British Journal of Poultry Sciences 4 (3): 53-59, 2015
ISSN 1995-901X

DOI: 10.5829/idosi.bjps.2015.4.3.10170

Characterization of Indigenous Chicken Production and Utilization in Western Oromia, Ethiopia

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Abstract: The survey was conducted in Western Oromia to investigate the production and utilization indigenous village chicken under small scale farmers for future genetic improvement. Purposive sampling technique was used focusing on accessibility and chicken production potential. A total of 100 farmers were interviewed using semi-structured questionnaire. The overall mean of chicken flock size per household was 9.3±0.7. The results of the study showed that the main production system of indigenous chicken was free scavenging (50%) with supplement grains based on availability and scarcity of feeds. The majority of the respondents (78%) were reared indigenous chickens for income generation while 20% and 2% for household consumption and religious purposes. About 87% respondents select their indigenous chicken for breeding based on feather color, egg production, body size, comb and wattle shape, respectively. Newcastle disease (*Fungile)* and predators were reported as major bottlenecks to chicken production. We suggest capacity building for farmers and extension staff in areas of feeding, health and record keeping for improved production and productivity of indigenous chickens.

Key words: Chicken · Traditional management · Oromia · Ethiopia

INTRODUCTION

The total chicken population in the country is estimated to be 51.4.million [1]. According CSA [1] showed that indigenous, hybrid and exotic poultry breeds were 96.8%, 2.4% and 0.8%, respectively. Despite such large population, the total output of poultry is very low [2]. This is due to majorities (99 %) of these chickens are maintained under a traditional system with little or no input for housing, feeding or health care [3, 4]. Traditionally used indigenous chicken breeds are excluded from competition in spite of their occasionally unique values as meat quality, disease resistance and adaptation to the local environment. Village chicken represents a significant component of the rural household livelihood as a source of cash income and nutrition in Ethiopia [5]. Leta and Bekana [6] reported that traditional chicken keeping is practices by virtually every family in rural Ethiopia due to they provide protein for the rural population and generate family income. Alemu [7] and Smith [8] revealed that poultry production an ideal starting point for beginning animal agriculture and rich source of animal protein to human food. The same author confirmed the local chicken are ability to adapt to most areas, rapid growth rate, short generation time, low initial investment and small land size requirement. The major challenges in village based chicken productions in Ethiopia were 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 [9]. 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 [10]. This implies that the introduction of improved small-scale poultry (chicken) production is crucial to alleviate the poverty in our poor rural farmers.

Information of the indigenous chicken production and utilization systems, prospects and limitations are important in the design and implementation of village based chicken development programmes, will move away from the traditional backyard family system to improved (exotic) family poultry and increase the scale of the

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operation of the specialized layer and broiler production. Therefore, the objectives survey was to investigate baseline information on production, utilization and constraints of indigenous village chicken of small scale production system.

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 [11] Version 16.

RESULTS AND DISCUSSION

Socioeconomic Characteristics of the Household: The average household size was 6.7 ±0.24 they range from 2-12 persons. The mean family size obtained in the current study was lower than the 8.5±3.7 reported by Solomon *et al*. [10] for East Wollega and west Shoa zones. The overall mean land holding per household was 2.6 ±0.3 ha and it ranges from 0.25 to 13.5. The lands allocated for crop production (2.2ha) and grazing (0.8ha) (Table 1). More land used for crop production. This is implies that poultry production paramount important in the areas due to small land required for investment.

Famers acquired foundation flock of chicken through different systems. The majority of respondents obtained by purchase (91.9%), 6.1% sharing of chicks called "*Ribbi*" and 2% of acquired from parents. Similarly, Mammo [12] 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.

Production Performance of Chicken: The average age of local pullet to first egg is about 5.7 months. Similarly, age at first egg ranges from four to seven months in Mid Rift Valley of Oromia, Ethiopia [6]. This also in agreement with the work done by Hallima [13] in North West Ethiopia who recorded that 31.92 % of the pullets and 20.07 % of the cocks reached maturity at 28 to 32 weeks. It was also reported that sexual maturity of female chickens to be 28 weeks in Tanzania [14],24 weeks in Mali and Nigeria [15,16], 32 weeks in Sudan [17], 28 to 36 weeks in Benin [18]and 25 weeks in Senegal [19]. Fisseha *et al*. [20] reported longer age (month) of indigenous pullet at first laying in Bure (6.42), Fogera (5.9) and Dale (7.1) areas, respectively. The number of clutches/chicken /year is about 4.6 and the average number of eggs per clutch/ local chicken is 14.2 (Table 3). Correspondingly, the average number of eggs / hen / clutch reported for Bure, Fogera and Dale were 15.7, 13.2 and 14.9 [20] reported. Zemene *et al*. [21] 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*. [22] and Mandal *et al*. [23] reported age at first egg of 6.8 and 7.6 months for indigenous chickens, respectively.

From present study confirmed that average number of eggs incubated per local broody hen was about 13.3 and the average eggs hatched from incubated eggs was about 11.This is indicating that about 2.6 eggs were spoiled (Table 4). Zemene *et al.* [21] reported 12.8 eggs as average number of eggs incubated per hen average hatchability of 79.1%. Fisseha *et al*. [20] also indicated that the average hatchability percentage of eggs from local hens to be 82.6%.

Breeding of Chicken: The respondents reported that about 95% the farmers were owned local chickens breeds. The survey was indicated that 3% owned both local and exotic ecotypes and while 2% owned exotic chicken breeds. These results confirmed by CSA [1] showed that 96.8%, 2.4% and 0.8%, of the total poultry were indigenous, hybrid and exotic, respectively.

Majority of the respondents (94%) had interest to keep exotic breeds. This was due to exotic breeds have high production in terms of egg and body size. 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. Disease outbreak and shortage of formulated ration were also raised as major production constraints of the improved chicken breeds.

Majority of the respondents (87%) were exercise selection local chicken for breeding purpose while 6.2% of the respondents do not. The survey results were revealed that 66.8% of the respondents exercise selection both for female and male while about 17.7% of them select only female. Farmers use different production traits and

Table 1: House holding characteristics

Characters	N	Min	Max	Mean	Std. Error
Family size	100	2.00	12.00	6.74	0.24
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

Table 2: Systems through which farmers obtained their chicken

Obtained by	N	Percent (%)
Purchase	91	91.9
Gift from parent	2	2.0
Shared from other people	6	6.1

Table 3: Production performance indigenous chicken in the study area

Variables	N	Mean	Std. Error
Age of sexual maturity (month)	100	5.46	0.19
Number of eggs in one clutch/ local chicken	96	14.21	0.39
Number of clutches/ chicken /year	95	4.60	0.22
Mean age of local pullet at first egg (month)	100	5.66	0.19
Age of sexual maturity (month)	100	5.46	0.19
Number of eggs in one clutch/ local chicken	96	14.21	0.39
Number of clutches/ chicken /year	95	4.60	0.22

Table 4: Hatchability performance of local hen in the study area

Hatchability performance	N	Minimum	Maximum	Mean	Std. Error
Number of eggs incubated/ broody hens	98	8	25	13.29	0.30
Number of eggs hatched/ incubated eggs	98	6	22	10.94	0.28
Number of spoiled/ incubated eggs	90	0	7	2.62	0.14

Table 5: Class of indigenous local chicken farmers

Chicken owned	N	Minimum	Maximum	Mean	Std. Error
Hen	95	1	24	4.00	0.32
Cock	75	1	14	1.89	0.77
Chick	52	1	30	8.13	0.21
Over all chicken	100	1	42	9.32	0.71

Table 6: Character for which farmers were selected local chicken for breeding

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

Table 7: 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

phenotypic characters to select their chicken for breeding purposes. Agreement with Nebiyu Yemane *et al.* [24] reported 83.6% practiced selection in their chicken flocks for females (68.4%) and for both sexes (31.6%) in Halaba district of southern Ethiopia. Most of the respondents (37.4%) use egg production performances as indicator to select females for breeding, body size, feather color, comb and wattle shape are some of the traits used to select males. Preceded by egg production, body size of the chicken is the most important parameter used for selection of female (Table 6).

Majority of the respondent (59%) prefer red color ecotype and about 25% white colored for high egg productivity. Red ecotype colored is the most preferred color of female chickens. This color preference is due to the belief that red ecotype female chickens are more productive in terms of egg and meat and high market demand than the other female ecotype while white ecotype, they were easily picked up by predators due to white feather can be easily seen by predators from far distance especially by eagles and volcher. In agreement with the work of Nebiyu Yemane *et al.* [24] in Halaba district of southern Ethiopia red ecotype more preferred by farmers in terms of egg and meat productions. According to the survey results farmers are culling unproductive chicken through selling (66%) and consumption (39.4%) at home for family nutrition.

Chicken Husbandry Practices

Housing: Village chickens spent more of the daytime in extensive scavenging in and around the house. The respondents were revealed 55% share same room with chicken during night time, which called perch ' *koti*, 20% housed their chicken in different quarter in the roof, 14% house separately and 11% house them in the kitchen. These results are confirmed by Leta and Bekana [6] farmers in mid Rift Valley of Ethiopia provided night shelter for their chickens in either part of the kitchen (1.4 %), in the main house (58%), perch 26.6% and/or in separate sheds purpose-made for chickens (14 %). Fisseha *et al.* [20] 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*. [21] showed that about 88.3% of the chicken owners shared their main houses with the chicken and other farm animals, which makes the biosecurity of village poultry production system extremely poor.

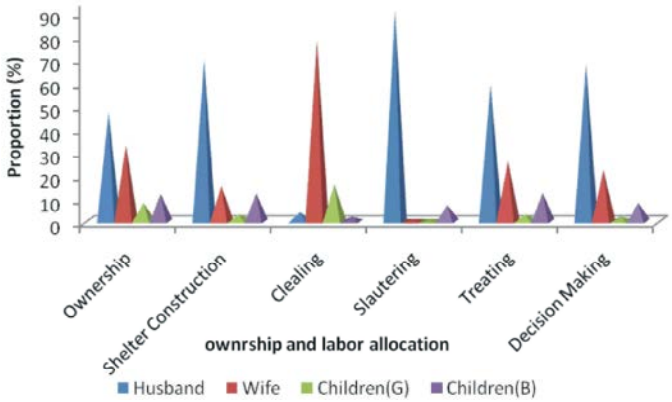

Fig. 1: Household division of labor in chicken husbandry practice in the study area

Division of Labor in Chicken Management: All family members participate in chicken husbandry and management practice in study areas. Though, both the husband and wife have equal right in ownership, decision was mainly made by husband. According to the present study 78%, of the respondents in study areas reported that cleaning house of chicken was primarily handled by wives (Figure 1), while egg management and feeding are done by wife and children. Poultry house construction and nests where females lay eggs are constructed by husbands (69.4%). The survey work done in mid Rift Valley of Ethiopia by Leta and Bekana [6] men take their share in poultry production by contracting poultry house accounting 57.5% followed by children accounting for 30%. Respondents reported that about 91% poultry slaughtering and treating of sick animals using different local medicinal herbs and taking sick chicken to veterinary clinics are done by husbands (Figure 1).

Feed and Feeding Management: The present results were confirmed that free scavenging (50%) the dominant chicken's production system in western Oromia, Ethiopia. Based on availability and scarcity feed village chicken were supplemented grains like maize, sorghum, wheat and finger millet. Similarly, scavenging was the major source of feeding chickens in in Halaba district of southern Ethiopia [24] and Leta and Bekana [6] in mid Rift valley of Ethiopia with conditional feed supplementation. Bogale [25] also reported that majority (88.9%) farmers in the Farta district of Amahara regional gave supplementary feed to their chicken. Leta and Bekana [6] reported in mid rift valley Ethiopia 98% farmers practiced supplementary feeding systems which is uses greater than 90% maize, wheat, sorghum and household waste products as the main supplement of chicken feed. This result is similar to the results of work done by Halima [13] in northern Ethiopia who reported that 96.8% of the farmers supplied partial supplementation of feeds and 95.5 % of the feed was produced locally.

The study results were revealed that 79.8% time supplementation was done in the morning. Major reasons for supplementation were to increase egg yield (70.7%), improve meat yield (13.1%) to shorten age at marketing or improve growth performance (12.1%) the chicken and to improve efficiency of hen's broodiness (5%) during incubation.

The farmers' practices supplementation feed based different class of chicken; however, high preference supplementation was given for chicks and layers (Table 8). The results revealed that chicks followed by layers hens were given priority in case of supplemental feed provision, since chicks are not yet in a position to scavenge feed and the layers hens were mostly being kept inside the house lay the eggs and do not have enough time to freely scavenge and get their feed This findings are in agreement with results reported by Fisseha *et al*. [20] in that young chicks and layers are given priority in supplementary feeding and Nebiyu Yemane, *et al*. [24] in Halaba districts of southern Ethiopia priority of supplemental feed provision for chicks and brood hens.

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*. [20] 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.

Table 10: Type of feed/food offered as supplement for village chicken

Type of feed/food for supplementation	N	Percent (%)
Grain(Maize, sorghum, wheat and finger millet)	86	86.9
Food left over (Breed,Injera,kolo and others)	12	12.1
All as its availability	2	2.0
Total	100	100.0

Table 8: Priority of supplementation in village 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

Table 9: Disease/symptoms identified by respondents

Disease/symptoms identified	Percent (%)
Diarrhea, sudden death, paralysis,	75.0
External parasites	2.0
Newcastle disease(Fungile)	24.0

Hatchery and Egg Storage: The majority of the respondents (68%) practice selecting of eggs for incubation based on body size of hens, size and shape of eggs. More than 80% of the respondents reported that they prefer eggs from large body size hens for incubation while very few farmers (2.5%) did not bother about the size of hen when selecting eggs for incubation. This is indicating that chicks from large body sized hens grow faster and larger in body 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 %). 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). Leta and Bekana [6] confirm that 61% of the farmers identify spoiled eggs during incubation by sun candling 39%, shaking 33% and putting in water 28%. 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. According to Leta and Bekana [6] revealed that in mid rift valley Ethiopia 54% of the farmers incubate chicken eggs at any time while 42% of the respondents incubate chicken eggs at dry season. The materials used for brooding in survey areas were local made material '*gorbo*'(56%), clay pots with straw bedding (38.2%) and clay pot without bedding (5.6%), respectively. The average number of eggs laid per clutch from local hens is about 16.5, which ranges from 8-25 in the study areas. This is comparable with the 16 eggs (8 to 28 eggs) reported by Fisseha *et al*. [20] in Bure district of the Amhara regional state.

Health Managements of Village Chicken: Diarrhea, sudden death and paralysis were the most economically important problems identified in the areas followed by Newcastle disease (Table 9).

In the current study the farmers were identified only Newcastle disease (*Fungile*) by local name poultry diseases. Tadele [26] and Amsalu [27] also reported that Newcastle disease is probably, the only disease can be identified by farmers in rural areas on the bases of clinical sign. The most prevalent disease of local chicken in Halaba districts of southern Ethiopia was Newcastle disease (locally known as "Kimbisha") [24]. That was probably why Newcastle disease acquired specific local name such as *Fungile* or *Encurif* in Ethiopia. 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 [13] and Fisseha *et al*. [20] also indicated that predators were the major constraints in village chicken production in north-west Ethiopia. According to Nebiyu Yemane*, et al*. [24] report farmers ranked predators like hawks, foxes and wild cats as the main constraint of poultry production in Halaba districts of southern Ethiopian. In contrast to the present results, Moreki [28] reported that mortality due to diseases as the main constraint to village chicken production. The most common traditional medicine used in the study area for treating sick chicken mix lemon juice in poultry feed (29.3%) and juices of different plant leaves (18.7%), while 52% of the respondents reported that they did not know traditional herbs used to treat their chickens. Similarly, Nebiyu Yemane, *et al*. [24] findings water in Halaba districts of southern Ethiopia farmers treating sick birds *by* traditional medicine like tobacco leaf, lemon juice and table oil which were administrated with a drinking.

Marketing of Village Chicken: From the survey results the farmers report that keep poultry for income generation (78%). Although they kept poultry for home consumption to improve family nutrition and ceremonial and religious purposes. Mammo [12] 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. There is division of family in poultry meat consumption based age (Table 10). About 37% of the respondents reported that they do not consume poultry meat and poultry products due to the fact that they are expensive. In the study areas respondents are preferred selling chickens for generate cash income rather than consumption at home. This is in agreement with the report of Mammo [12] for South Wollo zone, Ethiopia.

Table 10: Priority of poultry products in family nutrition

Group of family members	Percent (%)
Infants	59.0
Pregnant women	7.0
Adults	5.0
Lactating mother	4.0
Older people	1.0
All group in the family	24.0

Table 11: Prices for different types of chicken and egg during the study period (2012)

Price of chicken and egg	N	Minimum	Maximum	Mean	Std. Error
Average price of egg	96	1.00	2.50	1.69	0.03
Average price of pullet	96	25.00	71.0	57.19	7.53
Average price of hen	96	25.00	95.00	63.02	1.64
Average price of cock	96	50.00	150.00	99.64	2.04
Average price of cockerel	95	40.00	125.00	67.79	1.57

Table 12: 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

The prices of different group of chicken and egg were presented in Table 11. An average mean price of cockerel was greater than both pullet and hen (Table 11). Fifty percent of the respondents had access to credit service. The main purchasing and selling criteria for female and male chickens used by farmers in the study area were color, comb type and body size like breeding, respectively.

Market price of poultry and egg were influenced by different attributes in the study areas (Table 12).

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*. [20] 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 poultry production is traditional with very weak or no extension services. To improve the current production and productivity of poultry production in the areas:

- Strengthening extension services in the area of input provision (feeds, medicines, vaccination, etc.) are crucial. Control of diseases, mainly Newcastle, can be achieved mainly through sanitation practices, vaccination and prophylactic treatments.
- Capacity building of poultry 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. Movable poultry houses can be constructed from locally available materials with minimum coast.
- Capacity building for farmers and extension agents in record and record keeping can help improving productivity via selection and mating.
- Linking farmers to pullet producers in order that they can communicate and buy pullets by themselves than looking for extension staff to have pullets

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