

Major Production and Health Constraints of Chicken in some Districts of East Wollega, Horro Guduru Wollega and West Shoa zones, Oromia, Ethiopia

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Abstract

A preliminary survey was carried out in some districts of east Wollega, Horro Guduru Wollega and west Shoa zones to investigate the production and health constraints of village chicken under farmers' management condition and generate baseline data for future improvement poultry production. Purposive sampling technique was used for sites selection mainly due focusing on accessibility and chicken production potential. A total of 120 farmers were interviewed using semi-structured questionnaire by the researchers from Bako Agricultural research center. The questionnaire was pre-tested before commencement of the actual work. The overall average chicken flock size was 9.3 ± 0.7 per household. Traditional poultry production is conducted in the study areas. No supplementary feed is offered other than grains in wet season when feed is scarce. According to majority of the respondents (65%) chickens are reared for income generation. Some also produce chicken for household consumption (17%) and for cultural and religious purposes (10%). There were attributes preferences like feather color and comb type both for market and breeding purposes. Red feathered (59%) and white feathered (25%) chickens are the most preferred types. Owners attributed white feather color with high egg production. Disease of which diarrhea was identified as the major problem by respondents of the study areas. Predators such as eagles were also reported as major bottlenecks to chicken production. We suggest capacity building for farmers and extension staff in areas of ration formulation from locally available feed resources and record and record keeping for improved production and productivity and also to follow appropriate disease and predators control measures.

Keywords: Chicken, traditional management, Oromia, Ethiopia

Introduction

The total chicken/poultry population in the country is estimated to be 56.87 million with regard to blood level of chicken, 95.86 percent, 2.79 percent and 1.35 percent of the total chicken were reported to be indigenous, hybrid and exotic (CSA, 2014/15), respectively. Despite such large population, the total output of poultry is very low (Alemu *et al.*, 1998).

Majorities (99 %) of these chickens are maintained under a traditional system with little or no input for housing, feeding or health care (Tadelle and Ogle, 2001). In most parts of Ethiopia, village chicken represents a significant component of the rural household livelihood as a source of cash income and nutrition (Dhuguma, 2009). Indigenous chickens, which are managed under extensive systems accounts for 99% of the total population in Ethiopia (AACMC, 1984). Samson and Endalew (2010) reported that traditional chicken keeping is practiced by virtually every family in rural Ethiopia due to they provide protein for the rural population and generate family income. Alemu (1987) and Smith, (1990) revealed that poultry production an ideal starting point for beginning animal agriculture and rich source of animal protein to human food, enhance, to their ability to adapt to most areas, rapid growth rate, short generation time, low initial investment and small land size requirement makes. In addition, the local chicken sector constitutes a significant contribution to human livelihood and contributes significantly to food security (Dhuguma, 2009). In Ethiopia lack of knowledge about poultry production, limitation of feed resources, prevalence of economically important diseases (Newcastle, Coccidiosis etc) as well as institutional and socio-economic constraints remains to be the major challenges in village based chicken productions (Ashenafi *et al.*, 2004). In East Wollega, Horro Guduru Wollega and parts of west Shoa, the average land holding was about 2.3ha of which about 1.8ha (78.3%) being allotted for cropping and 0.5ha (21.7%) for grazing (Solomon Abegaz *et al.*, 2005). This implies that the introduction of improved small-scale poultry (chicken) production is crucial to alleviate the poverty in our poor rural farmers. One of the research areas forgotten in the western part of the country (Ethiopia) is poultry research followed by goat, as it has been raised from agricultural offices East wollega Zones many times during ADPLCA review meeting. Therefore, to answer this question the study conducted with the following objectives ; (i) to characterized the production and health constraints of village chicken under farmers' management condition and (ii) to generate base line data on traditional production and productivity of chicken of the area.

Materials and Methods

Study Area

The survey was carried out in western Oromia zones of East Wollega, Horro Guduru Wollega and West Shoa. Five districts per zone and two peasant associations (PAs) from each district were used in the current study. Purposive sampling techniques were used to select the districts and PAs. Data on chicken population, productivity, objective of family chicken production, constraints, production and productivity and health were collected using semi structured questionnaire. A total of 100 farmers owing chicken were interviewed.

Data Analysis: Descriptive statistics like mean, range, frequency and percentage were used to analyze the data using Statistical Package for Social Sciences (SPSS, 2004) Version 20.

Results and Discussion

Socioeconomic Characteristics of the household

Family size of respondents ranges from 2-12 persons with an average of 6.74 (± 0.24) people. The mean family size obtained in the current study was lower than the 8.5 (± 3.66) reported by Solomon *et al.* (2005) for East Wollega (recently divided into Horro Gudura Wollega and East Wollega zones) and west Shoa zones. The mean land holding per household of the interviewed farmers was 2.62 (± 0.25) ha and it ranges from 0.25 to 13.5. About 2.15 (± 0.20) ha allocated for crop production leaving only 0.81 (± 0.07) ha for grazing (Table 1). Based on respondents grazing land has been decreasing from time to time mainly because of cropland encroachment and the increase in population size.

Table 1. Ages, family size and land holding of the respondents

Characters	N	Min	Max	Mean	Std. Error
Family size	120	3.00	12.00	6.84	0.34
Land holding (ha)	97	0.25	13.50	2.63	0.25
Crop land (ha)	96	0.25	12.00	2.16	0.20
Grazing land (ha)	56	0.00	2.50	0.81	0.08

N=number of respondents

Farmers acquired foundation flock of chicken through different systems. Majority of respondents obtained by purchase (91.9%), 6.0% sharing of chicks called “*Ribbi*” and 3% of acquired from parents. Similarly, Mammo (2007) also reported that about 75.5% of chicken producers in Jamma woreda of South Wollo, Ethiopia acquired foundation and replacement stocks mainly by purchasing from market.

Table 2. Systems through which farmers obtained their chicken

Ways farmers obtained chicken	N	Percent (%)
Purchase	110	91.9
Gift from parent	3	3.0
Shared from other people	7	6.0

N=number of respondents

During the current study about 73.3% of the respondents reported that the trend of poultry production increasing, while about 20.8% of the respondents reported that the trend has been decreasing. About 5% of the respondents reported that they don't have information about the trend of chicken production.

Table 3 Trend of poultry production among farming community/private sectors

Trend of production	N	Percent (%)
Increasing	88	73.3
Decreasing	25	20.8
Have no information	6	5.0

N= Number of household

The average mean price of cockerel was greater than both pullet and hen but the difference is not this much when we compare the average mean price of cockerel and hen (Table 4). Fifty percent of the respondents had access to credit service. About 64% of the interviewed farmers who got the credit service used the money they borrowed for improved poultry production to purchase agricultural input (e.g. fertilizer and improved seeds) and ploughing oxen. It was also reported that few of respondents use the credit money for trading. About 37% of the interviewed individuals cannot estimate the time spent daily on poultry management while about 62.9 % can estimate the time spent. About 38% of the respondent said they can spend an hour per day on total poultry management.

Table 4. Prices for different types of chicken and egg during the study period

Price of different group of chicken and egg	Freq	Minimum	Maximum	Mean	Std. Error
Average price of egg	116	1.00	2.50	1.69	0.03
Average price of pullet	116	25.00	71.0	57.19	7.53
Average price of hen	116	25.00	95.00	63.02	1.64
Average price of cock	116	50.00	150.00	99.64	2.04
Average price of cockerel	115	40.00	125.00	67.79	1.57

Production performance of chicken

The average age of local pullet to 1st egg is about 5.7 months. The number of clutches/chicken /year is about 4.6 and the average number of eggs per clutch/ local chicken is 14.2 (Table.5). Fisseha *et al.* (2010) reported longer age (month) of indigenous pullet at 1st laying in Bure (6.42), Fogera (5.9) and Dale (7.1) areas, respectively. Correspondingly, the average number of eggs / hen / clutch reported for same areas were 15.7, 13.2 and 14.9. Zemene *et al.* (2012) also reported 14.1 eggs per hen per clutch and 45.7 eggs per year with average egg weight of 39.6g. Tadele *et al.* (2003) and Mandal *et al.* (2006) reported age at first egg of 6.8 and 7.6 months for indigenous chickens, respectively.

Table 5 .Production performance indigenous chicken in the study area

Variables	N	Mean	Std. Error
Age of sexual maturity (month)	120	5.46	0.19
No of eggs in one clutch/ local chicken	116	14.21	0.39
No of clutches/ chicken /year	115	4.60	0.22
Mean age of local pullet at 1 st egg (month)	120	5.66	0.19

N=number of respondents

The average number of eggs incubated per local broody hen was about 13.3 and the average eggs hatched from incubated eggs was about 11, indicating that about 2.6 eggs were spoiled (table 6). It means that proportion of hatched eggs of incubated eggs is 82.3. Zemene *et al.* (2012) reported 12.8 eggs as average number of eggs incubated per hen average hatchability of 79.1%. Fisseha *et al.* (2010) also indicated that the average hatchability percentage of eggs from local hens to be 82.6%.

Table 6. Hatchability performance of local hen in the study area

Hatchability performance	N	Minimum	Maximum	Mean	Std. Error
No of eggs incubated / broody hens	118	8	25	13.29	0.30
No of eggs hatched /incubated eggs	118	6	22	10.94	0.28
No of spoiled/incubated eggs	110	0	7	2.62	0.14

N=number of respondents

Breed ownership and Breeding Practice of chicken

About 95% of the respondents owned local breeds. Only about 3% owned both local and exotic ecotypes and while the rest 2% of the respondents owned exotic breeds. These results confirmed by CSA (2013) showed that 96.9 %, 0 .54 % and 2.56 % of the total poultry were indigenous, hybrid and exotic, respectively. The mean number of chicken owned by the respondents was about 9.3 of which 8.13 (87.2%) of them are chicks.

Table 7. Class of Chicken owned by respondents

Chicken owned	N	Minimum	Maximum	Mean	Std. Error
Hen	115	1	24	4.00	0.32
Cock	95	1	14	1.89	0.77
Chick	62	1	30	8.13	0.21
Over all chicken	120	1	42	9.32	0.71

N=number of respondents

Majority of the respondents (87%) select their chicken for breeding. However, about 6.2% of the respondents do not select chicken for breeding. Most (66.8%) of the respondents who exercise selection both for female and male while about 17.7% of them select only female. Farmers use different production traits and phenotypic characters to select their chicken for breeding purposes. Most of the respondents (37.4%) use egg production performances as indicator to select females for breeding, live weight, feather color, comb and wattle shape are some of the traits used to select males. Preceded by egg production, live weight of the chicken is the most important parameter used for selection (Table 8).

Table 8. Character for which farmers were selected local chicken, either for market or breeding

Character(s)	N	Percent (%)
Feather color	20	20.2
Egg productivity	37	37.4
Live weight estimate	28	28.3
Comb/wattle shape/type	6	6.1
For all characters	7	7.1
Have no information	1	1.0

N=number of respondents

Feather color had also great importance as far as poultry production is concerned. Majority of the respondent (59%) prefer red color as 1st due to its high market demand and egg production and about 25% white colored as 2nd for its high egg productivity. But still there was hesitation in accepting chicken with white feather by few of the respondents. According to respondents, chicken with white feather can be seen by predators from far distance especially by eagles and Voulcher easily. About 12% of the respondents didn't prefer chicken with their coat color (Table 9).

More than 94 % of the respondents had high interest to have exotic chicken. However, the high purchase price of the exotic breed inhibited them from having the breed. Moreover, they are not easily available. A farmer need to register in the nearby Livestock Development and Health Agency and should wait for more than six month to one year to have two pullets. Disease outbreak and shortage of formulated ration were also raised as major production constraints of the improved breeds.

According to respondents view, culling of those poultry (chicken) which were unproductive was very important. About 66% of the respondents culled unproductive females mainly through selling, while 39.4% of respondents consume at home culled females.

Table 9. Poultry color preference of farmers for breeding

Coat color(s)	N	Percent (%)
White	25	25.0
Red	59	59.0
Gray	1	1.0
Gebsima	2	2.0
Black	1	1.0
No coat color preference	12	12.0

N=number of respondents

Chicken Husbandry Practices

Housing

In spite of the fact that village chickens spent more of the daytime in extensive scavenging in and around the house, housing was among the common flock-management practices. According to the respondents, about 55% respondents share same room with chicken (chicken are kept on a small bed like materials made from local materials locally called perch 'koti' that is tied and suspended at the corner of the ceiling/roof, 20% of the respondents housed their chicken in different quarter in the roof, 14% house separately and about 11% house them in the kitchen. Fisseha *et al.* (2010) indicated that 77.9% of the respondents keep their chicken at various sheltering places in the main house: including perches inside the house (45.7%) on the floor covered by bamboo made materials (27.1%) on the ceiling of the house (3.6%) and under locally constructed sitting place "medab" (1.4%). The report of Zemene *et al.* (2012) showed that about 88.3% of the chicken owners shared their main houses with the chicken and other farm animals, which makes the bio-security of village poultry production system extremely poor. The majority of the respondents 91.9 % poultry rest on the material locally called 'koti' during night; which was made from local material and put above head at the corner of ceiling. Cleaning of the poultry liters was done by 76.1% of respondents while 2.3% of the respondents do not clean the liters at all.

Feed and Feeding Management

About 50% of the respondent revealed that the most dominant chicken's production system was free scavenging. Some supplemented their chicken with grains like maize, sorghum, wheat and finger millet based on the availability of such grains and scarcity of feeds. Bogale (2008) also reported that majority (88.9%) farmers in the Farta district of Amahara regional state gave supplementary feed to their chicken. According to reports of Halima *et al.* (2007) and Zemene *et al.*, (2012), the majority of farmers who practiced supplementary feed used maize, barley; wheat, finger millet and house hold waste products to feed their chickens. According to respondents (79.8%), time supplementation was done in the morning. Major reasons for supplementation were reported as: to increase egg yield (70.7%), to improve meat yield (13.1%) to shorten age at marketing or improve growth performance (12.1%) the chicken and to improve efficiency of hens broodiness (5%) during

incubation. Chicks and layers are classes of chicken given preference feeds as opposed to other classes (Table 10)

Table 10. Priority of supplementation in chicken

No	Class of chicken	Frequency	Percent (%)
1	Chicks	41	41.4
2	Layers	38	38.4
3	Pullet	3	3.0
4	All age equally (no priority)	17	17.2

Our findings are in agreement with results reported by Fisseha *et al.* (2010) in that young chicks and layers are given priority in supplementary feeding. According to respondents, young chickens cannot scavenge and well fed hens lay more eggs. No special container or feed trough was needed to offer supplementary feeds to chicken. Be it kitchen leftovers or grains, owners broadcast the feeds on the ground where they pick it up. The majority of the respondents (92.9%) supplement their chicken during rainy season (mostly from end of June to September) when feed is scarce. Only about 5.2% of the respondents indicated that they supplement their chicken during dry season. This is indicated that supplementary feeds for chickens depend on season. Fisseha *et al.* (2010) also that about 84% of the poultry owners in Bure and Fogera areas of north-western Ethiopia provided supplementary feed to their chicken during rainy/wet season (from July to September) than in the dry season. This coincides with a season when grains are depleted even for human consumption.

Hatchery and Egg Storage

The majority of the respondents (68%) practice selecting of eggs for incubation. The selection criteria reported were: size of hens, size and shape of eggs. More than 80% of the respondents reported that they prefer eggs from large hens for incubation while very few farmers (2.5%) did not bother about the size of hen when selecting eggs for incubation. Based on the respondents view eggs from large sized hens preferred due to the fact that chickens from large hens grow faster and larger in size as compared to those chicks from small sizes hens. Large sized eggs and non-deformed eggs were also chosen for incubation. Most of the eggs used for incubation were home laid eggs (94.9 %). About 3.1% of the respondents reported that they had used purchased egg for incubation. Techniques used to identify spoiled eggs from unspoiled eggs reported by respondents were shaking (78.6%), immersing in the water (14.3%) and candling (using direct sun light). Poultry owners allow their hens to incubate eggs mostly (90%) during dry season. The major reason is the availability of feed in the dry season compared to the rainy season. Locally made material called 'gorbo' (56%) and clay pots with straw bedding (38.2%) and clay pot without bedding (5.6%) are some of the most important materials used for broody hens during brooding. The average number of eggs laid per clutch from local hens is about 16.5 (8-25) in the study areas. This is comparable with the 16 eggs (8 to 28 eggs) reported by Fisseha *et al.* (2010) in Bure district of the Amhara regional state.

Disease, Predation and Other Health Related Problems

Diarrhea, sudden death and paralysis were the most economically important problems identified in the areas followed by Newcastle disease (Table 11).

Table 11. Disease/symptoms identified by respondents

Disease/symptoms identified	Percent (%)
Diarrhea, sudden death and Paralysis	62.0
External parasites	2.0
Newcastle disease(Fungile)	20.0
Others	17.0

In the current study, poultry owners identified only Newcastle disease (*Fungile*) by local name, but they indicated others by symptoms. Tadalle (1996) and Amsalu (2003) also reported that Newcastle disease is probably, the only disease can be identified by farmers in rural areas on the bases of clinical sign. That was probably why Newcastle disease acquired specific local name such as *Fungile* or *Encurif* in Ethiopia. In the current study, mortality was highest in lower age groups (chicks up to 2 weeks of age) which were reported as 41.8%. Generally, it was observed in the current study that disease prevalence was decreasing from chicks to adult chicken (Table 12).

Most of the respondents (79.6%) keep chickens of different age groups together. Only about 19.4% of the respondents keep separately the different age groups.

Table 12. Different age groups as affected by different types of diseases

Age group affected	Percent (%)
Up to 2 weeks	41.8
2 weeks -1 month	22.4
1 month- 3 month	7.1
Adult	9.2
All age groups	21.4

Some of the respondents treated their chicken with different traditional medicine and only few of them took their chicken to veterinary clinic. Sick animals are left within the flock, except when unable to walk with them. Owners mix lemon juice in poultry feed (29.3%) and also use juices of different plant leaves (18.7%). About 52% of the respondents reported that they did not know traditional herbs used to treat their chickens. Retarded growth, low egg production performance, reduced hatchability, droopiness and enlargement of hock joint were also some of the problems reported in the current study. About 60% of the respondents indicated that there were responsive extension services despite that the government assigned more than three extension agents in one station.

According to the respondents predators were also important problems for poultry production in the study areas. Common predators identified by respondents were eagle (47%), wild cat and volcher (10%). Halima (2007) and Fisseha *et al.* (2010) also indicated that predators were the major constraints in village chicken production in north-west Ethiopia.

Socio-economic aspects

The majority of interviewed farmers (65%) rear poultry for income generation. Respondents also indicated that they produce for home consumption (improve family nutrition) and for ceremonial and religious purposes. Mammo (2007) indicated that the major purpose of poultry keeping was mainly for income generation followed by home consumption and religious purposes in Jamma districts of south Wollo zone, Ethiopia. Most of the respondents (52%) give chicken products especially egg for infants whereas about 23% the respondents reported that the give chicken products for whole family members. About 9% of the respondents indicated that they give priority to pregnant women, 7% for adults and 5% of respondents nursing mother (Table 13).

Table 13. Purpose of chicken keeping and priority of poultry products in family nutrition

Purpose of chicken keeping	Percent (%)
Income generation	65.0
Home consumption	17.0
Ceremonial and religious purpose	10.0
Others	8.0

Group of family members	Percent (%)
To infants	52.0
To pregnant women	9.0
Adults	7.0
To lactating mother	5.0
To older people	4.0
To all group in the family	23.0

About 37% of the respondents reported that they do not consume poultry meat and poultry products due to the fact that they are expensive. This is in agreement with the report of Mammo (2007) for South Wollo zone, Ethiopia. Even those owners who have chicken prefer selling than consuming, as they have given priority to generate cash income.

Market price for poultry was influenced by different attributes in the study areas. Some of the major attributes were: weight, feather color, comb type. Poultry price was also influenced by seasons (Table14)

Table14. Reasons for the seasonality of poultry and poultry products

Reasons	Percent (%)
Disease	63.0
Demand and supply problems	25.0
Market problems	2.0
Religious/ceremonial target	6.0
Have no information	4.0

A large number of respondents (63%) reported that chicken price is lower during rainy/wet season due to diseases such as Newcastle disease and cossidiosis. About 25% of the respondents attributed price seasonality to demand and supply poultry in the market. For instance, during rainy season the supply of chicken is high while

demand is low. In addition to disease problems, chicken are also considered as enemy to backyard vegetables in rainy season. About 6% of the interviewed farmers reported that both the demand and supply of chicken and chicken products are high during the cultural and religious festivals such as Easter (*'Fasika'*), the Ethiopian New year and Christmas (*'Gena'*). Fisseha *et al.*; (2010) also indicated that chicken price was lower during rainy season due to the high risk of diseases and shortage of disposal cash by farmers.

Conclusions and recommendations

Our results indicated that chicken production is traditional with very weak or no extension services especially in tackling occurring diseases.

To improve the current production and productivity of chicken production in the areas:

- Strengthening extension services in the area of input provision (medicines, vaccination, and feeds,) are crucial.
- Control and prevention of diseases, mainly Newcastle, can be achieved mainly through sanitation practices, vaccination and prophylactic treatments.
- Capacity building of chicken producers in formulating ration from locally available feed materials and strategic supplementation are needed.
- Introduction and demonstration of movable poultry houses are important to protect the attacks from predators and high productivity.

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