COLLEGE OF AGRICULTURE

SCHOOL OF ANIMAL AND RANGE SCIENCES

ASSESSING MANAGEMENT PRACTICES OF EXOTIC CHICKEN BREED, REARED IN SHEBEDINO DISTRICT, SIDAMA REGIONAL STATE, ETHIOPIA

MSc. THESIS

BY

ALEMU ALASO ADISO

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HAWASSA, ETHIOPIA

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(SPECIALIZATION: ANIMAL PRODUCTION)

MAJOR ADVISOR: MOHAMMED BEYAN (PhD, Associate Professor)

CO-ADVISOR: TEGENE NEGESSE (PhD, Professor)

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DECLARATION

Hereby I confirm that, this thesis is my own research work and has not been presented for a degree in any other university, and all sources of material used for this thesis / dissertation have been duly acknowledged. This thesis is submitted in partial fulfillment of the requirements for the Master's with specialization in Animal production, the Graduate Program of the Department/School of Animal and Range science in Hawassa University. Copies of this thesis will be deposited in the Hawassa University Library and will be made available to borrowers under the rules and regulations of the Library.

Name: Alemu Alaso Adiso

Signature: _____

Place and Date of Submission: _____

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ACRONYMS AND ABBREVIATIONS

BB	Bovans Brown
CSA	Central Statistics Authority
DOC	Day Old Chicks
DZARC	Debrezeit Agricultural Research Center
FAO	Food and Agriculture Organization of the United Nations
GOs	Governmental Organizations
Ha	Hectare
HH	Household
IB	Issa Brown
IBD	Infectious Bursal Disease
IFAD	International Fund for Agricultural Development
MoA	Ministry of Agriculture
MoARD	Ministry of Agriculture and Rural Development
NCD	New Castle Disease
NGOs	Non-Governmental Organizations
NVI	National Veterinary Institute
PMDC	Poultry Multiplication and Distribution Center
RIR	Rhode Island Red
SNNPR	Southern Nations Nationalities and Peoples Regional State
SWADO	ShebedinoWoreda Agriculture Development Organization
USAID	United States Agency for International Development
WLH	White Leghorn

ABSTRACT

ASSESSING MANAGEMENT PRACTICES OF EXOTIC CHICKEN BREED, REARED IN SHEBEDINO DISTRICT, SIDAMA REGIONAL STATE, ETHIOPIA

BY

ALEMUALASO

ADVISORS: MOHAMMED BEYAN, TEGENE NEGESSE

Exotic chicken management practices, performance and challenges and opportunity infive kebeles of Shebedino district in Sidama Regional state, Ethiopia were assessed. Sample size of HHs for the survey was determined using a multi stage sampling technique and Processed data analyzed by using statistical package for social science (SPSS) version 20.0 soft ware. Five kebeles (2 from highland, 3 from midland and 4kebeles and 1kebele from rural and urban areas respectively) were selected purposively based on potential of production. Total sample size of selected population was 137of which59.85% was male and 40.15% were female. The average family sizes were 5.54 and 5.53 persons with in highland and mid-land of the district, respectively. Age of respondents ranged from 44.5 and 45 years for Highland and Mid-land Agro-ecologies of the district, respectively. Total landholding/HH were 0.5-1 ha (24.8%) and 1.25-1.75 ha (57.67%), 2-2.25 ha (13.13%) and 2.5-3 ha (4.4%) of the respondents both high and mid land agro-ecologies. Average numbers of exotic chicks, pullets, cockerels, hens and cocks per HH were 17, 5.3, 2.6, 7.3and 2.8 respectively, both high and mid land agro-ecologies. Majority of the sample respondents (58.7%) and (63.7%) in the highland and midland of the district respectively; keep exotic chickens primarily for income generation and next home consumption. Commonly distributed exotic chicken breeds were Sasso (49.64%), IB (Issa Brown) (43.06%) and BB (Bovans Brown) (7.3%) in the high land and mid land of the district. Majority of households (71.53%) practice free-scavenging or/and extensive poultry production system and about a quarter of them semi-intensive poultry production system. The exotic chickens rearing experiences of household were ≤ 5 years (8.76 %), 6-10 years (41.61 %) and > 10 years (49.63 %). Majority of respondents (67.9%) used traditional housing with main house. Higher numbers of the respondents (68.6%) obtain from local available feeds.75.9% of the respondents practiced supplementary feeding by maize, kocho, home left over and wheat bran to their exotic chickens. Majority of respondents (82.4%) provided water adi-libitum, whereas 14.7% provided three times per day and the remaining 2.9% offered twicea day. The major diseases reported in the study area, in the order of their importance, were Newcastle, coccidiosis and fowl pox. Bovans brown, Issa brown and Sasso attained sexual maturity at 90-120 days. The predators that most commonly occur and attack exotic chickens were wild cat (local name Ganchara), fox and hawk. Disease, feed problems followed by predators and poor adaptation were challenges of exotic chicken production. Major opportunities of rearing exotic chickens in the study areas were access to market, veterinary service and extension service and adaptation problem of exotic chickens. Government should create awareness on vaccination of chicken against major poultry diseases in the study areas.

Key word: Exotic chicken management, Challenges and Opportunity.

1. INTRODUCTION

1.1. Background of the study

Livestock production in general and chickens in particular play important socioeconomic roles in developing countries (Alders, 2004; Salam, 2005). Poultry production has a major role in the economy of developing countries, including an important role in poverty alleviation by means of income generation and household food security (Gondwe, 2004 and Abdelqader et al., 2007). Provision of animal protein, generation of extra cash incomes and religious/cultural considerations are amongst the major reasons for keeping village chickens by rural communities (Alders and Pym, 2009). Nearly all rural and per-urban families in developing countries keep a small flock of free range chickens (Jens et al., 2004).

Ethiopia has about 60% of the total chicken population of East Africa, which includes local, exotic, and hybrid chicken breeds. Report on population of Ethiopian chickens estimated to be about 59.49 Million and with regard to breed, 90.85%, 4.76% and 4.39% of the total poultry population to be indigenous, hybrid and exotic, respectively (CSA, 2017).

Poultry production has an important economic, social and cultural benefit and plays a significant role in family nutrition in the developing countries. The proportional contribution of poultry to the total animal protein production of the world by the year 2020 is believed to increase to 40%, the major increase being in the developing world (FAO, 2010).

In Ethiopia, about 95.86% of the total national poultry products (eggs and meat) are comes from Indigenous chickens kept under village management system while the remaining 1.35% is obtained from intensively kept exotic breed of chickens and 2.79% are obtained from hybrids. However, due to low productivity of indigenous chickens it was important to introduce

different exotic breeds of chickens to be used for crossbreeding with the indigenous chickens (Tamirat, 2015).Four breeds of exotic chickens (Rhode Island Red, Australorp, New Hampshireand White Leghorns) were imported to Ethiopia and extensively researched since the 1950s (Demeke, 2008). Higher learning institutions, research organizations, Ministry of Agriculture, and Non-Government Organizations have focused on the introduction of exotic breeds of chickens into the country for distribution to the farming population along with management i.e. feeding, housing and health care practices (Tadelle, 2011).

The production performance of exotic birds under the Ethiopian condition needs to be monitored regularly to give guidelines for policy makers. However, lack of recorded data on the productive performance of chicken makes it difficult to assess the importance and contributions of the past attempts made to improve the sector (Moges et al., 2010).

The mean annual egg production of indigenous chickens is estimated at 60 small eggs with thick shells and a deep yellow yolk color. But even if they show low productivity, they are well adapted to the tropics, resistant to poor management, feed shortages and tolerate some of the most common diseases and parasites. On the other hand, improved exotic chickens produce higher number of eggs and more meat than the indigenous chicken breeds, but tropical climate is a great challenge. It was indicated that all the imported breeds of chickens performed well under the intensive management system in Ethiopia. The idea of distributing exotic chickens particularly Rhode Island Red(RIR) to the farming population was to improve the productivity of local birds by mating them with improved cocks (Yami and Desie, 1997).

Currently, one of the extension options to attempt is the use of full packages jointly with improved exotic breeds that are better in terms of productivity. The Extension Department of

the Ministry of Agriculture of Ethiopia has shown more preference and interest in the use of the Rhode Island Red breed that could be serving as a dual-purpose for both egg and meat production. Additionally, Fayoumi breed has been imported with the expectation of better productivity, adaptation and disease resistance than the other exotic breeds in rural setting of Ethiopia (Wilson, 2010).Tadesse et al., (2013) and Akililu et al., (2004) reported that the exotic chicken such as Brown, Bovans Brown, Potchefstroom Koekoek and Sasso were distributed to smallholder farmers of some parts of the country. However, there are a number of challenges and constraints limiting the success and profitability of Exotic chickens kept under both backyard and semi-intensive production system in Ethiopia. Like feed availability and quality, disease and predators, extension problems, exotic chicken adaptation challenges, genetic dilution of local breeds and veterinary service shortages are the major today's poultry sector headaches (Dessie et al., 2013).

There are encouraging attempts to improve the poultry subsector and currently Ethiopia is strengthening the efforts to increase facilities such as the animal health services, the training of beneficiaries in health and husbandry practice and on- and off-farm adaptive research on topics related to poultry production.

1.2. Statements of problem

Shebedino district is one of the 36 districts of Sidama zone found in Region of Ethiopia, where exotic breeds of chicken are found highly distributed through extension services. There are many farmers owning exotic chickens who make part of their living from the income generated from the sale of eggs and live animals. However, the production system of exotic chicken in the study area is largely based on free ranging (back yard) and extensive type, which is not proper for the exotic breed to optimize their productive potential chickens are managed mainly

utilizing various feed sources searching by their own in the field, with conditional feed supplementation. Few exceptions where some farmers practice semi-intensive type of chicken management using fences around their homestead are observed in the district.

Due to the nature of the management systems, which are traditional, the exotic chicken are challenged with several constraints; such as feed problems, lack of health care, poor housing, etc., Hence, the producers are not in a position to obtain optimum performances from these animals. Therefore, there is a need for improvement of the management practices for the exotic animals. To this effect an appropriate intervention of stakeholder is very critical. However, there is lack of documented information regarding the conditions and management practices of the exotic chickens in the District. This study is, therefore, aimed at generating the required information and producing a document that can fill the gap.

1.3. OBJETCIVE(S)

1.3.1. General Objective

To study management practices, associated constraints and performance of exotic chicken breeds in Shebedino district.

1.3.2. Specific objective (s)

-To assess the exotic chicken management practices in the study district

- To assess e exotic chicken performances in the study area

- To assess the challenges and opportunities of exotic chicken production in the study district

2. LITERATURE REVIEW

2.1. Introduction of Exotic Chicken Breeds:

Exotic chickens were first introduced into Ethiopia in 1953 and 1956 by Jimma Agricultural and Technical School and Alemaya College of Agriculture, respectively (Wondmeneh et al., 2016). It has been reported that many exotic breeds of chicken (White and brown Leghorns, Rhode Island Red, Bovans, NewHampshire, Cornish, Australoup and Light Sussex) were introduced over the past years. This introduction of exotic breeds can be occurred through importing Day-old chicks (DOC) which were either imported from Egypt, Germany, Holland and other countries, pure exotic pullets, Cockerels, Fertile eggs to farmers from abroad as well as to poultry breeding and multiplication centers. The common exotic breed may use as pure and/or for cross breed (Haftu, 2016). According to (Teklewold et al., 2006) and (Reta, 2009), the past genetic improvement efforts of the Ethiopian village chicken through cross breeding with exotic chicken extension was constrained by lack of comprehensive poultry technology extension package for distribution to the end users. In the recent years, the Egyptian Fayoumi breed has been imported with the expectation of better productivity, adaptation and disease resistance than the other exotic breeds in rural setting of Ethiopia (Wilson, 2010).

2.2. Poultry Production Systems in Ethiopia

2.2.1. The Free Range (Extensive) Poultry Production System:

The sources of replacement stocks are usually rough purchasing followed by household hatching and others. In this system chickens are usually kept under free-range system and the major proportion of the feed is obtained through scavenging. There are high off-take rates especially during national holidays and occasionally high mortality rates Emebet M et al., (2013) and CSA

(2009). Women are the primary owners and managers of chickens in the traditional poultry production sector. Rural women raises poultry for income generation aimed at purchasing of basic commodities such as salt, cooking oil, sugars and others Nasser M et al., (2000). In this system chickens are usually kept under free-range system and the major proportion of the feed is obtained through scavenging.

It accounts for 96.9% of Ethiopia's 50.38 million poultry population (CSA, 2013). The system is dominated by indigenous chickens, and characterized by the production of a small number of low-yielding chickens (40–60 eggs/hen per year), an average flock size of 7–10 mature birds per household and with little or no additional inputs for feeding and health care, except provision of shelter during the night time. Hatching and brooding are entirely natural, by broody hens, but there is often very high chick mortality, of 25–88% (Tadelle et al., 2003). The target of production is mainly for home consumption (Tadelle, 1996), but many farmers rarely consume their own birds or eggs, instead preserving them as a 'safety net' which they can sell when needed. Women are the primary owners and managers of chickens in the traditional poultry production sector. Rural women raises poultry for income generation aimed at purchasing of basic commodities such as salt, cooking oil, sugars and others (Nasser et al., 2000).

In this system chickens are usually kept under free-range system and the major proportion of the feed is obtained through scavenging. There are high off-take rates especially during national holidays and occasionally high mortality rates (Emebet et al., 2013) and (CSA, 2009).

2.2.2. Semi-intensive Chicken Production System

This type of chicken production system is better than free ranging production system since it uses inputs like supplemental feed, vaccine, etc. It has a small house which accommodate laying nest and feeders which serves as chicken house for night time. The house has one or two side open door for easy movement of the chicken to the fenced area during the day time. The fence can be made from mesh wire or other materials and will not allow the chicken to escape above on it. The fenced area should be always clean and dry. Since the feed the chickens obtain from the scavenging is very low, they should be supplemented with energy and protein feeds. Since the main objective of the production is to get profit, they should get better health management practice like vaccination against NCD than free scavenging system. They are more productive than the chicken in free scavenging system. It contains flock size of 50-200 birds/chicken per household which are improved breeds (Bush, 2006)..

The total number of small-scale intensive poultry producers and their specific contribution to the national poultry production is not known. However, they provide the largest share of poultry eggs and meat to the growing urban population (Boere *et al*., 2015).

2.2.3. The Intensive Poultry Production System:

This production system is highly intensive production system involves an average of 10,000 chickens kept under indoor conditions with a medium to high bio-security level. This system heavily depends on imported exotic breeds that require intensive inputs such as feed, housing, health, and modern management systems. It is estimated that this sector accounts for nearly 2% of the Ethiopian poultry population. This system is characterized by higher level of productivity and entirely market oriented to meet the large poultry demand in major cities. The existence of

somehow better bio-security practices has reduced chicken mortality rates to merely 5% (Bush, 2006).

The large scale commercial poultry Provide fertile eggs, table eggs, day old chicks, broiler meat and adult breeding stocks to the small scale modern poultry farms. The general indications are that the intensive poultry industry plays a key role in supplying poultry meat and eggs to urban markets at a competitive price. The industry also provides employment for a range of workers from poultry attendants to truck drivers to professional manager (Getinet, 2007).

There are few private large scale commercial poultry farms in our country, all of which are located in DebreZeit. ELFORA, Alema and Genesis are the top three largest commercial poultry farms with modern production and processing facilities (Bush, 2006).ELFORA annually delivers (www.ethiomarket.org elfora), around 420,000 chickens and over 34 million eggs to the market of Addis Ababa. Alema poultry farms is the 2nd largest commercial poultry farms in the country delivering nearly half a million broilers to Addis Ababa market in each year. The farm has its own broilers parent stock, feed processing plants, hatchery, slaughter houses, cold storage and transportation facilities.

2.3. Management Practices of Exotic Chickens

2.3.1. Housing system

Chicken houses can be constructed from locally available materials, with well-built wall, adequately ventilated with corrugated wire, equipped with watering and feeding materials and provided with litter materials was considered as constructed based on the recommended government extension package for poultry housing. The lesser use of recommended specifications in poultry house construction indicates the lack of technical training on scientific

poultry rearing to the producers. Generally, it was also observed that few HHs is residing near the town and main road to Addis Ababa providing electricity and litter material in poultry houses. (Moges et al., 2010) and (Takele and Ali, 2011) reported that, the provision of electricity and litter materials for village chicken was not practices in most parts of Ethiopia. Both fixed and mobile shedding are common used in free-range systems. The fixed sheds have litter, perches and nest boxes. However, fixed housing is rarely used in free-range operations, with the most popular system being the movable shelters and birds provided an area of pasture in a national system (Glatz and Yingjun, 2004). According to (Desalew et al., 2013) finding, from the total of 280 chicken owners interviewed, only 62 farmers (22.1%) prepared separate overnight houses for village birds. Majority (77.9%) of village chicken owners kept birds on various night sheltering places including; perches inside the house (45.7%) on the floor covered by bamboo made materials (27.1%), on ceilings of the house (3.6%) and under locally constructed sitting place (1.4%).

2.3.2. Feeding and watering systems

The dominant system of poultry feeding practiced in Ethiopia is free scavenging with supplementary feeding. However, the proportion of those that supplement their chicks with a commercial ration is very small (Halima, 2007; Moges et al., 2010 and Mengesha et al., 2011). Supplementary feed was provided by majority (97.5%) of chicken owners, while 84.3% of them did this between the months of July to September. Grains and household leftovers were the major kinds of feeds stuffs (56.4%) supplemented by chicken owner farmers. Most these chicken owners (87.1%) used cereal crop harvest (self produced grains) as supplementary feed (Fisseha et al., 2010). Halima (2007) also reported that 99.3% of chicken owners in North West Amhara Region provided supplementary feeds to village birds. Similarly, (Mapiye et al., 2005)

reported that 95.5% of the farmers in Rushinga district of Zimbabwe produced their own supplementary feeds and only 4.5% used purchased feed.

(Desalew et al., 2013) revealed that, about 96% of respondents were provided water with free access. Likewise, (Moges et al., 2010) and (Mengesha et al., 2011) reported similar, watering practices in Bure district of North West Zone of Amahra region and Jamma district of South Wollo, respectively. All village chicken owners (100%) of the district provided water to village chickens; 85.4% only during the dry season and 14.3% throughout the year. The major sources of water for chicken in the area were river (30.4%), spring (28.5%), locally made underground water (21.4%) and pipe water (19.7%). Majority of chicken owners (98.2%) had watering trough. Broken clay material, locally called "shekila", (37.3%), wooden trough (32.7%) and plastic made trough (28.2%) were the most widely used types of watering troughs (Desalew et al., 2013).

2.3.3. Chicken health and disease control measures

Melesse and Negesse(2009) reported that disease was cited as the most important constraint of village chicken production in southern parts of Ethiopia. Newcastle disease (NCD) was the most (98.2%) prevalent and economically important disease problem affecting free-range birds and it is reported to be the first major causes of chicken death/loss (Fisseha et al., 2010). Similarly, Halima (2007) reported that the major causes of death for local birds in North West Amhara were seasonal outbreaks of diseases, specifically Newcastle disease. The prevalence of the NCD and mortality of chicken were higher at the start of rainy season, mainly on April (66.8%) and May (31.4%). Serkalem et al. (2005) also reported that NCD was one of the major infectious diseases affecting productivity and survival of village chickens in central highlands of Ethiopia.

Free-range chicken owners had no any culture of vaccinating birds against diseases in Ethiopia. This might be due to lack of awareness about the presence of chicken vaccines, lack of attention to free-range chickens and low availability of vaccines. A traditional treatment was the major type of treatment used by majority of free-range chicken owners (95%) against NCD. Accordingly provision of a mixture of local alcohol (‘*Arekie*’), lemon and onion to sick birds against NCD was the most widely used type of traditional treatment. Other common types of traditional treatments observed were; use some herbs like ‘semiza’ *(Justitiaschemperina)* and ‘endod’ *(Phytolaccadodecandra)* (33.2%) and use of tetracycline capsule (Fisseha et al., 2010).

2.4. Poultry meat and egg consumption and Consumers’ preference in Ethiopia

In Ethiopia, about 95.86% of the total national poultry products (eggs and meat) are obtained from indigenous chickens kept under village management system while the remaining1.35% is comes from intensively kept exotic breed of chickens and 2.79% are obtained from hybrids Getinet (2007) Poultry products offer affordable quality animal protein sources for the smallholder farm households. Rural households consume a very limited quantity of poultry products. They rank income generation as the primary purpose of village chicken production. Poultry meat and egg consumption is moreover closely associated with wealth status. The poorer the household, the fewer poultry products are eaten, chickens is not a daily food (Dawit et al., 2012). According to the belief of Ethiopian Orthodox Tewahedo Christians, the faithful must abstain from eating meat and dairy products to attain forgiveness of sins committed during the year, and undergo a rigorous schedule of prayers and atonement. Therefore, followers do not eat meat and dairy products (i.e. egg, butter, milk, and cheese) on fasting days such as Wednesdays and Fridays except the 50 days running from Easter, the Fast of the Prophets, the fast of Nineveh, Lent, the Fast of the Apostles and the fast of the Holy Virgin Mary.

Consumption of chicken in respect to the Ethiopian people has very cultural practices, that is, the preparation process of the national dish, "Doro wat", has strict traditional guidelines and gendered roles. Cuisine may vary from region to region but regardless of their religion, Ethiopian women learn the ritualized process of making this traditional dish as a 'rite of passage (Natasha,2011).The chicken is halal or kosher slaughtered by men after having been blessed. Slaughtering animals is a job reserved for men but only women know how to cook it; men are not allowed into the kitchen. A 'proper' lady knows how to cut a chicken into 12 perfect pieces (Janet et al., 2019). According to Natasha (Janet et al., 2019) Women begin the laborious task of cleaning the carcass. The women then cut the chicken into 12 pieces. This is done very precisely so that each wing, leg, chest, thigh, back and breast mirror each other and all veins are done away with. In the West, of course, chicken is processed before being packaged and can be bought ready to cook from the grocery store. Ethiopian women, however, buy the whole live chicken and cut it up in the traditional manner.

Consumer preference for any of these birds varies from one individual to another. In terms of adaptive traits and consumption the indigenous chickens were considered favorable. (Nigussie et al., 2010) reported that the main reason for preference of local chicken meat and egg was its perceived good taste. Most of the respondents have the opinion that the eggs (90%) and meat (92%) obtained from modern breeds have poorer taste. According to (Senbeta et al.,2015) almost half of respondents preferred to buy eggs of local chickens as they were considered to be tasty and the yellow colored yolk was commonly favored. Respondents explained that eggs from local chickens tastes better because they are scavenging natural rather than formulated feed (chemical feed).Others preferred to buy eggs of exotic chickens as they were considered to be large in size to maximize utility and better visual attractiveness of the shell color and few

respondents cannot choose for the breeds of eggs understood for their similar nutrition. Similarly, (Fisseha, 2009) reported in his study that most consumers preferred to buy local eggs from producers as they were considered to be tasty and attractive dark coloured yolk. Consumer preference observed for eggs from local, improved and both local and improved chicken were 77.8%, 17.8% and 4.4% respondents in Ada'a and 87.8%, 7.8% and 4.4%, in Lume districts, respectively, as reported by (Desalew, 2012).Shell colour is another factor that influences consumer choice. Shell colour is not an indication of internal egg quality and says nothing about the nutritive value or the quality of the egg (Flock *et al.,* 2007). However, (Senbeta et al., 2015) reported that there is usually a consumer preference to either white or brown, which needs to be given a due consideration in marketing eggs. In this regard, more than half prefer brown-shelled eggs, incorrectly believing them to be more nutritious and a better taste than white eggs and also, they expected as brown eggs comes from local hens with attractive yellow yolk colours. On the other hand, small number of respondents were found to prefer white shelled eggs as they appear cleaner and fresher, while other consumers do not pay attention to the colour of the shell considered as the same function and quality.

2.5. Economic Contribution of Exotic Chickens

According to Sonaiya(2004) smallholder-farming families, landless laborers and people with incomes below the poverty line are able to raise chicken with low inputs and harvest the benefits of eggs and meat via scavenging feed with small amount of supplementation. Family chicken meat and eggs contribute 20-30% to the total animal protein supply in low income and food-deficit countries. Rearing of chickens can create additional income besides consumption of eggs which can help improve nutritional security to the most vulnerable sections of the urban

resource challenged specifically, pregnant and nursing mothers, old and infirm people, growing children and those who are suffering from immune compromising diseases (Ruxton, 2013).

2.6. Opportunity of Improved Poultry Production

Non Governmental Organizations often have more and better equipped field staff in comparison with government agricultural offices who can work together with communities. At present Minister of Livestock and Fishery Development is the organization mandated with poultry extension work. The Ministry poultry extension activities have concentrated on breed improvement via distribution of exotic breeds. The ongoing national poultry extension package of the Ministry embraces the distribution of 3-month-old exotic pullets and cockerels. The breeding multiplication centers are expected to rear chicks up to three months of age or even older before distribution to farmers but are unable to meet demand due to the huge requirement in terms of brooding facilities, despite having adequate hatching capacity. The ministry promoted a scheme whereby cockerels and pullets of Rhode Island Red (RIR) were distributed from the breeding and multiplication centers to subsistence farmers (www.Ethio-chicken, 2015).

Recently Minister of Agriculture and Rural Development drawn up development strategy for poultry and poultry products explains that there are plans to bring about improvements through five key measures. The measures are the following which are: Properly delineating potential production areas; organizing producers into different specialized tasks and linking them up through market chains (e.g. fertile egg producers, hatchery and chick growers, pullet growers, broiler growers, feed producers, health care takers); improving input services (increasing the production capacity of existing poultry-multiplication centers, establishing new parent stock farms and chick-rearing centers); Establishing a new distribution style of focusing on potential

villages that could create easy access to such input services as improved feed and health, rather than scattering efforts thinly over long distances and motivating private-sector participation in poultry development by linking commercial farms with small-holders in a market chain (MoARD, 2010). Especial the emergency of improved chicken breeds supply models, veterinary service and consultation supply, feed and equipment supply from PMDC (Poultry Multiplication and Distribution Center) to the farmers and some poultry farms and the presence of government intervention from region to Keble level for facilitating the system are the most important practices in developing the sector(www.Ethio-chicken, 2015).

Numbers of NGOs and FAO are also involved in the implementation of poultry development projects to support vulnerable households. Donors and NGOs involved in training on household poultry and hay-box chick brooding technology and distribution of chicks of exotic breeds. They also assisted the implementation of national/regional training courses accompanied by the distribution of chicks and pullets/cockerels and to raise awareness on avian and human Influenza Small holder poultry production has been a frequent sub-component of several donor funded projects, for example the credit project of the International Fund for Agricultural Development (IFAD) targeting poorer rural women (Jobre, 2007).

Currently, Ethiopia is strengthening animal health services, the training of beneficiaries in health and husbandry practice and on- and off-farm adaptive research on topics related to poultry production and developing importation of improved breed and strategies of multiplication and distribution to the farmers and other bodies (Aklilu, 2007).

In Ethiopia, the Australian V4 feed supplied vaccine for Newcastle Disease was tried on-station and on-farm through the FAO Rural Poultry Project by the National Veterinary Institute (NVI)

with promising results. The development of the new heat tolerant vaccine that can be administered via feed opened up the possibility of significantly reducing mortality in village poultry, which should make producers more positive towards genetically improved birds and inputs to improve feeding and housing (FAO, 2013).

2.7. Major Challenges of Exotic Chicken Production in Ethiopia

2.7.1. Diseases

Exotic chicken distributed to farmers in different agro- climatic zones are exposed for to various risk factors that predispose for high chicken losses. Furthermore, the existing improper management such as improper nutrition, substandard hygienic standard, lack of appropriate disease prevention and control program are major constraints for exotic-chicken production and these contributed for high mortality rates chickens (Hailu et al., 2012).

Another study from Benishangul-Gumuz Region, Western Ethiopia performed by (Alemayehuetal., 2015) reported that Newcastle disease were the most prevalent and economically important disease affecting chicken in the study areas mainly during the rainy season. Shortage of supplementing feeds during rainy season makes the chickens more vulnerable to diseases. In addition to Newcastle disease, coccidiosis and fowl typhoid are the major cause for chicken mortality (Addis et al., 2014).

In Ethiopia, sero-prevalence surveys in village chickens have identified the presence of infectious bursal disease (IBD) (Jenbreie et al., 2012), salmonellosis(Berhe et al.,2012) pasteurellosis and mycoplasma infections (Chaka et al., 2012) parasitic diseases, including coccidiosis(Luu et al., 2013) and helminthes (Molla et al.,2012).

2.7.2. Nutritional constraint

According to Tegene(1992), Tadelle and Ogle (1996) and Alemu and Tadelle(1997) crop analysis result indicated that the physical proportion of seeds was higher in the short rainy season and the concentration of crude protein; calcium and phosphorus were below the recommended requirements for egg production. Mbugua(1990) indicated that egg production and egg size vary with season, as the quality and availability of feed varies.

The scavenging feed resource is deficient in protein, energy and probably calcium for layer birds, indicating therole of supplementation in bringing a considerable increase in egg production (Tadelle and Ogle. 1996b).

Most formulations available do not have vitamin/mineral premixes, ingredients and processed feeds vary in nutritive value and there is no regular quality control mechanism in the country. Unavailability of feed quality legislation and laboratory facilities for chemical analysis also contributes greatly to the poor quality of processed feeds. Currently, understanding the problem the Ethiopian Quality and Standards Authority is working with the Ethiopian Society of Animal Production (ESAP) on feed quality standards and legislation (Dessie et al., 2013).

2.7.3. Feed Availability

According to Tadelle et al. (2010) and Hailu et al. (2012) poultry feed and nutrition is one of the most critical constraints to poultry production under both the rural small holder and large-scale systems in Ethiopia. The problem is mainly associated with lack of processing facilities, inconsistent availability and distribution and sub-standard quality of processed feeds. Regular availability of good quality feed ingredients and a fully balanced complete feed are essential for efficient poultry production. Grains, cereal by-products, oilseed cakes and meat and bone meal

are obtained locally. The shortage in the supply of grains especially corn is improving due to the increase in the production of corn in recent years. The most serious problems arise from the unavailability of suitable micro-nutrient sources: vitamins and minerals.

2.7.4. Predation

The predation is strongly associated with the rainy season. The predators include primarily birds of prey such as vultures, which prey only on chicken and wild mammals such as cats and foxes, which prey on mature birds as well as chicks. Predators such as birds of prey (locally known as ("Culullee")(34%), cats and dogs (16.3%) and wild animals (15%) were identified as the major causes of village poultry in rift valley of Oromia, Ethiopia (Tadelleet al., 2010). Another study from Benishangul-Gumuz Region, Western Ethiopia done by (Alemayehu et al., 2015) reported that wild cat (locally known as shelemetmat), eagle and foxes were the common chicken predators identified by the chicken owners in the Region. Eagle is a serious problem in dry seasonwhile the rest is commonly attacking chicken during wet season.

2.7.5. Feed Cost

Little attention is given to the least cost formulation of rations; it is believed that considerable scope exists to reduce the price of feed in some areas without reducing its nutritive value. The lack of feed mills and dependence on supplies of some ingredients from large cities and its surroundings add to the overall cost of feed in many parts of the country. The absence of bulk deliveries and storage has increased feed costs. In some cases, a lot of wastage occurs due to weevil infestation. The shortage in the supply of protein supplements of animal origin has made the price of abattoir by-products extremely high. In many instances, the cost of mixed feed does not seem to follow reductions in ingredient cost. A price of mixed feed remains unduly high

even at times when the price of the major component of mixed rations (e.g. corn) fall by more than fifty percentage (Dessie et al., 2013).

2.7.6. Lack of Proper Housing:

Although no data are available about housing at national level, the local birds are set free on free range whereby they move freely during the day and spend the night in the main house. Overnight housing, perched in trees or on roofs and overnight housing within the main house are the common patterns of housing prevailing in the country. Lack of housing is one of the constraints of the village poultry production systems. In some African countries, a large proportion of village poultry mortality accounted due to nocturnal predators because of lack of proper housing (Dwinger et al., 2003).

2.7.7. Weak Agricultural Extension Services:

According to (Mogeset al.,2010) reported that agricultural extension service is provided almost solely by the government. A holistic and multi-disciplinary support of services like extension, training, veterinary and credit are critical in supporting village chicken improvement programs.

He said that training for both farmers and extension staff focusing on disease control, improved housing, feeding, marketing and entrepreneurship could help to improve productivity of local chicken. An extension service is among the constraints that hinders development of poultry industry in developing countries. Although extension and research are well-organized systems that design and disseminate technological innovations to farmers, little emphasis has been given to Local Chicken research and extension (Ali S, AM, 2012).

2.7.8. Problem of market

Poultry products in most developing countries, especially in Africa, are still expensive. The marketing system is generally informal and poorly developed (Alemayehu et al., 2015). Poultry marketing structure has not well studied in Ethiopia. The market outlets or channels available to producers are diverse at all markets, although their importance differs across markets. The major channels through which producers/farmers sell their chicken in the markets are direct sold to consumers and/or to small retails that take the chicken to large urban centers. Unlike eggs and meat from commercial hybrid birds (derived from imported stock), local consumers generally prefer those from indigenous stocks (Desalew, 2012).

There is a chronic shortage supply of day old chicks, pullet and cockerels in Ethiopia. This leads to many farmers abandoning poultry keeping because their poultry houses will often be empty for months on end whilst they are waiting for new supplies from the hatcheries. Although the available hatching capacity is adequate; its performance is rather poor and needs improvement (Mebratu, 2015).

3. MATERIALS AND METHODS

3.1. Description of the Study Area

Shebedino district is one of the 36 districts of Sidama Regional States of Ethiopia which is located at the North-central part of Sidama region at a distance of 27 km from the capital city of Sidama Regional states, Hawassa and the distance from Addis Ababa, the capital city of Ethiopia, to Shebedino district is 302 km. Astronomically it is situated in the coordinates of $6^0 46'$ to $7^0 45'$ North latitude and $39^0 34'$ to $39^0 53'$ East longitudes. It lies between 1800 to 2950 m. a. s. l. The district is classified into two agro-ecologies: the high altitude (>2500 m.a.s.l. 9.4% coverage and has 4 kebeles) and the mid altitude (1800-2500 m.a.s.l. 90.6% coverage and has 21 kebeles). It receives an annual rainfall that ranges between 900 to 1500 mm, with mean annual temperature between 16 and 25^{o}c. The neighboring districts are Gorche to the East, Boricha to the West, Dale to the South and Tula to the North. It has total land area of 27,690 hectare; of which about 26,990 hectare is occupied by rural house hold farmers, while the remaining 700 hectare is hold by urban dwellers. The topography of the District is 8.57% mountain, 90.43 plateau and 1% others (SWADO, 2018).

There are two rainy seasons; namely Belg (February to April) and Meher (June to September). The dominant animal species and size of livestock holding of the smallholder farmers of the study district are indigenous animals.

Based on the 2007 census conducted by the CSA, this district has a total population of 233,922, of whom 118,026 are male and 115,896 are females; 118,831 or 5.06% of its population are urban dwellers. The livestock population of the district is estimated at 209,356 local chickens; 119157 exotic chickens, 102,605 cattle, 45,585 sheep, 40,925 goats, 6,645 donkeys, 179 horses

and 14,525 honey bee colonies (SWADO 2018, unpublished Data).The main economic activity in the study area is mixed farming and the major agricultural crops include enset, coffee, onion, teff, maize, barley, bean, pea, millet, sorghum, potato, tomato, cabbage, banana, and others (SWADO, 2018).

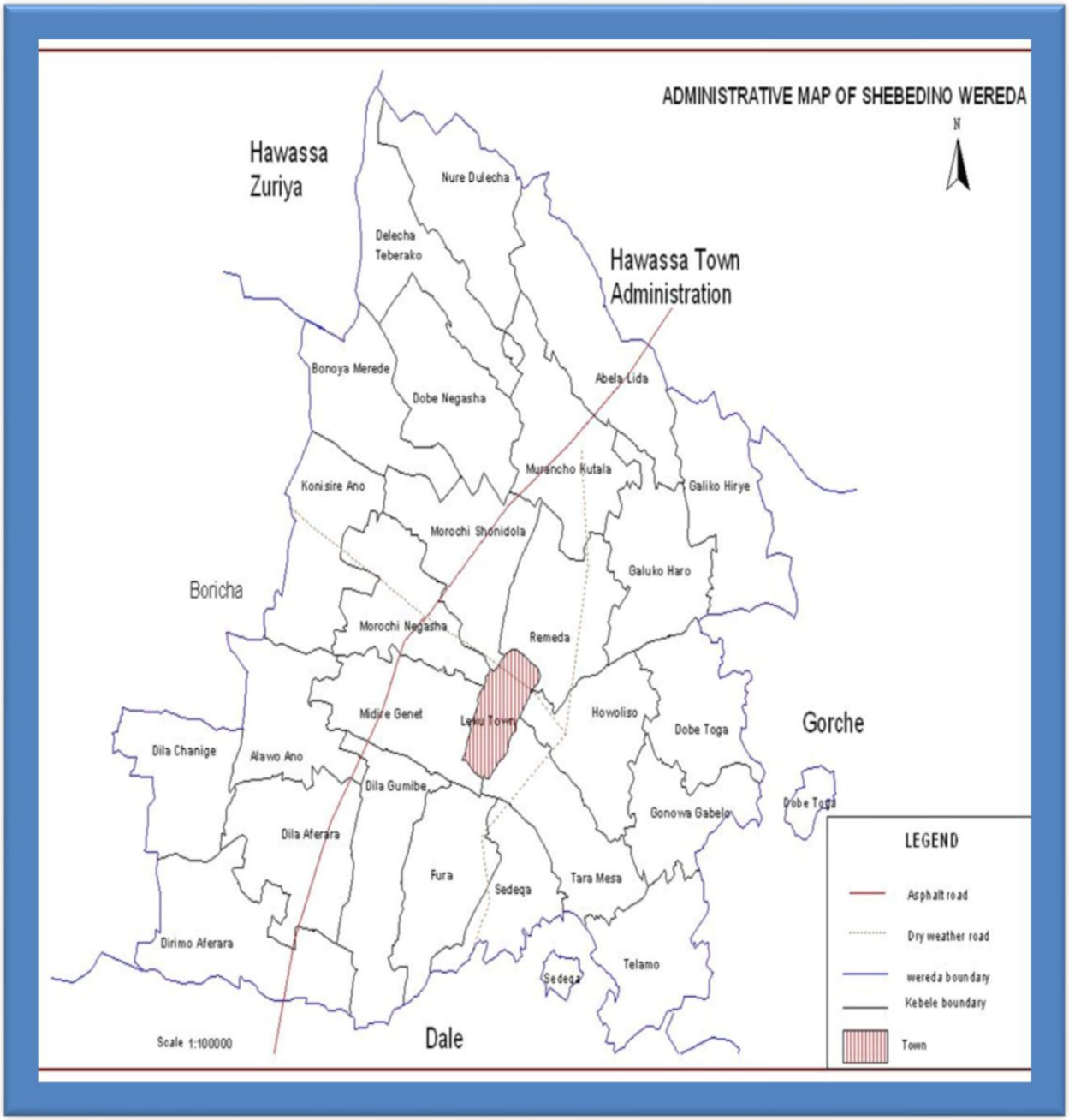

Figure 3.1: Map of the study area

3.2. Sampling Techniques and Procedures

Shebedino district has 22 rural and 3 Urban Kebeles classified into two agro-ecologies. To determine the sample size of HHs for the survey a multi stage sampling technique were employed. In the first stage, five kebeles (two from Dega, two from Weinadega and 1 from the urban areas) were selected purposively based on the potential of exotic chicken production. In the second stage, HHs who has more than three years' experience in exotic chicken production and possessing a minimum of three exotic chickens were again selected purposively. Then after, to determine the sample size of HHs according to population size the formulas of (Yemane, 1967) were used as follows:

$n = \frac{N}{1+N(e)2}$ Where: n=Sample size

N= Population size

e= level of precision (e is assumed to be 0.078).

$$n = \frac{831}{1 + 831(0.078)2}$$

n= 137 Sampling proportion of each kebele = Nk1= Nk1*n/N of study area

nk1= 132*137/831=22

Table 1: Sample size of selected fivekebeles

Selected kebeles	Population size (N)	Sample size (n)
Dobe Toga	132	22
Telamo	146	24
Taramessa	180	29
Dilaafarara	168	28
Leku-01	205	34
Total	831	137

3.3. Data Collection and sources of data to be collected

Both primary and secondary data were collected from HHs, Group discussions, Key informant interviews and from relevant organizations in the district, respectively. A questionnaire survey were employed to collect the data from the selected HHs. Checklists designed to confirm the data gathered from the HHs survey were used to collect data from the group discussion and Key informants interview. The group discussions were carried out with selected HHs who has long experience in exotic chicken production in the two agro ecologies and urban kebele. The Key informant Interview was considered experts in exotic chicken production, knowledgeable elders, and stake holders working in the area in Shebedino district.

The data to be collected were designed to generate data on socio-economic characteristics of household profiles (sex, age, family size, education level, livestock and crop production), poultry production systems (number and types of poultry reared, trend of exotic chicken production performances(eggs and meat) yield, economic importance of the exotic chicken, management practices (feeding, housing, watering systems, veterinary services, bio-security and opportunity and challenges of exotic chicken production performances in the study area.

Questionnaires were prepared in English and translated into Amharic and sidama language to collect the data from the households. The HH survey was conducted by 5 recruited and trained enumerators, who were fluent in local Language Sidama and Amharic with close supervision of the researchers.

3.4. Data processing and analysis

The primary data collected from household survey through semi-structured questionnaires was processed (data was checked for accuracy, data entries were coded, coded data were entered in to the computer and editing of the data were completed). Processed data were analyzed by using statistical package for social science (SPSS) version 20.0 software. Descriptive statistics such as percentage, mean, ranking, standard deviation, and cross tabulation were used to analyze the data quantitatively. On the other hand, data gathered through key informant interview, focus group discussion and personal observation were organized according to themes and analyzed to strengthen data obtained from household survey.

Simple descriptive statistics were employed in order to have a summary description of the data collected from the survey. This involved the use of percentages, means, frequency distributions and standard deviations to describe parameters such as socioeconomic characteristics, chicken eggs and meat performances, chicken ownerships.

Priority index was also used to rank the challenges according to their severity and opportunities of exotic chickens' production based on their relative importance using the following formula:

Priority index = (F1*4) + (F2*+3) + (F3*2) + (F4*1)/FT.

F1= Frequency of the first rank;

F2= Frequency of second rank;

F3 = Frequency of third rank;

F4= Frequency of fourth rank;

FT= Frequency of total respondents.

Model of statistical analysis

General linear model procedures (GLM) were used to variation between different management aspects and different agro ecologies. Model statements for this study regarding various parameters of exotic chickens were employed as:

$Y_{ij}=\mu+ai+bi+ei$; where Yij = Response variables; μ = Population mean; a_i = effect of agro-ecology on various productive parameters of exotic chicken; bi= effects of management on productive parameters of exotic chicken; and e_i = Random error

4. RESULTS AND DISCUSSION

4.1. Socio-economic Characteristics

Some socio-economic characteristics of households in the study area are indicated in Tables 2 and 3. Accordingly; from the total of 137 interviewed respondents, 59.85% were males and 40.15% females. The proportions of male respondents were higher than females in both high land and mid land agro-ecologies of the study area. This result is in line with the result of (Tesfu, 2007) that was reported higher male ratio in the households. The average family sizes were 5.54 and 5.53 persons with in highland and mid-land of the district, respectively. That is there is no difference of family size in the study area. These results were almost smaller than southern Ethiopia (6.95 persons) reported by (Mekonnen, 2007) and higher than the national average of 5.2 persons (Yami, 1995).The average age of respondents was about44.5 and 45 years for highland and mid-land agro-ecologies. This is similar to those reported by Moges et al. (2010) in North West Ethiopia. About 90%, 7% and 3% of the respondents were married, widowed and divorced respectively. Only 8.76% were illiterate and (9.5%), (51.4%), (21.2%) and (8.76 %) of the respondents were able to read and write, and completed elementary and high school and joined diploma and above respectively; in both agro-ecologies of the district. The result of the educational level of the respondents in this survey is not in line with the finding of Hailu etal.(2012) who reported 20.1% illiteracy. Most of households (75.2%) were farmers and very few of the respondents were civil servants (5.84%).Most of the households (57.67%) own 1.25-1.75 ha which agrees with the reports of Halima et al. (2007) where the average land size per house hold is below 2 ha.

4.2. Livestock holding

The total average number of cattle, sheep and goats reared per household in the study area was 1.5, 1.6 and 1.3 respectively, in highland and mid land agro-ecologies of the study areas (Table 4). The total average numbers of the indigenous chicks, pullets, cockerels, hens and cocks per household was 4.2, 1.9, 0.9, 2.2 and 1.0 respectively; from this majority (4.2) of them are indigenous chicks. The total average numbers of the cross bred chicks, pullets, cockerels, hens and cocks was 0.5, 0.6, 0.5, 0.3and 0.3 respectively; from this majority (0.6) of them are pullets of the cross bred chickens. The total average numbers of the exotic chicks, pullets, cockerels, hens and cocks was 17, 5.3, 2.6, 7.3and 2.8 respectively; from this majority (17) of them are chicks of the exotic chickens. Chicks followed by hens were dominant in flock structures of chicken. This result was in line with Gueye(2009) who reported that the flock sizes generally ranged from 5 to 20 fowls per African village households. However, lower results were also reported from Awassa Zuria and Dale district with mean flock size of 8.8 and 9.2 chickens/HH;respectively. (Mekonnen and Assefa, 2007). Furthermore, similar report was carried out on the average flock size per household of 16 in the central parts of Ethiopia and in the Kwale district of the south coast of Kenya (Assefa, 2007). Furthermore, two fold lower reports from current findings were carriedout on the average flock size per household of 7.1 (Tadelle D, 2003b). The total average numbers of chickens kept per year by the sampled respondents was 107.4.

Most of the ownerships of chickens in the study area show that more women are engaged in chicken rearing than men. This has an implication that more or equal emphasis has to be given to women in extension works of modern poultry keeping. This finding agreed with the reports of Jens et al.(2004); in sub Saharan Africa from the total family size about 80% of the chicken

flocks were owned and largely controlled by women. Similar result was also reported by many researchers (Mekonnin and Halima 2007)

Table 2: Sex, family size, age, marital status and education levelof the chickens of sampled respondents in Shebedino district, Sidaama Region

Variables	Agro-ecology				Total, n=137	
	Highland, n= 46		Midland, n= 91			
	Freq	%	Freq	%	Freq	%
Sex of respondents						
Male	27	32.9	55	67.1	82	59.85
Female	19	34.5	36	65.5	55	40.15
Family size of household head	5.54	-	5.53	-	5.53	-
Average age of the respondents	44.5	-	45	-	44.7	
Marital status of household head						
Married	42	34.1	81	65.9	123	89.8
Widowed	3	30.0	7	70.0	10	7.3
Divorced	1	25.0	3	75.0	4	2.9
Religion of household head						
Muslim	7	35.0	13	65.0	20	14.6
Orthodox	6	30.0	14	70	20	14.6
Protestant	33	34.0	64	66	97	70.8
Educational level of the households						
Illiterate	4	33.3	8	66.7	12	8.75
Able to read and write	4	30.8	9	69.2	13	9.5
Elementary	23	32.4	48	67.6	71	51.8
Completed their high school	12	41.4	17	58.6	29	21.2
Diploma and above	3	25.0	9	75.0	12	8.75

Freq = frequency, %= percent, n=number of sample population

Table 3: Occupation, land holding and ownership of the chickens in Shebedino district, Sidaama Region

Variables	Agro-ecology				Total n=137	
	High land, n=46		Mid land, n=91			
	Freq.	%	Freq.	%	Freq.	%
Occupation of household						
Farmers	36	35.0	67	65	103	75.2
Civil servant	2	25.0	6	75	8	5.84
Merchant	3	27.3	8	72.7	11	8.01
Student	5	33/3	10	66.7	15	10.95
Land size of household						
0.5-1 ha	15	44.1	19	55.9	34	24.8
1.25-1.75 ha	23	29.1	56	70.9	79	57.67
2-2.25 ha	6	33.3	12	66.7	18	13.13
2.5-3 ha	2	33.3	4	66.7	6	4.4
Ownership of chickens						
Head	3	30.0	7	70.0	10	7.3
Spouse	21	30.9	47	69.1	68	49.6
Head and spouse together	3	23.1	10	76.9	13	9.5
Sons	8	40.0	12	60.0	20	14.6
Daughters	11	42.3	15	57.7	26	19

Freq = frequency, %= percent; n=number of sample population

Table 4: The livestock holding in Shebedino district, Sidaama Region

Livestock species	Agro-ecology											
	High land, n=46				Mid land, n=91				Total N=137			
	Mean	Min.	Max.	Stand. Dev	Mean	Min.	Max.	Stand. dev	mean	Min.	Max.	Stand. dev
Cattle	1.7	0	3.0	0.9	1.4	0	3.0	0.8	1.5	0	3	0.9
Sheep	2.0	0	3.0	0.97	1.4	0	3.0	0.9	1.6	0	3	0.96
Goats	1.0	0	3.0	0.82	1.4	0	3.0	0.9	1.3	0	3	0.9
Indigenous chickens												
chick (DOC-8wks)	4.2	0	15	4.0	4.2	0	15	3.7	4.2	0	15	3.80
pullet (8-20 wks)	2.0	0	8.0	2.7	1.8	0	8.0	1.9	1.9	0	8	2.20
cockerels(8-20 wks)	0.9	0	3.0	0.8	0.9	0	3	0.8	0.9	0	3	0.8
hen (>20 wks)	2.3	0	8.0	1.7	2.0	0	10	1.4	2.2	0	10	1.47
Cocks (>20 wks)	0.9	0	3.0	0.9	1.0	0	3	0.7	1.0	0	3	0.8
Cross bred chickens												
chick (DOC-8wks)	0.5	0	2.0	0.7	0.6	0	3	0.7	0.5	0	3	0.7
pullet (8-20 wks)	0.4	0	2.0	0.6	0.7	0	2	0.6	0.6	0	2	0.6
cockerels(8-20wks)	0.5	0	2.0	0.7	0.5	0	2	0.5	0.5	0	2	0.6
hen (>20 wks)	0.4	0	2.0	0.5	0.3	0	2.0	0.5	0.3	0	2	0.5
Cocks (>20 wks)	0.3	0	2.0	0.5	0.3	0	2.0	0.5	0.3	0	2	0.5
Exotic chickens												
chick(DOC-8 wks)	20	0	300	62.8	15	0	500	65	17	0	500	64.6
pullet (8-20 wks)	4.4	0	20	4.35	5.8	1	30	5.5	5.3	0	30	5.21
cockerel(8-20 wks)	1.7	0	6.0	1.26	3.1	1	10	2.1	2.6	0	10	1.99
hen (>20 wks)	7.6	2	50	7.73	7.0	2	30	5.6	7.3	2	50	6.41
Cocks (>20 wks)	3.3	1	18	3.37	2.5	0	10	2.4	2.8	0	18	2.76
Numbers of chickens kept per year	104	40	450	79.0	109	50	600	75	107	40	600	76.5

4.3. Purposes of keeping exotic chickens

Rearing exotic chickens is cheaper than cattle as it needs low initial capital, small land and easy for management. Majority of the sample respondents (58.7%) and (63.7%) in the highland and midland of the district respectively; keep exotic chickens primarily for both Income generation and home consumption purposes. This finding is in line with the reports of Halima et al. (2007) and Fisseha et al. (2010) which indicated that village chickens are raised in northwest Ethiopia for various purposes. Tesfu(2007) indicated that generally sale of egg and birds given the first priority in the study conducted around Dire Dewa area. The present finding is also supported by Mamo and Berhan(2006) who indicated that most of the respondent gave priority for both home consumption (44.6%) and income generation (46.8%) in the study conducted on village poultry production under traditional management in Jima districts of Amhara region (Fisseha et al., 2010).Dessie and Ogle (2001) also reported that villager keeps poultry for sell, home consumption and social value. The current finding is supported by the report of Hailu et al.(2012) in which 76% of the farmers in Amhara area raise chicken for purpose of income generation.

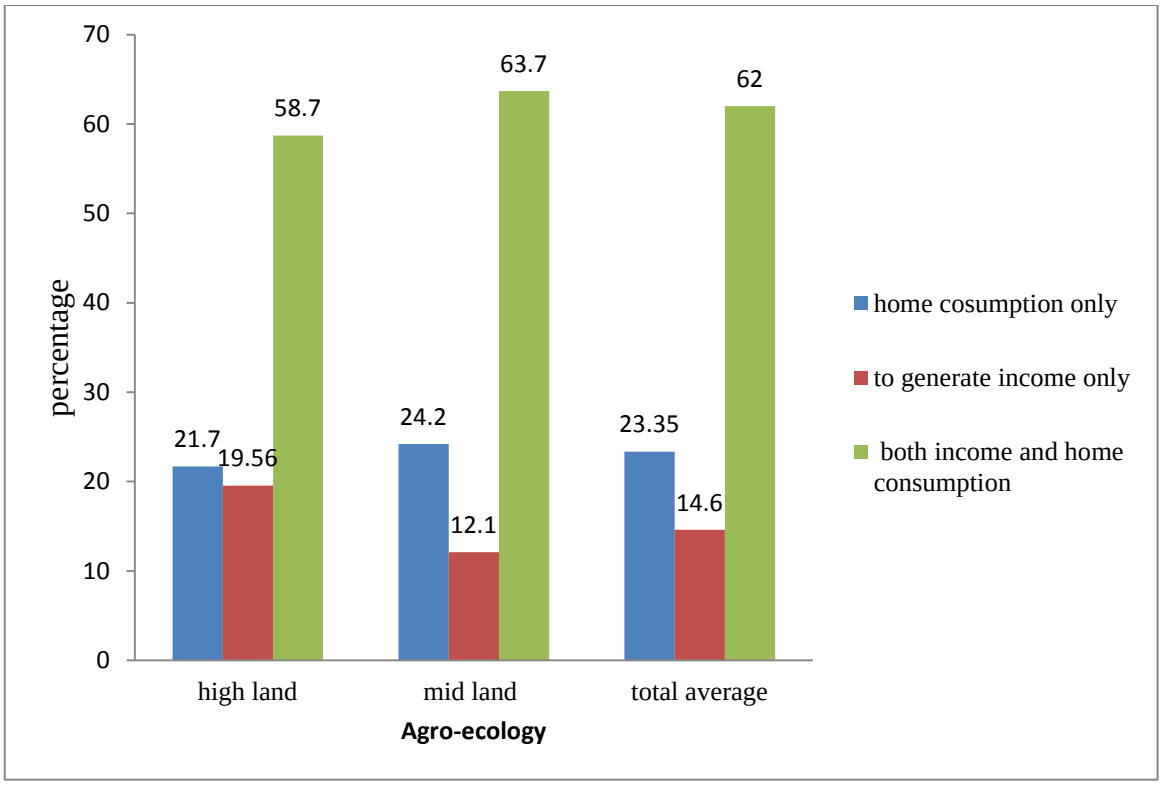

Figure 2: The Purposes of keeping exotic chickens in the study area

4.4. Exotic Chicken Production System

4.4.1. Source and Breed of Exotic Chicken

The dominant poultry production system practiced in the study area was extensive or village poultry production system. This indicated that most of the respondents reared the chickens under traditional/scavenging conditions without proper housing and management. This finding is in consonance with the observations of Mekonnen(2007).The respondents need to be appraised about the importance of modern poultry management practices, which can boost up the productivity of the hens and the profitability of the venture (Moges et al., 2010).However, about 1/3 of the respondents practiced semi-intensive poultry production system in the study area. This finding in consonance with Emebet(2015) who also indicated that a few number

(28.45%) of the farmers manage their chickens semi-extensively in South-West Showa and Gurage of Ethiopia.

All respondents that have participated in this study have got exotic chicken breeds purchased from governmental. The findings further indicate that the three popular exotic ecotypes of chickens were kept namely Sasso, Bovans Brown (BB) and Issa Brown (IB) besides the local ecotypes. It was distributed from Hawassa poultry farm and Ethio-chicken. Majority of the respondents did not know the names of breeds of the exotic chickens. This has an implication that any governmental or private organizations engaged in exotic chicken multiplication should come up with full information about the breed and the end users (chicken producers) should be well trained about its management practices. Besides, during group discussion, it was noticed that some agricultural experts and key informants have little or no information about the exotic breeds that have been distributed so far. In addition, the respondents differentiate the exotic breeds in case of adaptation, BB were selected as more adapted and productive in the high land and mid land of the district.

Table 5: Production System, Source of the exotic chickens, frequently distributed and more adapted exotic chickens

Variables	Agro-ecology					
	High land, n=46		Mid land, n=91		Total n=137	
	Freq	%	Freq	%	Freq	%
Production System						
Scavenging/Extensive	40	86.96	58	63.74	98	71.53
Semi Intensive	6	13.04	33	36.26	39	28.47
Source of the exotic chickens breed						
GOs	46	100	91	100	137	100
frequently distributed breeds of chickens						
Sasso	25	54.35	43	47.25	68	49.64
Issa brown	21	45.65	38	41.75	59	43.06
Bovans brown	0	0.00	10	11.0	10	7.3
More adapted exotic chickens						
Sasso	8	17.4	16	17.6	24	17.5
Issa brown	9	19.56	28	30.76	37	27.0
Bovans brown	29	63.04	47	51.64	76	55.5

n= number of sample population

The most commonly used exotic chicken breeds were sasso (49.64%), Issa brown (43.06%) and Bovans brown (7.3%) in the high land and mid land of the district. It distributed from Hawassa poultry farm and Ethio-chicken. In addition, the respondents differentiate the exotic breeds in case of adaptation.Bovans Brown was selected by the majority of respondents (63.04% and 51.64%) as more adapted in the highland and midland of the district respectively.

4.5. Management practices of exotic chickens

4.5.1. Housing system

The majority respondents who are sharing their home with chicken indicated (figure 2) that the main reason for doing this is small number of chicken, lack of awareness, shortage of land and construction materials. The finding is in agreement with that of Mamoet al. (2006) who found that most of the respondent (60.5-90.3%) house chicken same room with the household. This result is in agreement with findings of Yami(1995), who reported both in Ethiopia and Kenya, the majority of chickens are housed either with family or in kitchen.Nhleco et al.(2003) reported that in South Africa 50% of the respondent under study use separate housing system for chicken, which is not similar with the current result. Also it is in contrary to Dolberg(2007),who reported that majority of village chicken producers use separate shelter for chicken production in Benshangul-Gumuz and Halima(2007),who reported that about 51% of farmers kept their chickens in separate shelter in north western Ethiopia. Mekonnin(2007) who reported from north western part of Ethiopia and Meseret (2010) who revealed that 50.77% and 59.7% of farmers from Fogera kept their chicken outside the house, respectively. Though, whereas Mekonnin(2007) reported that there is no specific separate poultry house in Dale Wereda. And the least percentage of sampled respondents used separate house for exotic chicken production. The houses were not constructed considering the space requirement per a chicken and not hygienic. The houses mainly built from wood made with corrugated roof and wood made with grass roof.

More results of the study indicated that the reasons of respondents for housing exotic chickens were to protect from thieves, predator and rough weather, the rest to provide shelter for egg laying and to provide shelter at any time in the study area. Half of the sampled respondents

have electricity and some of the respondents used ventilation access and litter (segatura) in the chicken house. All respondents‟ clean chickens‟ house, but cleaning interval and quality of cleaning differ from one respondent to another (personal observation). Majority of the respondents used to clean chicken house once a day basis and some in daily and twice a day basis. Higher number of respondents does not utilized heating systems, some of the respondents used electricity and coal to heating exotic chickens' house in the study area. The chickens mainly roost in the house and on the tree In contradictory to the present finding, Dessie and Ogle (2001) reported that in most case (88.5%) chickens roosted inside the family dwelling at night in which the roost being made out of two or three parallel planks of wood.

Respondents of this survey have also indicated that house construction (37.98%), supply of formulated chicken feed (28.47%), preparation of brooders and feeding equipments (17.5%) and access for market (16.05%) were the preconditions for rearing exotic chickens.

The results from Table 6 indicate that most of the respondents in the study area are well experienced in rearing chicken. The results of the experience of rearing the chickens (Table 6) in the study areas are similar with reports of Melese and Melkamu(2014); and Nebiyu(2016). Alemayehu (2017) has report that having experience of livestock rearing plays an important role in improving the husbandry practices as the rearer are better aware of the disease symptoms, feeding and watering needs besides egg storage and incubation management. The respondents replaced dead chickens were 10.95%, 73.0% and 16.05% of chicks, pullets and cockerels and hen and cocks respectively. This result indicated that most of the respondents rear the young cockerels/pullets while a few have procured the chicks and adult hens and cocks. This study in line with Abraham and Yayneshet(2010) who reported Procurement of pullets over day old chicks (DOC) ensures less chances of mortality from either diseases or parasites

Table 6: Production System, precondition to rearing exotic chickens and Chicken farming experience of household

Variables	Agro-ecology					
	High land, n=46		Mid land, n=91		Total n=137	
	Freq.	(%)	Freq.	%	Freq.	%
Precondition To Rearing Exotic Chickens						
House Construction	21	45.65	31	34.06	52	37.98
Supply of formulated feed	11	23.91	28	30.76	39	28.47
Brooders and feeding equipments	7	15.22	17	18.7	24	17.5
Access For Market	7	15.22	15	16.48	22	16.05
Farming Experiences						
≤ 5 Years	4	6.7	8	8.8	12	8.76
6-10 Years	19	41.3	38	41.75	57	41.61
>10 Years	23	47.82	45	49.45	68	49.63
Replacing Of dead Chickens						
Chicks	3	6.5	12	13.2	15	10.95
Pullets And Cockerels	35	76.01	65	71.4	100	73.0
Hens And Cocks	8	17.4	14	15.4	22	16.05

Freq.= frequency, %= percent; n=number of sample population

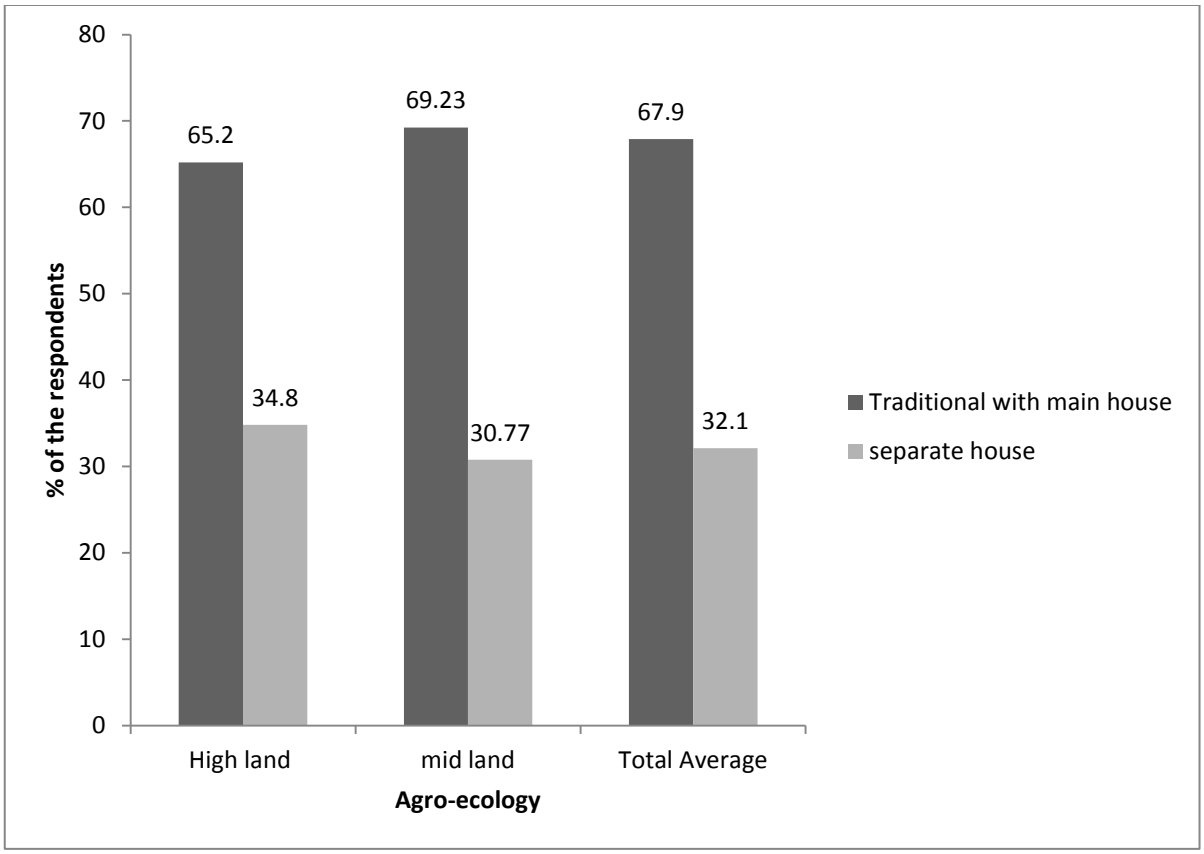

Figure 3: The types of the hosing systems of the study area

Table 7: Reasons of housing, house facilities and frequency of cleaning chickens house of Household

Variables	Agro-ecology				Total n=137	
	High land, n=46		Mid land, n=91			
	Freq.	(%)	Freq.	%	Freq.	%
Reasons to housing						
To protect from thieves, predator and rough weather	37	80.5	74	81.5	111	81.0
to provide shelter for egg laying	2	4.4	5	5.5	7	5.0
to provide shelter any time	7	15.1	12	13.0	19	14.0
Facilities of the house						
Electricity	20	43.5	48	52.7	68	49.6
Ventilation	5	10.9	13	14.3	18	13.1
Litter (sagatura)	21	45.6	30	33	51	37.3
practice of cleaning house						
Yes	46	100.0	91	100.0	137	100.0
No	0	0.0	0	0.0	0	0.0
Frequency of cleaning house						
Daily basis	23	50.0	59	64.8	82	59.85
Twice a day	16	34.8	10	11.0	26	18.98
Thrice a week	7	15.2	22	24.2	29	21.17

Freq.= frequency, %= percent; n= number of sample population

4.5.2. Feeds and feeding system

The major feed sources of exotic chickens in the study area were feeds obtain from local and natural feeds and other from local and commercial feeds. Potential available feed sources of exotic chickens in the study area were maize, home leftover and some of barley. The feeds were given to the chickens in the form of grain and mashed. Lack of feed supplementation is one of free-ranging back yard poultry production system (Gueye et al., 2007). However, in this study 75.9% of the respondents practiced supplementary feeding to their exotic chickens. Another study in Awassazuria by Assefa et al. (2007) also indicated that 95% of the HHs offer supplementary feed. The major supplementary feeds in the study area were maize, kocho, home left over and wheat bran. This finding is in line with that of Samson et al. (2010) who reported more than 90 % maize, wheat, sorghum and house hold waste products as main supplementary feed in mid rift valley of Oromia. This also agreed with the results of Dessei et al. (2013) who indicated the major supplementary feeds are wheat and maize grains but also includes kitchen wastes and bone meal in central and western high lands of Ethiopia. Majority of respondents giving supplementary feeds forexotic chickens on daily basis/once per day. But some of the respondents provided supplementary feed for exotic chickens on weekly basis/ once per week.

Majority of the respondents supplemented together for whole group of the exotic chicken. Whereas, very few of the respondents used to supplement different classes of the exotic chickens separately. Majority of the sampled respondents provided feeds spreading on the ground but about 35.3% of the respondents provided on feeding through to their exotic chickens in the study area. Most of the respondents use clay trough for feeding exotic chickens followed by plastic troughs and least by wooden troughs. Most of exotic chickens feeds were

locally made, some obtained from local market and very few were purchased. Majority of the respondents mentioned less interest to produce and about 1/3 of the respondents mentioned increased demand of exotic chickens feed as factors that limit availability of feeds. There is feed shortage occurs during wet season in the study area. This result is in agreement with that of Leulseged(1998)who reported severe scarcity of scavenging feed resource during wet seasons indicating that availability of scavenging feed resource basis depends on seasons and backyard conditions. Less importance of feed scarcity for feeding exotic chickens in the study area was possibly related with better income of the respondents. Their further explanation indicated that during this time the grass grows vigorously and covers the ground. On the other hand ceasing of egg production, body weight loss and cannibalism were the main problems associated with feed shortage.

Table 8:Feeding system and the major feed sources of exotic chickens in Shebedino district

Variables	Agro-ecology				Total n=137	
	High land, n=46		Mid land, n=91			
	Freq.	%	Freq.	%	Freq.	%
Sources of feeds						
local and natural feeds	31	67.4	63	69.23	94	68.6
local and commercial feed	15	32.6	28	30.77	43	31.4
Potential available feeds						
Maize	34	73.92	74	81.31	108	78.83
Home leftover	5	10.87	17	18.7	22	16.05
Barley	7	15.21	0	0.0	7	5.01
the feeds provided						
Grain	37	80.43	69	75.82	106	77.37
Mashed	9	19.57	22	24.18	31	22.63
Feed supplementation						
Yes	35	76.1	69	75.82	104	75.9
No	11	23.9	22	24.18	33	24.1
Types of supplementary feeds						
Wheat bran	17	48.57	30	43.48	47	45.2
Maize	18	51.43	39	56.52	57	54.8
Frequency of feeding						
once daily basis	26	74.3	9	25.7	35	19.23
on weekly basis/	58	84.0	11	16.0	69	80.77
Ways of provision of supplementary feeds						
separate different classes	6	14.14	9	13.0	15	14.4
together for whole group	29	82.86	60	87.0	89	85.6
Ways of feeding practiced to chicken						
throw on the ground	34	73.9	63	69.23	97	70.8
on feeding through	12	26.1	28	30.77	40	29.2
Feeding materials						
Plastic trough	12	34.3	21	30.4	33	31.73
Clay trough	16	45.7	36	52.2	52	50.0
Wooden trough	7	20.0	12	17.4	19	18.27
Place of obtaining feeds						
Local made	26	56.5	65	71.4	91	66.43
Locally via agents	8	17.4	11	12.1	19	13.87
Purchased from local market	12	26.1	15	16.5	27	19.7
Seasons of feed scarcity						
Wet season	27	58.7	45	49.5	72	52.56
Dry season	10	21.74	17	18.7	27	19.7
After rainy season	9	19.56	29	31.8	38	27.74

Freq.= frequency, %= percent; n=number of sample population

4.5.3. Source of water and watering system

The sources of water to the exotic chickens mainly were stand pipe in the study area. According to all respondents, the distance between their home and source of water was less than one kilometer. This finding also indicated that all of the respondents provide water for their chickens'. This result is in line with that of Desalew(2012) who reported provision of water among the chickens in East Shewa of Ethiopia. Water is one of the most important but neglected of all the nutrients; both quality and quantity of water available to the chickens need to be optimum for overall improvement in productivity (Ravindran, 2013). The present findings (of provision of water adlib) are in accordance with the observations of Dirsha(2009) and Desalew(2012). While some of the respondents too indicated that they were not careful to provide water to their flocks, the numbers were too few and hence they need to be made aware of the importance of water as an important nutrient. As it was noticed during farm visit, almost all materials used by the sample respondents for providing water for chickens were not cleaned and dirty. This needs due attention since unhygienic conditions might lead to disease because exotic chickens are sensitive to disease than local chicken breeds. Thus, concerned bodies should provide intensive trainings for producers on the concerns of chicken bio-security.

Table 9: Watering system and source of water of exotic chickens in Shebedino district

Variables	Agro-ecology				Total n=137	
	High land, n=46		Mid land, n=91			
	Freq.	%	Freq.	%	Freq.	%
Sources of water						
Stand pipe	35	76.1	72	79.1	107	78.1
Ground water	7	15.2	6	6.6	13	9.5
Bore hole	4	8.7	13	14.3	17	12.4
Frequency of watering during dry season						
Adilbitum	30	65.2	56	61.5	86	62.8
Twice a day	11	23.9	25	27.5	36	26.3
Thrice a day	5	10.9	10	11.0	15	10.9
Frequency of watering during wet season						
Adilbitum	14	30.4	23	25.3	37	27.0
Twice a day	23	50.0	53	58.3	76	55.5
Thrice a day	9	19.6	15	16.4	24	17.5
Watering materials						
Plastic trough	16	34.8	26	28.6	42	30.7
Clay trough	23	50.0	48	52.75	71	51.8
Wooden trough	7	15.2	17	18.7	24	17.5
frequency of cleaning watering and feeding trough						
every day	40	87.0	84	92.3	124	90.5
never cleaned	6	13.0	7	7.7	13	9.5

Freq. = frequency, %= percent; n=number of sample population

Almost all of the respondents in the study area provide water for their chickens and they entirely use pipe water (Table 9). As it was noticed during farm visit, almost all materials used by the sample respondents for providing water for chickens were not cleaned and dirty. According to all respondents, the distance between home of the house hold and source of water was less than one kilometer. Most of respondents provided water adlibitum, very few three times per day and negligible percent of them offered two times per day. Majority of chicken management activities which include feeding, watering and cleaning of chicken house are done by women.

4.5.4. Chicken health and disease control measures

All of the respondents reported occurrence of disease in their farm. This result shows that the discussion with the Shebedino district veterinary health care experts indicate that there was the problem of health of the chicken in the study area and most prevalent disease is the Newcastle.The present study was in agreement with the finding of Mekonnen et al. (2017) who reported about 73.5% of the respondents reported that the most common exotic chicken disease was Newcastle disease. Similar study of Desalegn(2015) who reported ND as identified to be the most important disease in all production systems, being responsible for the largest proportion of morbidity and mortality in all parts of the country (Desalegn, 2015).The second important disease in the study areas were coccidiosis especially during high rainy season followed by the fowl pox. Addis and Aschalew, (2014) who revealed in addition to Newcastle disease, coccidiosis and fowl typhoid are the major cause for chicken mortality in Ethiopia. Majority of the respondents and veterinarians indicated that Newcastle (Fengel) Symptoms were (Head and wing dropping and sleeping and sometimes diarrhea, weakness, fluid in mouth and eye, reduce feeding and watering, don't move). This result indicated the disease might probably be Newcastle (Fengel). Due to these reasons, most of the respondents in the areas were practice culling preventative major for their chicken. This study agreed with the findings of Desalew(2012) who reported most of the respondents indicated culling of birds suffering from diseases. Majority of the respondents culled exotic chickens from the flock for the cases of sickness and on the other hand some of the respondents culled for the case of poor productive and old aged chickens. This study is not in line with report of Mammo(2006) who reported that culling of unproductive chickens through consumption and sale.

4.5.4.1. Season of disease occurrence

Respondents indicated that the major causes of losses in the study area were disease this mainly because farmers in the area have no proper prevention mechanism and do not have proper vaccination program to their chicken. There is also a favorable condition for the transmission of the diseases, which is likely associated with the nature of the rearing practice. The respondents indicated that the severity of the disease was higher during wet season. During wet season the rain starts to fall and the environment becomes very wet. Wet season was also characterized by feed shortage in the study area. The wet environmental conditions together with feed shortage that occur during wet season affect resistance of chicken to disease at wet season as compared to dry season. The result of this study is in line with that of Alemayehuet al.(2015) who reported that Newcastle diseases were the most prevalent and economically important diseases affecting chicken in the study areas mainly during the rainy season. Whereas, (33.6%) of the respondents didn't observe deaths per year for their exotic chickens. According to all the respondents in both agro-ecologies of the district young chickens were mostly affected by the disease.

The respondents of the study areas use both the modern veterinary medicines and ethno veterinary medicines. They reported that they take their chicken to the nearby veterinary clinic as soon as they observe disease symptoms. Different ethno-veterinary disease prevention medicines used by respondents in the study were lemon (citrus), Garlic (Allium sativum)and feto (brassica spp.)to cure their chickens. In many cases Garlic was used as traditional medicine even for human beings in addition to its use as food. Garlic has the broadest spectrum of any antimicrobial substance. This property belongs to the garlic constituent allicin (Peter et al., 2008). Mekonnen(2007) also reported that most of the farmers (87.6%) used traditional

remedies to treat their sick chickens, which are usually administered through drinking water. Similarly, Swatson et al. (2001) in Vhembe district of South Africa reported that traditional herbal remedies used in an attempt to control disease outbreaks were made from the ground barks or leaves of plants. Benabdeljelil et al. (2001) also reported that, people raising Beldi poultry in morocco used several traditional "medicines " locally available such as olive oil, onion, garlic, pepper, paprika and others.

The dead birds in the study area were thrown away by most of the respondents in the study area. However, Melkamu(2017) reported that the dead birds were buried under the ground in small-scale commercial poultry farms in and around East Gojjam Zone. Similar finding was reported by Uduak(2014) where 52% of dead birds were buried around the farm. Yakubuet al. (2018) reported that 56% of dead birds in and around Mekelle were removed via throwing. Bereket(2014) also reported that in small-scale intensive system of production about 55.6% of the producers disposed dead chicken via burying. However, NABC (2014) burning or incineration process is expected to destroy all infective agents.

Table 10: Diseases of exotic chicken and seasons of disease occurrence in Shebedino district, Sidaama Region

Variables	Agro-ecology					
	High land, n=46		Mid land, n=91		Total n=137	
	Freq.	%	Freq.	%	Freq.	%
commonly occurred diseases						
Newcastel	23	50.0	47	51.6	70	51.1
Coccidiosis	8	17.4	14	15.4	22	16.06
Fowl pox	15	32.6	30	33.0	45	32.84
Seasons of the year diseases and death occurred the most						
Rainy	33	71.3	74	81.3	107	78.1
Dry	13	28.3	17	18.7	30	21.9
Chickens die per year						
None	28	60.87	18	19.8	46	33.6
1-15 chickens	18	39.13	66	72.5	84	61.3
16-30 chickens	0	0.0	5	5.5	5	3.65
>30 chickens	0	0.0	2	2.2	2	1.45
Mostly affected age groups of chickens						
Young chickens	46	100.0	91	100.0	137	100.0
Old chickens	0	0.0	0	0.0	0	0.0

Freq. = frequency, %= percent; n=number of sample population

Table 10:Diseases of exotic chicken and seasons of disease occurrence in Shebedino district, Sidaama Region (cont……..)

Variables	Agro-ecology					
	High land, n=46		Mid land, n=91		Total n=137	
	Freq.	%	Freq.	%	Freq.	%
Treatment ways						
Ethno-veterinary practices	16	34.8	27	29.7	43	31.4
takes to veterinary center	25	54.35	51	56.0	76	55.47
no control	5	10.85	13	14.3	18	13.13
Ethno-veterinary medicines						
lemon (citrus)	29	63.0	39	42.8	68	49.64
Garlic (Allium sativum)	17	37.0	27	29.7	44	32.12
Feto (brassica spp.)	0	0.0	25	27.5	25	18.24
Actions taken to dead chickens						
Buried	12	26.1	19	20.87	31	22.62
Throwing to dog	34	73.9	72	79.13	106	77.38
Culling Practice						
Yes	43	93.48	85	93.4	128	93.4
No	3	6.52	6	6.6	9	6.6
Ways of Culling						
By selling	29	63.0	54	59.3	83	60.6
By consuming at home	17	37.0	37	40.7	54	39.4
Reasons to culling						
Sickness	34	73.9	71	78.0	105	76.64
Poor productivity	9	19.57	15	16.5	24	17.52
Old age	3	6.53	5	5.5	8	5.84

Freq. = frequency, %= percent; n=number of sample population

About half of the respondents implement scientific disease controlling techniques (Table 9). They take their chicken to the nearby veterinary clinic as soon as they observe disease

symptoms. But few of them used ethno-veterinary methods to control disease. About half of the respondents used ethno-veterinary medicines to treat sick birds by administration of lemon (citrus), and 1/3 of them use Garlic (*Allium sativum*) and close to 1/5 of them use feto *(brassica spp.)*; by adding with feed and water. Though, very few of the respondents didn't use any disease control method. Majority of the respondents throw dead chicken to dogs and very few of them bury dead chickens.

The majority of the respondents practice culling. About 60.6 and 39.4% of the respondents cull chickens from the flock for sale and consumption purpose respectively. Sickness was the major reason for culling, followed by poor productivity but old age has smallest contribution to culling.

4.8. Predators of exotic chicken

The respondents indicated that wild cat (local name *Ganchara*) followed by fox (local name *Yedala*) and hawk (local name *Risa*) in decreasing order of impotence are most commonly occurring predators that attack exotic chickens in high land, mid land and overall (Figure 4). Predators were listed alongside diseases as major cause of bird's death. The predation is strongly associated with the rainy season. This result is in line with that of Dessie et al. (2004).The predators include primarily birds of prey such as vultures, which prey only on chicken and wild mammals such as fox, "Shelemetemate", aner (halaro), which prey on mature birds as well as chicks. Protective method of exotic chicken from predator attack were (32.12%) of the respondents kept the chicken in the house, (32.12%) of the respondents theater/ tie their chicken and control their movement, whereas (5.1%) of the respondents use mesh wire. According to (48.9%) of the respondents predator controlling practices was not done.

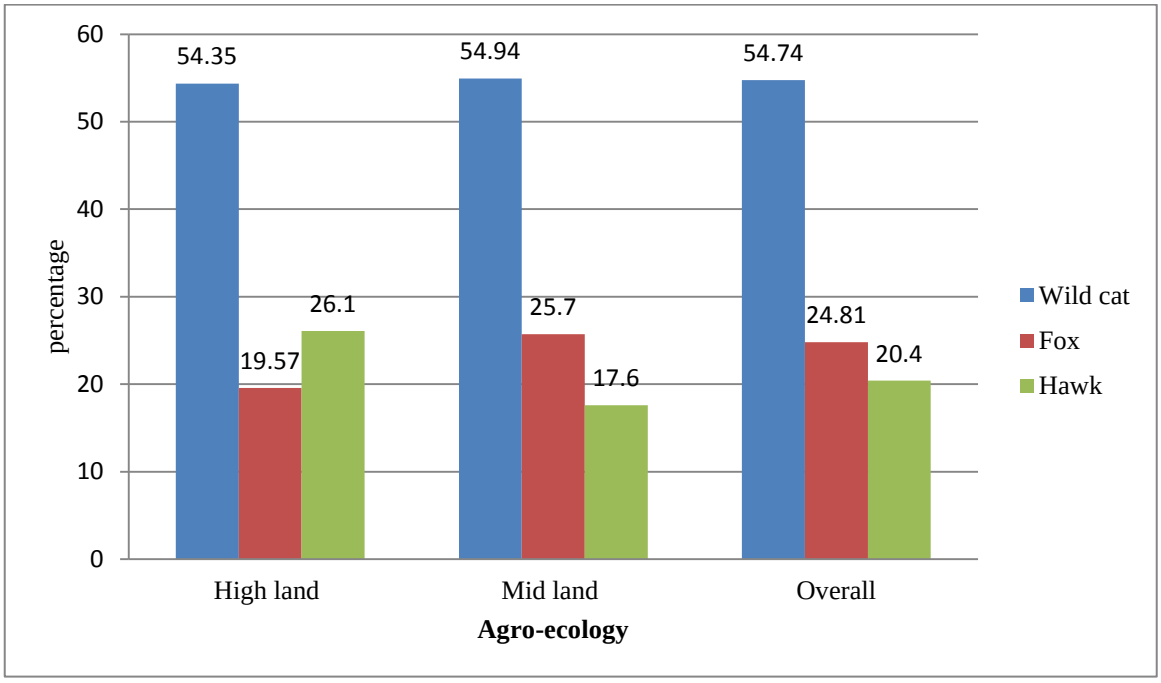

Figure 4: Predators in the study area

About ½ of the respondents in high land, mid land and overall of the respondents in the district, respectively; didn't practiced predator controlling systems to their exotic chickens. About 1/3 of the respondents kept chicken in the house to protect their chicken from predator attack in high land, mid land and overall (15.21%), (13.2%) and (13.87%) of the respondents tie their chicken and control their movement, in high land, mid land and overall of the respondents in the district, respectively. Whereas, very few of them use mesh wire, in high land, mid land and overall of the respondents in the district, respectively.

4.9. Market Access

Respondents in the study area have good market access to buy exotic chickens production inputs respectively. They have bought inputs mainly from Retailer and private company. All of

the responds in the district have market access to sell exotic chickens and eggs. The respondents sold their exotic chickens mostly when there is personal money requirement in the house. On the other hand the respondents were sold their exotic chickens when the chickens attain specific weight gain/ age and during holy day and festivals respectively. The higher proportion of the respondents practiced of selling of eggs and chicken (Table 11) to village market. Whereas, the remaining sampled respondents were sold eggs and chicken to the local shop keepers, retailer, whole seller and selling at own doorstep. All of the respondents carry themselves to transport their exotic chickens to the market in the study area.

The majority of the sampled respondents in the district were preferred for meat from indigenous chickens.Kyarisiimaet al.(2011) also revealed that consumers perceived local chicken to be the tastiest and safest of all other chicken meats on the market and the rest of the sampled respondents in the district were preferred for meat equally from both indigenous and exotic chickens, respectively. And also, the majority of the respondents overall sampled respondents of the district were preferred for eggs from indigenous chickens. Similar finding of Senbetaet al. (2015) almost half of respondents preferred to buy eggs of local chickens as they were considered to be tasty and the yellow colored yolk was commonly favored. And the Consumer preference for any of these chickens varies from one individual to another so the remaining respondents were preferred for eggs equally from both indigenous and exotic chickens. This study is in line with that of Desalew(2012) who reported Consumer preference observed for eggs from local, improved and both local and improved chicken were 77.8%, 17.8% and 4.4% respondents in Ada'a and 87.8%, 7.8% and 4.4%, in Lume districts, respectively.

Table 11: Marketing systems and preference of the consumers in Shebedino district, Sidaama Region

	Agro-Ecology					
	High Land, n=46		Mid Land, n=91		Total n=137	
Variables	Freq.	%	Freq.	%	Freq.	%
Market Access to Buy Production Inputs						
Yes	37	80.4	79	86.8	116	84.7
No	9	19.6	12	13.2	21	15.3
Place Of Buying Chickens Production Inputs						
Government	0	0.0	0	0.0	0	0.0
Retailer	40	86.96	80	87.91	120	87.6
Private Company	6	13.04	11	12.09	17	12.4
Market Access To Sell Production Inputs						
Yes	46	100.0	91	100.0	137	100.0
No	0	0.0	0	0.0	0	0.0
Selling Time Of The Chickens Products						
Specific Weight Gain/ Age Of Chicken	11	23.92	18	19.8	29	21.16
Personal Money Requirement	28	60.87	61	67.0	89	64.97
During Holy Day And Festivals	7	15.21	12	13.2	19	13.87
Place Of Selling Chickens Products						
Village Market	23	50.0	39	42.85	62	45.26
Local Shop Keepers	10	21.74	21	23.05	31	22.63
Selling At Own Doorstep	0	0.0	6	6.6	6	4.4
Retailer	13	28.26	18	19.8	31	22.63
Whole Seller	0	0.0	7	7.7	7	5.1
Means Of Transportation						
Carry Themselves	46	100.0	91	100.0	137	100.0
By Cart	0	0.0	0	0.0	0	0.0
Types Of Chickens Breed Its Meat Is The Most Preferred By Consumer						
Indigenous Chickens	34	73.91	69	75.82	103	75.18
Exotic Chickens	0	0.0	0	0.0	0	0.0
Equally Preferred	12	26.09	22	24.18	34	24.82
Types Of Chickens Breed Its Eggs Is The Most Preferred By Consumer						
Indigenous Chickens	36	78.26	72	79.12	108	78.83
Exotic Chickens	0	0.0	0	0	0	0.0
Equally Preferred	10	21.74	19	20.88	29	21.17

Freq= frequency %= percent n=number of sample respondents

4.10. Extension services for improvement of Exotic Chicken

Most of the respondents used agricultural extension service to improve poultry productivity in study area. This implies that the households who have access to extension service have better knowledge and understanding on poultry management practices (like feeding, housing, watering and protection health care) so on.

Although extension and research are well-organized systems that design and disseminate technological innovations to farmers, little emphasis has been given to local chicken research and extension (Ali, 2012). The distance between house and extension service provision center mainly was≤ 1 km in the study area. Whereas, some of the respondents the distance between the respondent house and extension service provision center was ≤2 km and >2 km in the study area. According to the survey result majority of services of extension provided to the respondents were from governmental organization in the study area. This finding is agreement with those of Moges et al.(2010) reported that agricultural extension service is provided almost solely by the government. The majority of the respondents in the study area the respondents visited by the extension agents mainly once in two weeks. But some of respondents in the study area have visited by the extension agents once in a week and once in a month. In addition, this study indicated that majority of the respondents in the study area received training from (GOs) and few proportion of the respondents received training from (NGOs). Providing credit to the farmers to procure poultry production inputs could help to enhance poultry productivity in these study areas. However, a few proportion of respondents provided credit facility only in the study area. The present study was in agreement with the finding of Aklilu et al.(2007); Mogeset al. (2010a) and Takele and Oli(2011), but still availability of credit service is limited for village chicken owners.

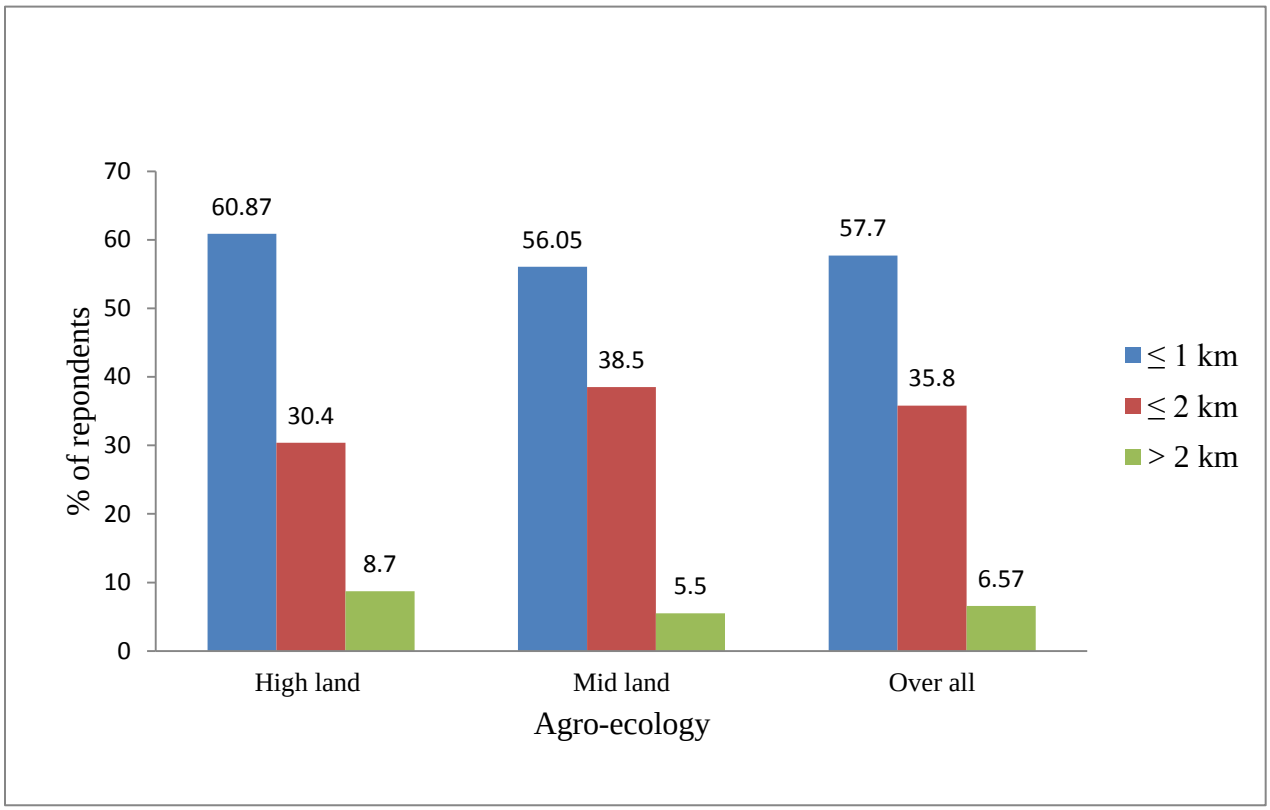

Figure 5: Distance between home of the respondents and extension service center in the study area

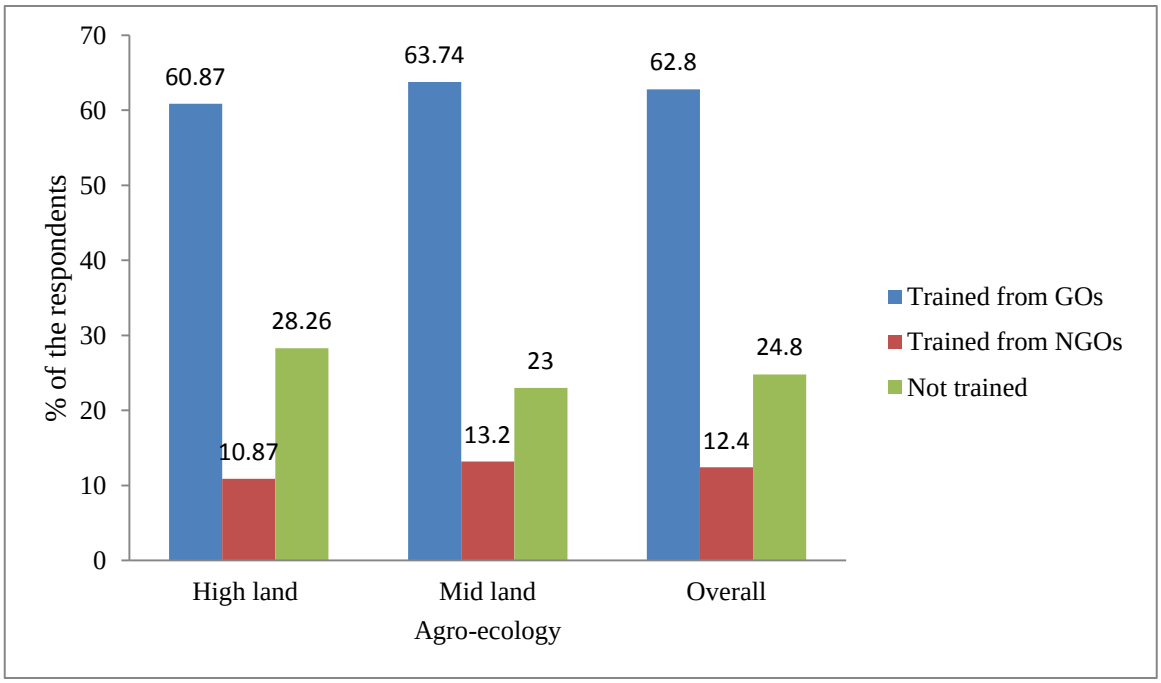

Figure 6: Types of training received by respondents in the study area

4.11. Challenges and opportunities for poultry production

The results presented in Table 10 indicate the challenges for rearing exotic chickens in the study areas. In the present study areas, diseases were reported as first major problem, where NCD was number one challenges of exotic chicken productivity; followed by feed shortage, predators and poor adaptation. This study was agreement with finding of Wondu et al. (2013). Aman et al. (2017) also revealed that constraints in poultry production in the study districts of the Wolaitta zone and KambataTambaro zone were disease followed by shortage of feeds. However, the present finding disagrees with the result obtained by Czech et al.(2003);Melkamu and Wube(2013) and Selam and Kelay(2013) who reported that predation is a more important cause of mortality than disease.

The results presented in Table 12 indicates the opportunities of rearing exotic chickens in the study areas, the major opportunities being access to market accessibility, followed by access to veterinary service, extension service and exotic chicken adaptation. This result was similar with the finding of (Nebiyu, 2016). The presence ofall weather market is appealing as in many parts of the country (those predominated by the people practicing Orthodox Christianity) where market is seasonal (Ayalewand Adane, 2013; Emebet, 2016). Therefore, it is expected that the educated, unemployed and small-scale entrepreneurs' can take poultry farming as their means of livelihood. The opportunities exotic chicken production in the study area too are more or less similar with a slight deviation in their ranking, which indicate that there is a scope for improvement of Veterinary services, which is one of the existing factors assuring profitability of the chicken farming and it is similar with the findings of (Feleke et al., 2015; Nebiyu, 2016).

Table 12: Challenges for exotic chicken production in Shebedino district, Sidaama Region (n=137).

	high land		mid land		Overall	
Variable	PI	Rank	PI	Rank	PI	Rank
Disease	0.2959	1st	0.2987	1st	0.2978	1st
Scarcity of feed	0.2685	2nd	0.2869	2nd	0.2807	2nd
Predators	0.2368	3rd	0.2248	3rd	0.2288	3rd
Extension problems	0	-	0	-	0	-
market problem	0	-	0	-	0	-
adaptation problem	0.1988	4th	0.1896	4th	0.1927	4th
Total	1.00		1.0		1.00	

PI=Priority index

Table 13: Opportunities for exotic chicken production in Shebedino district, Sidaama Region (n=137).

	high land		mid land		Overall	
Variable	PI	Rank	PI	Rank	PI	Rank
Market accessibility	0.2910	1st	0.3107	1st	0.3038	1st
Veterinary services	0.2766	2nd	0.2673	2nd	0.2705	2nd
Extension services	0.2370	3rd	0.2316	3rd	0.2335	3rd
adaptation of chickens	0.1954	4th	0.1904	4th	0.1922	4th
Total	1.00		1.00		1.00	

PI=Priority index

6. SUMMARY, CONCLUSION AND RECOMMENDATION

6.1. CONCLUSION

The result of the present study on assessment and management practices of exotic chickens, performance and challenges and opportunity was done infive selected kebeles of the Shebedino district, Sidama Region. Both primary and secondary data were collected from HHs, Group discussions, Key informant interviews and from relevant organizations in the district, respectively.

Most of the households practiced scavenging management with very few of them offering supplementary feeds to the chicken besides scavenging. High proportions of respondents are sharing their home with chickens. Water was provided adlib to the chickens. The main purposes of keeping exotic chicken in the study area were for both income generation and home consumption which was followed by consumption only and sale only.

The higher death of exotic chicken in the study area was caused by disease, feed shortage and predator. The most commonly important disease in the study area was Newcastle. The commonly observed predators in the study area were wild cat (local name ‘’Ganchara’’), fox and hawk. Egg production performance of exotic chicken in the study area in general was better than local chicken but not at its satisfactory level.

Disease was the first and feed problems the second challenges of exotic chicken production in the study area. The two problems are followed by predators and poor adaptation of exotic chickens.

The major opportunities of rearing exotic chickens in the study areas were market accessibility, followed by access to veterinary service, extension service and exotic chicken adaptation.

6.2. RECOMMENDATION

Exotic chickens are easily attacked by disease, predators and poor adaptive ability to harsh environments, and require semi-intensive and intensive management system to produce well.

Government should create awareness on vaccination of chicken for the community, to provide wide spread vaccination against major poultry diseases in the study areas.The existing poultry extension package also need to place special emphasis on important veterinary issues, since poultry diseases are widely spreading.

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8. APPENDIX

Questionnaire on Assessment on Exotic Chicken Management Practices Performances, Challenges and Opportunity in shebedino District, Sidama Region

Region_____City_____Zone_____

District/Woreda _____ Site (Kebele) _____

Date of interview _____ Agro-ecology_____

Name of enumerator _____signature _____

I. Socio-economic characteristics (household) information

1. Name of respondent _____

3. Sex of household head A. Male B. Female

4. Age of respondent_____

5. Family size of the respondent? _____

6. Marital status: A. Married B. Single C. Widow D. Divorced

7. Educational status of the household

a. illiterate b. read and write only c. elementary d. high school e. diploma and above

8. Religions of household head

A. Muslim B. Orthodox C. Protestant D. Catholic

9. Major occupation: A. Farmer B. Civil servants C. Trader D. Student E. Others

10. Household Ownership A. Owned B. Rented C. Caretakers

II. Agriculture

1. What type of agriculture you practice? A. Livestock production B. Crop production C. mixed

2. Land size? A. 0.5-1 ha B. 1.25-1.75 ha C. 2-2.25 ha d. 2.5-3 ha

3. Distance of farm from the home?

4. Herd composition, size

No.	Species	Total number	Number in breed types		
			Local	Cross	exotic
1	Cattle				
2	Sheep				
3	Goat				

5. Classify your chicken flock according to age, sex and breeding category (number)

Chicken	Total No.	Number of local	Number of exotic	Number of cross
Chick(1 day-8 wks)				
Pullet (8-20 weeks)				
Cockerels (8-20 wks)				
Hen (>20wks)				
Cock (>20wks)				

III. Chicken production

1. What is Purposes of keeping exotic chicken?
    a. home consumption b. to generate income c. income and home consumption d. cultural privilege
2. Member of household who own chickens? A. head B. spouse C. head and spouse together D. sons E. daughter
3. What is the exotic chicken production system do you practice?
    a. Extensive b. semi-intensive c. intensive
4. How many years' experiences do you have?
    a. 3-5 years b. 6-8 years c. above 8 years
5. Age of the exotic chicken while start rear
    a. chick b. pullet and cockerels c. hen and cock
6. How many chickens are kept in the farm per year?

IV. Breeds and their sources

1. Where do you purchase your chickens?
    a. Local through agents b. Own stock hatching c. Import directly

2. Precondition for rearing exotic chickens

a. House construction b. Supply of formulated chicken feed c. Preparation of brooders and feeding equipment
d. Access for market and extension service

2. What breeds/strains of birds do you use for production?
    a. Sasso b. Issa brown c. Rhode Island Red d. Bovans brown e. Rhode Island White
3. What is More adapted breeds of chickens in your locality
    a. Sasso b. Issa brown c. Rhode Island Red d. Bovans brown e. Rhode Island White
4. What is Criteria for adaptability of chickens in your locality?

Criteria for adaptability	Rank
Disease resistance	
Low predation	
Productive in adverse condition of feed shortage	
Survive in high and low temperature extreme	

V. Management systems

1. What types of housing do you use?

a. Traditional with main house b. separate house

2. What is Type of materials used to construct chicken house?
    a. Stone made with grass roof b. Stone made with corrugated iron c. Wood made with grass roof d. Wood made with corrugated roof

3. What are Housing facilities you have used?
   a. Provision of electricity b. provision of adequate ventilation facilities c. litter materials used
4. What is Reasons for housing?
   a. To protect from thieves, predator and rough weather b. to provide shelter for egg laying c. at any time
5. Frequency of cleaning house
   a. Daily b. once a day c. twice a day d. thrice a week
6. What types of heating systems do you use?

a. No b. electricity c. gas d. coal

7. Where do you get water for your chickens?
   a. Ground water b. Borehole c. Stand pipe d. river
8. At what intervals do you provide water to your chicken during dry season?
   a. At any time b. once a day c. twice a day d. more than twice a day
9. At what intervals do you provide water to your chicken during wet season?
   a. At any time b. once a day c. twice a day d. more than twice a day e. not provided
10. What is watering materials used to drink your chickens?
    a. Plastic trough b. clay trough c. wooden trough
11. Frequency of cleaning watering and feeding trough
    a. every day b. never cleaned,
12. Where do you get feed for your chickens?
    a. Natural b. local feed c. local + natural feed d. commercial feed e. local + commercial feeds
13. What types of feeds do you use to your birds?

a. Grain b. mash c. pellet d. mixed

14. Frequency of feeding

a. Morning, afternoon and evening b. Any time during the day c. Morning and afternoon d. Morning and evening e. Afternoon only f. Morning only g. Evening only h. No feeding

15. How to practice feeding your chicken?
    a. Throw on the ground b. on feeding through
16. What is feeding materials used to feed your chickens?
    a. Plastic trough b. clay trough c. wooden trough
17. Where do your chickens roost on?
    a. On the tree b. in the house
18. Where do you purchase these feeds?
    a. Local made b. locally via agents c. local markets d. import directly.
19. How many kg of feed do you give per flock per day?
    a. 1-3 kg b. 4-6kg c. 7-9 kg d. 10-12 kg e. above 12 kg
20. What are potential available feed in your place?
    a. Maize b. barley c. wheat bran d. home left over
21. Have you practiced supplementary feeding to your chickens?
    a. Yes b. No

22. What are the most supplementary feeds in your locality?
    a. Maize b. barley c. wheat bran d. sorghum
23. How do you practice supplementary feeding to your chicken?
    a. Separate to different classes b. Together for the whole group
24. What are the factors that limit the use of local available feeds?
    a. Demand of feed increased b. less interest of farmers c. drought
25. In which seasons of the year faced feed shortage to your chickens?
    a. Rainy season b. dry season c. after rainy season
26. What are Problems associated with feed shortage?
    a. Cease of egg production b. Body weight loss c. Increased in mortality rate d. Cannibalism

27. Do you practice culling in your flock?
    a. Yes b. No
28. What are Ways of Culling?
    a. By selling b. by consuming at home
29. What are the reasons for culling?
    a. Poor production performance b. sickness c. chickens with physical problem d. old age
30. What diseases are of importance in your farm?
    a.Coccidiosis b. Newcastel Disease (NCD) c. fowl pox d. ecto-parasite
    30. Disease of symptoms

a. Loss of appetite 0.5 5.0 0.5 6.0 b. Diarrhea 6.0 15.0 1.0 22.0 c. Dullness and roughling feathers 9.0 39.0 2.5 50.5 d. Dropping of wings and heads 0.0 1.5 1.0 2.5
Circling and paralysis

30. what are the main source of the disease
a. Incoming flock's b. own flocks
31. do you vaccinate your chickens?
a. Yes b. No

31. During which seasons of the year do these diseases occured the most?
    a. Rainy season b. before rainy season c. after rainy season d. dry season
32. How many chickens die per year?
    a. 3-5 chickens b. 6-10 chickens c. 11-15 chickens d. 16-20 chicken e. > 20 chickens
33. Which age group is the most affected?
    a. Day-old chicks b. Young chickens c. old chickens d. mixed
34. How do you treat when your chicken sick?
    a. Treat with ethno veterinary practices b. Takes to veterinary center c. no control
35. What are ethno veterinary medicines used to treat your chickens?
    a. Lemon (*Citrus)* b. nechshinkurt (*Allium sativum*) c. feto (*Brassica* spp.) d. genger

34. What do you do dead chickens?
a. buried b. left to dog

35. what are predators which prey your chickens?
a. vulture b. fox c. cats d. cullule

36. Do you use any disinfectants in your farm?
    a. Yes b. no

VI. Production performances of exotic chickens

1. How do you rate the performances of exotic chicken?
   a. Very good b. good c. not good d. no ideas
2. What is age at first female sexual maturity your chickens?
   a. 90-120 days b. 130-150 days c. 160-180 days d. above 180 days
3. What is age at first male sexual maturity your chickens?
   a. 90-120 days b. 130-150 days c. 160-180 days d. above 180 days
4. the average length egg-laying period/hen 105 days/year
   a. 90-120 days b. 130-150 days c. 160-180 days d. above 180 days
5. average egg production per year per hen of exotic chicken 148.2
   a. 120-150 eggs b. 160-190 eggs c. 200-230 eggs d. above 230 eggs
6. average egg production per clutch per hen of exotic chicken 45.2
   a. 30-40 b. 41-50 c. 51-60 d. above 60
7. How many eggs your families consume?

Eggs _____ (%).

8. How many eggs you used for the sale?

Eggs _____(%) .

9. How often do you collect eggs per day?
   a. Once b. twice c. more than twice
10. Where do you store eggs before being sold?
    a. In the pot b. in the dish c. in the basket
11. In which seasons of the year do you get maximum egg production in your farm?
    a. Rainy seasons b. dry seasons c. both
12. In which seasons of the year do you get minimum egg production in your farm?
    a. Rainy seasons b. dry seasons c. both

G. Marketing (Products and production input)

1. Do you have market access to buy poultry production inputs?
   a. Yes b. No
2. Where do you buy poultry production inputs?
   a. NGO b. Government c. Retailer d. Private companies
3. Do you have market access for your poultry products?
   a. Yes b. No
4. When do you sell your poultry products? (Time of selling)

a. Specific wt. gain/age of chicken b. Personal money requirement c. During holydays and festivals

5. To whom are you selling your poultry products?

a. Village market b. Local shopkeepers c. selling at own doorstep d. Retailer e. Whole sellers

6. Which breed type meat is most preferred by consumers?

a. Meat from improved breed b. Meat from local chicken c. equally preferred by consumers

7. Write your reasons for Q.7 responses? _____
_____

9. Which breed type egg is most preferred by consumers?

a. Eggs from improved breed b. Eggs from local chicken c. equally preferred

10. Write your reasons for Q.9 responses

VII. Extension services

1. Where do you purchase your drugs and vaccines?
   a. Development agents b. government c. imported d. local marke
2. Do you have access to the extension service?
   a. Yes b. No
3. What kind of extension workers provide services to you?
   a. No b. villagers' c Government d. NGOs e. private company
4. How frequently do you see the extension agent?
   a. Once in a week b. Once in two weeks c. Once in a month d. Not Seen
5. Do you discuss your production problems with extension agents?
   a. Yes b. No
6. Did you receive any management systems exotic chicken training recently?
   a. Yes b. No
7. When do you get training of poultry management?
   a. Before starting poultry production b. after starting poultry production
8. By whom did you receive?
   a. Villagers' b. Government c. NGOs d. Private company
9. Did you get credit service when you start poultry production? 1. Yes 2. No
10. If yes, for what purpose did use the credit? a. Day old chicks b. Poultry feed c. Poultry equipment d. pullets and cockerels
11. How did you rate effectiveness of services provided by extension worker?
    a. Excellent b. very good c. good d. poor
12. What you will suggest options to improve poultry production?

a. Suggestion options	Rank
Cost of improved chicks should be affordable	
Government should provide vaccination	
Training on poultry rearing practices	
Supply of electricity and clean water	
Poultry farmers associations (Cooperatives)	

VIII. Challenges and opportunity of exotic chicken production.

1. What are the major challenges of exotic chicken production?

a. Challenges of exotic chicken production	Rank
Disease	
Scarcity of feed	
Extension problems	
Poor adaptability	
Predators	
market problem	

b. Opportunity of exotic chicken production	Rank
Market access	
Feed access	
Extension service	
Veterinary service	