

Assessment of Chicken Production under Farmers Management Condition in Gimbi District, West Wollega Zone, Ethiopia

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Abstract

The study was conducted in Gimbi district, Oromia Regional State, Ethiopia to generate baseline information on the constraints and opportunities of village chicken production under farmer's management condition. The study used interview, survey and field observation as method of seeking for answers for research question. 180 total household respondents were interviewed using semi-structured questionnaires during the study period and SPSS soft ware version 23 was used to analyze the collected data.

Of total, 93.3% of respondents practiced free ranging type chicken production system with conditional feed supplementation and frequent water supply. Despite the largest concern was given for female households, males also involved in chicken management activities aiming for income generation and household consumption. The mean flock size per household was 8.25 for local chicken and less than 5 cross-breed chickens. Almost all farmers in the study area provided night shelter for their chickens, and majority (66.11%) of them use perch in the main house. In the study area, natural incubation system was practiced with the help of broody hens and majority (82.7%) of respondents preferred dry season period of incubation because of chick mortality is very high at the wet/rainy season. Even though high demand towards chicken and chicken products, availability of local market and water access, seasonal disease outbreak (31.67%) followed by predators (27.78%) and lack of veterinary health service (22.22%) was considered the largest threat to chicken production. Thus, strong and holistic extension services such as applying breed and management improvement methods, disease and predator control activities, providing frequent extension services in terms of regular training to farmers focusing on overall chickens' improvement strategies is highly recommended.

Keywords: Free ranging; Gimbi District; Village Chicken; Management

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Introduction

Poultry production has an essential economic, social and cultural benefit and plays a significant role in family nutrition in the developing countries. In many countries of the world, poultry are kept as scavengers in and around the residence areas at village and family level (Kitalyi, 1998). With an estimated total population of 1.6 billion at the end of 2010, village chicken is the most abundant species in Africa, contributing a significant part of the continents economy (FAOSAT, 2012).

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Ethiopia has large population of chickens estimated to be 56.53 million (CSA, 2017) with native chickens of non-disruptive breed. With regard to breed, 94.31 percent, 3.21 percent and 2.49 percent of the total poultry were reported to be indigenous, hybrid and exotic, respectively kept in urban and peri-urban areas of the country. The contribution of village chickens to farm household and rural economies is not proportional to their high numbers, although they contribute more than 98% of the total meat and egg production in the country (Udo., *et al.* 2006). This is mainly due to low productivity levels which are the result of diseases, poor management in terms of feeding and housing, poor growth rates and predation.

Village chicken production and management practiced in west Wollega Zone in general and in Gimbi district in particular, is extensive system which is mainly characterized by low input, low output and periodic destruction of large proportion of the flock due to different factors, thus the production and productivity of the village chicken is low. In the district, the poultry population approximately is 92,347. Even if the population is high, the farmers do not benefited from the sector, because of traditional production system, predator challenge, disease prevalence, feed shortage and poor genetic makeup of the chicken. Moreover, in the study area, there is no enough information regarding with production challenges and opportunities of village chickens production and there was no research done yet. Consequently, this study was initiated to generate baseline information about the constraints and opportunities of village chicken production in the study area.

Materials and Methods

Description of the study area

The study was conducted in Gimbi district which is located in Oromia National Regional State West Wollega administrative Zone located at 441 km from Addis Ababa to the west. Geographically the district is located 9°10'-9°17' North latitude and 35°44'-36°09' East longitudes and elevated from 1200m-2222m a.s.l. The average annual rain falls ranges 1000 to 1800mm and the mean annual temperature range is 10-30°C. The total surface area of the district is 112969hectare with a total population of 89243 with the proportion of 45657 male and 43586 female. Climatically, the district is categorized into three: 70% high land, 10% mid highland and 20% lowland. Mixed crop and livestock faming system is the mode of agriculture practice in the district. The most widely cultivated crops in the study area include coffee, maize, 'teff', barley, oil seeds (niger seed, sesame, sunflower), pulses (beans, peas, chickpeas) (CSAGW, 2017/18). Like other different parts of the country, the study area is enriched with immense types of livestock: 111697cattle, 47039 sheep, 9458goats, 9926 donkey, 123 Mule, and 92347 poultry and 14472 bee colonies (CSAGW, 2017/18).

Study Population and Design

Village chickens raised under scavenging production systems in the selected study sites constitute the study population. Cross-sectional type of study was conducted to collect data required for this study from May to July 2018 using questionnaire survey, observation and group discussion. The sampling units were defined as households keeping local chicken.

Sampling Procedure and Sample Size

Study kebeles and households in the study area were selected using purposive and simple random sampling procedure. Out of the total kebeles of the district, three kebeles (Lelisa Yesus, Waraseyo and Bikiltu Tokuma) (about 10% of the total kebeles) were randomly selected based on the extent and intensity of local chicken production. From each kebele, 60 households were randomly selected, making a total sample size of 180 households. The sample size was determined following the formula developed by Arsham (2002):

$$N = 0.25 / SE^2,$$

Where, N = Sample size,

SE = Standard error.

Thus, using the standard error of 0.038 with 95% confidence level, 180 households were included in the study.

Data collection

The primary data were collected by using semi-structured questionnaire, field observation and interview from 180 randomly selected respondents. The secondary data were collected from reviewing published and unpublished sources and reports of the CSA and district agricultural office. Focus group discussion was also carried out with key informants from poultry development experts, development agents, and some individuals, who are believed to be knowledgeable and well experienced about chicken production for supplementing and crosschecking the data acquired through the household survey.

Data Analysis and Presentation

The data were entered using Microsoft excel spreadsheet 2007 and analyzed using SPSS version 23 software. Survey results were reported using descriptive statics such as frequency and percentage and presented in the form of table, graphs and rank.

Results and Discussion

Flock size and Purpose of keeping chickens

The result of this study revealed that keeping of chickens is widely and commonly practiced in the study area. Almost all farmers keep chicken in varying number of flock size aspiring of egg production and meat mainly for income generation and household consumption; and also for other purposes such as hatching and rearing of chicks for replacement of future flock and as insurance (Table 1). In line with this study, Felake (2015) also report the same result.

No	Purpose of chicken keeping	Frequency	% Respondents
1	Income generation	110	61.1
2	Home consumption	44	24.44
3	Saving/insurance/Security	13	7.22
4	Replacement for future flock	8	4.44
5	All	5	2.8

Table 1: Purpose of Chicken production in the study area.

The overall average flock size of chicken in the study area was 8.25 chickens per household for local and less than 5 cross-breed chickens per household which is comparable the mean flock size of Felake (2015), who reported mean flock size of 8 in Wolaita Zone, Southern Ethiopia. As the result of this study, almost all respondent households keep all groups of chicken together without age separation.

Demographic Characteristics of respondents and Gender Involvement

Sex of the head of the household is believed that it is one of important factors that affect adaptation decision of the households to village chickens production improvement options. From the total respondents, 90% were male households and female headed household accounts of 10% of the total sample. The average family size of sample respondents is 6.10 (ranged 2-12) which is in agreement with the finding of Bereda, *et al.* (2014) who reported average family size of 6 ± 0.18.

Moreover, only 5% and 10.5% of the farmers have formal education background up to grade 1-8 and high school level, respectively (Table 2); and majority (46.11%) and 38.33% of them were illiterate and just able to read and write, respectively. These low education levels of the society are the challenges on modernization of poultry production that requires a continuous training to enable the village chicken productivity to move forward; because educated households improve at least some of the poultry related routine managements and alert in accepting new technologies.

Variables	Responses	Frequency	% Respondents
Sex	Male	162	90
	Female	18	10
Education status	Illiterate	83	46.11
	Read and write	69	38.33
	Grade 1-8	19	10.56
	High school	9	5
Farming systems	Livestock production	7	3.89
	Crop and livestock	170	94.44
	Others	3	1.67
Responsible family member to manage chicken	Females only	98	54.44
	Males only	14	7.78
	Both	68	37.78

Table 2: Demographic characteristics of respondent households.

The survey result also indicated that majority (94.44%) of the respondent farmers practiced mixed crop-livestock production activity. Concerning chicken management, both men and women (37.78%) share most of the poultry rearing activities, although the rest (54.44%) was given to the female family members in the households. From this result, it clearly could elucidate that in the study area, all members of the family in the household participate in chicken husbandry and management practice in one way or another.

Chicken management at farmer level

As the study result illustrated, majority (93.3%) of the respondents practiced chicken production system in the form of a free range or extensive type. Chickens were managed mainly on free ranging, utilizing various feed sources searching by their own in the field, with conditional feed supplementation. However, the rest (6.7%) of the household respondents practice semi-intensive types of chicken management using fences around their homestead. As the response of respondent farmers and group discussion with key informants, farmers in the study area are going to change and improve chicken management practice for future by improving the management activity as well as using improved chicken breeds.

Housing System of Village Chickens

Housing facilities for rural chicken are usually made of small wooden structures aimed at keeping the birds at night and thus, variety of night sheltering of chicken are practiced. The majority (66.11%) of farmers were housed their chickens on perch in the main house; whereas 22.22% and 7.78 farmers were housed their chicken in the main house at one of the room and in the kitchen, respectively. Only 3.89% of the farmers were used basket in the main house for housing of their chicken. Even if, the farmers were used the same room with and without perch to housed chickens, they can produce low amount of products. However, they were constructed chicken houses to protect chickens from predators, rain and wind during night time.

Feeding and watering

Although the supplementary feed is not satisfactory in terms of quality and quantity, all (100%) respondent farmers practiced in providing supplementary feed to their chickens. However, the frequency of provision per day varies mainly based on seasonal availability of feeds sources; while 83.75% of them did this between the months of July to September. In the study area, grains and household leftovers were the major kinds of feeds stuffs supplemented by chicken owner farmers. Most of these chicken owners (87.1%) used crop harvest (self produced grains) as supplementary feed. Maize (64.4%), wheat (25.6%) and feed leftover (10%) were the first, second and third types of grains provided as supplementary feed in the study area, respectively.

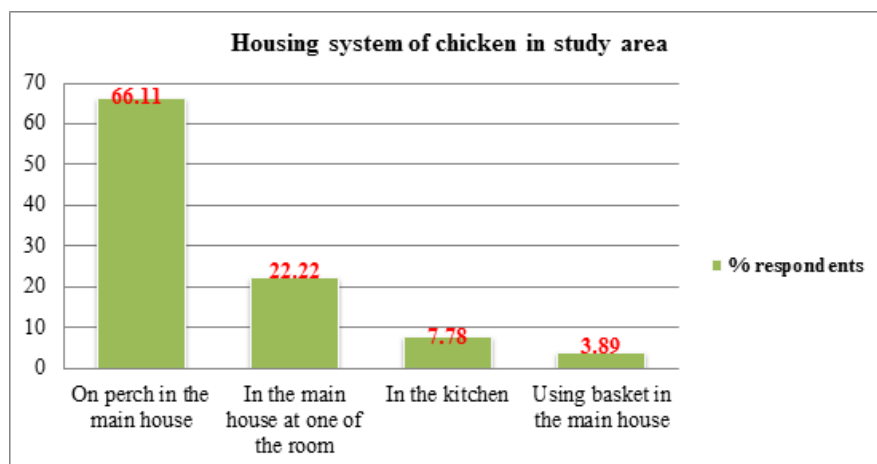


Figure 1: Housing system of village chickens in the study area.

Majority (93.3%) of them provide supplementary feed by throwing on the ground to feed in groups without age separation. However, some of the farmers less than 6.7% of them, who mainly practicing semi-intensive type of chicken management, use locally prepared materials like broken clay material, plastic and wooden trough, etc. to provide supplementary feed.

Like supplementary feeds, all village chicken owners (100%) of the district provided water to village birds; 80.45% only during the dry season and 19.55% throughout the year. Concerning the frequency of watering; most chicken owners (93%) used *ad libitum* type. The major sources of water for chicken in the study area were completely river water.

Chicken health and disease control measures

The result of the current study indicated that 95.5% of village chicken owners of the district experienced chicken disease problems. Newcastle disease (NCD) was the most prevalent and economically important (98.2%) disease problem affecting village birds and it is reported to be the first major causes of chicken death/loss in the district. The prevalence of the NCD and mortality of chicken were higher at the start of rainy season, mainly on April (71.26%) and May (28.74%).

The study result showed that all of the interviewed village chicken owners had no any culture of vaccinating birds against diseases. Lack of awareness about the presence of chicken vaccines (56%), lack of attention to village birds (28%) and low availability of vaccines (16%) were the major reasons mentioned by village chicken owners for lack of vaccination against diseases. A traditional treatment (ethno-veterinary) was the major type of treatment used by majority of village chicken owners (96%) against NCD. Accordingly, provision of a mixture of local alcohol ('*Arekie*'), lemon and garlic to sick birds against NCD was the most widely used type of traditional treatment.

From this study, it could be understood that there is a need for serious intervention in disease control activities so as to improve village chicken production and productivity in the study area. Control of chicken diseases could be achieved through improvement in veterinary and advisory services. It is also found critically significant to conduct further studies focusing on identification NCD virus strain and prevalence rate so that preventive and control programs could be formulated.

Incubation and hatchability

In Gimbi district all of the farmer practice incubation and hatchability. All of the respondents practice natural incubation system with the help of broody hens. About 82.7% preferred dry season period of incubation because of chick mortality is very high at the wet/rainy season. All respondents reported that they use broody hens for hatching eggs and growing chicks. Most farmers incubate eggs

using their brooder hens during the dry seasons when there is good feed resource, less disease risk and favourable environment for growing chicks. Similarly Fisseha, *et al.* (2010) reported the same findings. Of the incubated eggs 98% of eggs hatched out to healthy chicks; this implies that egg hatchability at household level is more economical. But the total number of grown chick into pullet/cockerels at 3 age months is limited to 50% due to seasonal disease (42%) and predators (58%). Different authors reported the same result from different parts of the country: Melkamu and Andargie, 2013; Matiwos., *et al.* 2015.

Constraints of chicken production in the study area

As discussed above high incidence of chicken diseases, mainly Newcastle disease was the major and economically important constraint for the existing chicken production system of the district. The most important constraints impairing the existing chicken production system under farmer’s management condition in the study area in their order of significance were disease, predators, lack of veterinary health service, lack of proper agricultural services with related to chicken husbandry and with limited feed supplementation, poor housing and poor chicken husbandry management by producer farmers.

In this study, all of the respondents emphasized diseases as the biggest constraint to improvement of their chicken flocks. Among the diseases of village chickens, respondents rated Newcastle Disease (100%) as the most devastating, and they explained it as highly discouraging to them not being able to sustain in chicken production activity.

Besides, wild birds (locally called (“*Culule*”) were the most dangerous type of predators (52.45%) affecting village birds. The attack of wild birds was very serious on young chicks (74.2%). The prevalence of wild birds was severe in all seasons of the year. However, other types of predators were dominant mainly during the rainy season, when vegetation was higher around the home stead. Protection of young chicks, especially from wild birds was critical, as this is the time when they are most vulnerable to predators.

Almost all the household respondents revealed that as there is no proper agricultural extension service related to chicken production like; advisory service, trainings, credit and input facilities. Rather agricultural extension service was mainly given for improved crop production system in the study area. Lack of access to get extension service was the main reason for little attention was given with regard to village chicken production by the responsible bodies. The present result is in conformity with the earlier report Fisseha, *et al.* 2007; Wondu., *et al.* 2013.

Constraints	No of respondents in the selected kebeles						
	Lelisa Yesus	Ware Seyo	Bikiltu Tokuma	Total	Mean	SD	%
Predators	16	18	16	50	16.67	1.15	27.78
Lack of veterinary health service	12	14	14	40	13.33	1.15	22.22
Disease	20	19	18	57	19	1	31.67
Lack of proper agricultural services with related to chicken husbandry	6	4	7	17	5.67	1.52	9.44
Poor housing	4	3	2	9	3	1	5
Poor chicken husbandry management by producer farmers	2	2	3	7	2.33	0.57	3.89
Total	60	60	60	180	0		100

Table 3: Major Constraints of Village Chicken Production in the Study Area.

Conclusion and Recommendations

Village chicken production is an integral part of livestock production system in the study area. It appears from this study that chicken production in Gimbi district remains dominated by family farming which is mainly practiced extensively by females and is primarily intended for income generation and home consumption. Free range or extensive type of chicken production (93.3%) is mainly practiced, and is characterized by the use of predominantly indigenous chicken breeds with low input–low output levels. Frequent disease outbreak, predators, lack of veterinary health services and lack of proper agricultural services with related to chicken husbandry were the constraints affecting chickens production in the study area. Apart from this, traditional management, limitation of supplementary feeds, low genetic potentials for productive traits, flock mortality and poor accessibility of improved breed stock are highly emphasized constraints, which contribute to the low level of productivity of chicken under farmer's management condition in the study area. However, the availability of high demand towards chicken and chicken products, local market, water access and availability of different types of crops are regarded as a good opportunity to the farmers. The achievement of village poultry development objectives requires a concerted effort, incorporating research, development and training. In view of the above, a coherent strategy should emphasize, but not limited to focusing on:

1. Strong and holistic extension services such as applying breed and management improvement methods, disease and predator control activities, providing frequent extension services in terms of regular training to farmers focusing on overall chickens' improvement strategies is highly recommended.
2. More study is also required to characterize the village chickens of the area, major diseases and predators of economic importance and to exploit the potential of the area.

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