and prevention of disease of village chicken in Chelliya district (% household)

Parameters	Agro Ecologies				Overall	
	Midland		Highland			
	n	%	n	%	n	%
Diseaes :						
other diseases	16	26.7	2	3.3	18	15
Newcastle Disease	44	73.3	58	96.7	102	85
***p* - value**	**0.0*** **					
Symtoms of diseases:						
Diarrhea	22	36.7	17	28.3	39	32.5
Coughing	9	15	12	20	21	17.5
Sudden Death	19	31.7	18	30	37	30.8
Parasite	10	16.7	12	20	22	18.3
Lameness	0	0	1	1.7	1	0.8
***p* - vaue**	**0.685**					
Preention of disease:						
Isolation/separation	26	43.3	28	46.7	54	45
Immediate Slaughter	1	1.7	3	5	4	3.3
Leaving with Flock	32	53.3	28	46.7	60	50
Treat with different Medicines	1	1.7	1	1.7	2	1.7
Total	60	100	60	100	120	100
***p*-value**	**0.71**					

n= represent numbers of respondents. There is no significant different between the row of symptoms and prevent diseases, but; *** highly significant in the diseases both agro-ecologies (P<0.001).

Table 1: Hatching, brooding and selection of village chicken in Chelliya district (% households)

Parameters	Agro Ecologies				Overall	
	Midland		Highland			
	n	%	n	%	n	%
Season of hatching practices:						
Dry season	60	100	60	100	60	100
Sitting materials for broody hens:						
Clay pot and straw bedding	60	100	57	95	117	97.5
Clay without bedding	0	0	3	5	3	2.5
***p*-value**	**0.079**					
Eggs Selected for Hatching and Brooding:						
Medium	30	50	18	30	48	40
Large	30	50	42	70	72	60
P-value	0.025*					
Hens Selected for Hatching and Brooding:						
Large	47	78.3	42	70	89	74.2
Small	1	1.7	2	3.3	3	2.5
Medium	12	20	16	26.7	28	23.3
Total	60	100	60	100	120	100
***p*-value**	**0.553**					

n = represents number of respondents. There is no significant difference between sitting materials for broodiness and hens selected for hatching and brooding, but; * there is significant difference between the row of two ago-ecologies in eggs selected for hatching and brooding (p< 0.05).

Flock Performances

The production and productivity history of at least five indigenous and exotic hens per each household was evaluated during the repeated survey activity. Table 8 shows the production performance of Indigenous and exotics chicken in chelliya district. The average number of eggs/hen/week, eggs/clutch and the number of eggs/hen/year were similar in midland and highland, but indigenous birds lay significantly (p<0.05) lower number of eggs as compared to exotic chicken breed. The average number of eggs/clutch obtained in this study was similar with 9-19 eggs per clutch reported in North-West Ethiopia by Halima (2007), 12-18 eggs in Nigerian local hens by Gueye (1998) and 6-20 eggs in Tanzania by Aichi (1998) and also the average number of eggs/year is similar with that reported by Solomon (2007).

Table 8: Egg production performance of village chickens in Chelliya district (Mean±SE).

Parameters	Agro Ecologies		Breed		Agro Ecologies X Breed
	Midland	Highland	Indigenous	Exotic	
Per weeks	3.91±0.22	3.48±0.22	3.23±0.22[b]	4.16±0.22[a]	*
Per clutch	15.6±0.87	13.93±0.87	12.93±0.87[b]	16.63±0.87[a]	*
Per year	187.2±10.45	166.8±10.45	155.2±10.45[b]	198.80±10.45[a]	*

[a, b,] Means with different superscripts within a row under the same heading are significantly different (p< 0.05). There is significant different between the row of the interaction agro ecologies with breeds.

Chicken and Eggs Marketing Characteristics

Marketing characteristics of village eggs and chicken were shown in Table 9. In the study area, the sale of live birds takes place in various places including: urban market, local markets and around the villages.

In the study areas, there were relatively different market prices for chicken and eggs. The variation of prices across the study RKs might be due to variation in climate and market place. The average price of eggs (1.7±0.02) recorded in the study area is greater than that reported by Tadelle *et al.* (2003) for Debrezeit area in the year 2001 during festival of Ethiopian Easter (0.40–0.50 birr) and also reported by Asefa (2007) in the study made in and around Umbullo Wachu watershed. There was no variation in egg prices (p>0.05) between the agro ecologies, but the variation in prices of chicken were statistically significant (Table 10) between the agro ecologies.

Present Price of Eggs and Laying Hens

The average market prices of egg, pullet and laying hen during the period of the study were shown in Table 11. For the study sites, Chelliya districts was the main market where crop and livestock products including chicken and eggs were sold and required household needs were purchased. Eggs were immediate sources of income to cover the daily minor household expenditures. Eggs and chicken were sold for money in the same village.

Table 9: Marketing outlets of village eggs and chicken in Chelliya district

Parameters	Agro Ecologies				Overall	
	Midland		Highland			
	n	%	n	%	n	%
Chicken sale:						
Local Markets	24	40	37	61.7	61	50.8
Retailer	3	5	0	0	3	2.5
Neighbors	1	1.7	0	0	1	0.8
All	32	53.3	23	38.3	55	45.8
***p*-value**		**0.041***				
Eggs Sale:						
Local Market	30	50	30	50	60	50
Retailer	1	1.7	0	0	1	0.8
All	29	48.3	30	50	59	49.2
Total	60	100	60	100	120	100
***p*-value**		**0.601**				

n= represents number of respondents. There is no significant different between the row in egg sale, but there is significant different in chicken sale between the row of two ago-ecologies (p<0.05).

Table 10: Average (mean±SE) prices in Birr per chicken and eggs in Chelliya district

Agro Ecologies	N	Eggs	Pullet	Hens	Cocks	Cockerels
Midland	60	1.74±0.03	39.4±1.7[a]	46.85±1.19[a]	83.62±1.17[a]	69.63±1.1[a]
High Land	60	1.66±0.03	31.45±0.63[b]	38.813±0.87[b]	75.87±1.1[b]	62.22±1.1[b]
Total	120	1.7±0.02	35.43±0.76	42.83±0.89	79.74±0.86	65.93±0.83
***p*-value**		**0.08[ns]**	**0.0*****	**0.001****	**0.009****	**0.002****

n = number respondents; a, b, Means with different superscripts within a column significantly different; ns = not significant, *** = highly significant (p<0.001); ** = significant (p<0.01).

Table 11: The current (Mean±SE) market prices of eggs, pullets and laying hen in Chelliya district

Agro Ecologies	n	Eggs	Pullets	Laying Hens
Midland	60	1.96±0.02	42.1±1.42[a]	47.93±1.29[a]
High Land	60	1.86±0.03	34.75±0.75[b]	40.55±0.82[b]
Total	120	1.91±0.02	38.43±0.87	44.24±0.83
***p*-value**		**0.002****	**0.011***	**0.028***

n = represent the number of respondents; a, b, Means with different superscripts within a column significantly different; *= significant (p< 0.05); ** = significant (p<0.01).

CONCLUSIONS

The study was conducted in eight RKs located in midland and highland altitude in Chelliya districts, Western Shewa**,** Ethiopia, with the objectives of assessing poultry production practices and productivity of indigenous and exotic chicken, opportunities, marketing practices of poultry and egg production under scavenging production system. The purpose of keeping poultry by the households is multiple. Chicken raising for sale accounts for about 31.81%, incubation of egg 30.7%, consumption 21.2 %, for religious 14.75 % and Gift 0.82%. The study revealed that the overall village chicken flock size was 3.81±0.18 per household. The survey result indicated that women's own chicken followed by children and men. Thus women play the major role in village chicken production. Market is the major source of foundation chicken for 69.2% of the respondents (n = 83). The primary constraint affecting poultry product consumption was giving priority for cash crop (35.8%) followed by expensiveness of egg and chicken meat (33.3%), less availability (24.2%) and expensiveness to prepare the dish (6.7%) in the study areas.

The main feed supplement to chicken were primarily wheat grain (59.2%) followed by food leftover (25.8%), kitchens wastes (11.7%) and at last spoiled grains (3.3%). According to the farmers, supplementing time is morning (66.7), at noon (0.8), after noon (30), and any time (2.5) during the day, respectively. Survey participants were also asked which class of chicken frequently gets the supplement feeds, and 70.8% of the respondents said that they give priority to layers followed by chicks (10.8%), pullet (10%), and cocks/cockerels (8.3%). Hens/layers got the highest priority and attention because farmers believe that supplemented hens lay more eggs. Despite the variations in source of water and frequency of watering, almost all of the respondents provided water to their chickens. The variation in prices across the study RKs might be due to variation in climates and market place/access. The overall average prices of 1.7±0.02, 35.43±0.76, 42.83±0.89, 79.74±0.86, 65.93±0.83 Birr per egg, pullet, hen, cock and cockerel, respectively. The overall average prices during the study period were 1.91±0.02, 38.43±0.87, 44.24±0.83 Birr per egg, pullet, and laying hen, respectively. Some of the major constraints to poultry production in study area identified by the producers were diseases, predator attack, lack of good management practices, low supply of exotic breed and limited credit for poultry production, moreover, lack of appropriate chicken and egg marketing system and lack of enough space for chicken marketing at urban markets were identified as constraint to poultry production in the study area. The opportunity for poultry production in the study area includes high turnover earning, small feed requirement, lower initial investment, and employment opportunities for poor women, and landless farmers.

Conflict of Interest

Conflict of interest none declared.

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